3001 MULTIPLE CHOICE QUESTIONS in ELECTRONICS ENGINEERING

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PART 1:

COMPILED QUESTIONS PER TOPIC

CHAPTER 1: ELECTRICITY AND MAGNETISM FUNDAMENTALS

1. Who discovered the relationship between magnetism and electricity that serves as the foundation for the theory of electromagnetism?
   A. Luigi Galvani
   B. Hans Christian Oersted
   C. Andre Ampere
   D. Charles Coulomb

2. Who demonstrated the theory of electromagnetic induction in 1831?
   A. Michael Faraday
   B. Andre Ampere
   C. James Clerk Maxwell
   D. Charles Coulomb

3. Who developed the electromagnetic theory of light in 1862?
   A. Heinrich Rudolf Hertz
   B. Wilhelm Rontgen
   C. James Clerk Maxwell
   D. Andre Ampere

4. Who discovered that a current-carrying conductor would move when placed in a magnetic field?
   A. Michael Faraday
   B. Andre Ampere
   C. Hans Christian Oersted
   D. Gustav Robert Kirchhoff

5. Who discovered the most important electrical effects which is the magnetic effect?
   A. Hans Christian Oersted
   B. Sir Charles Wheatstone
   C. Georg Ohm
   D. James Clerk Maxwell

6. Who demonstrated that there are magnetic effects around every current-carrying conductor and that current-carrying conductors can attract and repel each other just like magnets?
   A. Luigi Galvani
   B. Hans Christian Oersted
   C. Charles Coulomb
   D. Andre Ampere

7. Who discovered superconductivity in 1911?
   A. Kamerlingh Onnes
   B. Alex Muller
   C. Geory Bednorz
   D. Charles Coulomb

8. The magnitude of the induced emf in a coil is directly proportional to the rate of change of flux linkages. This is known as
   A. Joule's Law
   B. Faraday's second law of electromagnetic induction
   C. Faraday's first law of electromagnetic induction
   D. Coulomb's Law

9. Whenever a flux inking a coil or current changes, an emf is induced in it. This is known as
   A. Joule's Law
   B. Coulomb's Law
   C. Faraday's first law of electromagnetic induction
   D. Faraday's second law of electromagnetic induction

10. The force of attraction or repulsion between two magnetic poles is directly proportional to their strengths.
    A. Newton's first law
    B. Faraday's first law of electromagnetic induction
    C. Coulomb's first law
    D. Coulomb's second law

11. The force of attraction or repulsion between two magnetic poles is inversely proportional to the square of the distance between them. This is known as
    A. Newton's first law
    B. Faraday's first law of electromagnetic induction
    C. Coulomb's first law
    D. Coulomb's second law

12. Whenever a conductor cuts magnetic flux, an emf is induced in it. This is known as
    A. Coulomb's law
    B. Joule's law
    C. Faraday's law
    D. Ohm's law

13. A law that states that the polarity of the induced voltage will oppose the change in magnetic flux causing the induction.
    A. Joule's law
    B. Faraday's law
    C. Coulomb's law
    D. Lenz' law

14. A law that states that the current in a thermionic diode varies directly with the three-halves power of anode voltage and inversely with the square of the distance between the electrodes, provided operating conditions are such that the current is limited only by the space charge.
    A. Hall's law
    B. Joule's law
    C. Child's law
    D. Coulomb's law

15. States that the ratio of the thermal conductivity is proportional to the absolute temperature for all metals.
    A. Wien's displacement law
    B. Hartleys law
    C. Hall's law
    D. Wiedemann Franz law

16. A law establishing the fact that the algebraic su of the rises and drops of the mmf around a closed loop of a magnetic circuit is equal to zero.
    A. Kirchhoff's circuital law
    B. Maxwell's circuital law
    C. Ampere's circuital law
    D. Coulomb's circuital law

17. The net electrical charge in an isolated system remains constant. This is known as
    A. Law of conservation of charge
    B. Coulomb's first law
    C. Coulomb's second law
    D. Law of conservation of energy

18. Lenz's law is the consequence of the law of conservation of
    A. Energy
    B. Charge
    C. Field lines
    D. Momentum

19. Lenz' law states that the direction of the induced emf and hence current
    A. Is determined by the rate of current flux
    B. Is found by the right hand rule
    C. Is found by the left hand rule
    D. Always opposes the cause producing it

20. If you hold the conductor with right hand so that the stretched thumb points in the direction of the current, then encircling fingers will give the direction of magnetic lines of force round the conductor. This is known as
    A. Left hand cork screw rule
    B. Right hand cork screw rule
    C. Left hand rule
    D. Right hand rule

21. If the right handed bottle-opener cork screw is assumed to be along the conductor so as to advance in the direction of current flow, the motion of its handle will indicate the direction of magnetic flux produced around the conductor. This is known as
    A. Right hand rule
    B. Left hand rule
    C. **Cork screw rule**
    D. End rule

22. If on looking at any one end of a solenoid; the direction of current flow is found to be clockwise then the end under observation is a south pole. This is known as
    A. Right hand rule
    B. Left hand rule
    C. Cork screw rule
    D. End Rule

23. If the solenoid is gripped by the right hand with the fingers pointing the direction of current flow, the outstretched thumb will then point the north pole. This is known as
    A. Right hand rule
    B. **Helix rule**
    C. End rule
    D. Cork screw rule

24. The process by which an emf and hence current is generated or induced in a conductor when there is a change in the magnetic flux linking the conductor is called
    A. **Electromagnetic induction**
    B. Mutual induction
    C. Faraday's law
    D. Electromagnetic interference

25. The emf induced in a coil due to the change of its own flux linked with it is called
    A. Mutually induced emf
    B. Dynamically induced emf
    C. Statically induced emf
    D. **Self induced emf**

26. The emf induced in a coil due to the changing current of another neighboring coil is called
    A. Mutually induced emf
    B. Self induced emf
    C. Statically induced emf
    D. Dynamically induced emf

27. When a conductor is stationary and the magnetic field is moving or changing the emf induced is called
    A. Statically induced emf
    B. Mutually induced emf
    C. Self induced emf
    D. Dynamically induced emf

28. The magnetic potential in a magnetic circuit can be measured in terms of
    A. Mmf
    B. Emf
    C. Farad
    D. Coulomb

29. A substance that attracts pieces iron
    A. Conductor
    B. Semiconductor
    C. Magnet
    D. All of the above

30. The phenomenon by which a subtracts pieces of iron
    A. Magnetism
    B. Electromagnetism
    C. Naturalism
    D. Materialism

31. Which of the following is a natural magnet?
    A. Steel
    B. Magnesia
    C. Lodestone
    D. Soft iron

32. Define as that pole which when placed in air from a similar and equal pole repels it with a force of newtons
    A. North pole
    B. South pole
    C. **Unit pole**
    D. Magnetic pole

33. The point in a magnet where the intensity of magnetic lines of force is maximum
    A. **Magnetic pole**
    B. South pole
    C. North pole
    D. Unit pole

34. The straight line passing through the two poles of magnet is called
    A. Real axis
    B. Cartesian axis
    C. **Magnetic axis**
    D. Imaginary axis

35. The branch of Engineering which deals with the magnetic effect of electric current is known as
    A. Magnetism
    B. **Electromagnetism**
    C. Electrical engineering
    D. Electronics engineering

36. The space outside the magnet where its pole have a force of attraction or repulsion on a magnetic pole is called
    A. **Magnetic field**
    B. Electric field
    C. Electromagnetic field
    D. Free Space Field

37. The total number of magnetic lines of force in a magnetic field is called
    A. **Magnetic flux**
    B. Magnetic flux density
    C. Magnetic flux intensity
    D. Magnetic potential

38. The phenomenon by which a magnetic substance becomes a magnet when it is place near a magnet
    A. Magnetic effect
    B. Magnetic phenomenon
    C. **Magnetic induction**
    D. Electromagnetic induction

39. Which of the following magnetic materials can be easily magnetized in both direction?
    A. **Soft magnetic materials**
    B. Hard magnetic materials
    C. High hysteresis loss materials
    D. Low hysteresis loss materials

40. Which of the following materials has permeability slightly less than that of free space?
    A. Paramagnetic
    B. Non- magnetic
    C. Ferromagnetic
    D. **Diamagnetic**

41. Materials whose permeabilities are slightly greater than that of free space
    A. **Paramagnetic**
    B. Non- magnetic
    C. Ferromagnetic
    D. Diamagnetic

42. Materials that have very high permeabilities (hundreds and even thousands times of that of free space)
    A. Paramagnetic
    B. Non- magnetic
    C. **Ferromagnetic**
    D. Diamagnetic

43. The current of electric circuit is analogous to which quantity of a magnetic circuit
    A. Mmf
    B. **Flux**
    C. Flux density
    D. Reluctivity

44. What is the diameter of an atom?
    A. **About 10^-10 m**
    B. About 10^-10 cm
    C. About 10^-10 mm
    D. About 10^-10 μm

45. Defined as a closed path in which magnetic induction or flux flows
    A. Electric circuit
    B. **Magnetic circuit**
    C. Electronic circuit
    D. Electromagnetic circuit

46. The force which set ups or tends to set up magnetic flux in a magnetic circuit
    A. Dynamic force
    B. Electromotive force
    C. Potential difference
    D. **Magnetomotive force**

47. Referred to as the specific reluctance of a material
    A. Resistivity
    B. **Reluctivity**
    C. Conductivity
    D. Permeability

48. The property of a material which opposes the creation of magnetic flux in it
    A. Resistance
    B. **Reluctance**
    C. Permeance
    D. Conductance

49. It is the reciprocal of reluctance and implies the case of readiness with which magnetic flux is developed.
    A. Resistance
    B. Conductance
    C. **Permeance**
    D. Inductance

50. The ability of a material to conduct magnetic flux through it.
    A. Permittivity
    B. Reluctivity
    C. Conductivity
    D. **Permeability**

51. The ratio of the permeability of material to the permiabiity of air or vacuum.
    A. **Relative permeability**
    B. Relative permittivity
    C. Relative conductivity
    D. Relative reluctivity

52. Permeance is analogous to
    A. **Conductance**
    B. Reluctance
    C. Admittance
    D. Resistance

53. The property of magnetic materials of retaining magnetism after withdrawal of the magnetizing force is known as
    A. **Retentivity**
    B. Reluctivity
    C. Resistivity
    D. Conductivity

54. The quantity of magnetism retained by a magnetic material after withdrawal of the magnetizing force is called
    A. Leftover magnetism
    B. Hysteresis
    C. **Residual magnetism**
    D. Coercivity

55. The amount of magnetizing force to counter balance the residual magnetism of a magnetic material is referred to as
    A. Reluctivity
    B. Susceptivity
    C. **Coercivity**
    D. Retentivity

56. The ratio of the total flux (flux in iron path) to the useful flux (flux in air gap)
    A. Leakage flux
    B. Leakage current
    C. Leakage coefficient
    D. Leakage factor

57. Defined as the number of lines per unit area through any substance in a plane at right angles to the lines of force
    A. Flux
    B. Flux lines
    C. Flux density
    D. Flux intensity

58. Defined as the flux density produced in it due to its own induced magnetism
    A. Magnetic field intensity
    B. Electric field intensity
    C. Electromagnetic field intensity
    D. Intensity magnetization

59. The force acting on a unit n- pole placed at that point is called
    A. Magnetic field intensity
    B. Electric field intensity
    C. Electromagnetic field intensity
    D. Intensity magnetization

60. The ratio between the intensity of magnetization produced in a substance to the magnetizing force producing it
    A. Magnetic Reluctivity
    B. Magnetic Resistivity
    C. Magnetic susceptibility
    D. Magnetic conductivity

61. The lagging effect between flux density of the material and the magnetizing force applied
    A. Permeance
    B. Eddy current
    C. Hysteresis
    D. Reluctance

62. Refers to the magnetic lines
    A. **Flux**
    B. Hysteresis
    C. Current
    D. Magnetomotive force

63. Refers to the non- metallic materials that have the ferromagnetic properties of iron.
    A. **Ferrites**
    B. Ferromagnetic
    C. Diamagnetic
    D. Paramagnetic

64. The air space between poles of magnets
    A. **Air gap**
    B. Free space
    C. Vacuum
    D. Atmosphere

65. One that has magnetic poles produced by internal atomic structure with no external current necessary
    A. Diamagnetic
    B. **Permanent magnets**
    C. Paramagnetic
    D. Electromagnetic

66. Magnetic effects of the earth as a huge magnet with north and south poles.
    A. Diamagnetic
    B. Ferromagnetic
    C. **Terrestrial magnetism**
    D. Terrestrial ferromagnetism

67. Used to maintain strength of magnetic field
    A. Container
    B. Air gap
    C. **Keeper**
    D. Source

68. All magnetic field originates from
    A. **moving electric charge**
    B. Iron atoms
    C. Magnetic domain
    D. Permanent magnets

69. Magnetic fields do not interact with
    A. Moving permanent magnets
    B. Stationary permanent magnets
    C. Moving electric charges
    D. **Stationary electric charges**

70. The magnetic field inside a solenoid
    A. is zero
    B. **is uniform**
    C. increases with distance from the axis
    D. decreases with distance from the axis

71. When the ferromagnetic substance is inserted in a current- carrying solenoid, the magnetic field is
    A. Greatly decreased
    B. **Greatly increased**
    C. Slightly decreased
    D. Slightly increased

72. The magnetic field of a bar magnet most closely resembles the magnetic field of
    A. a horseshoe magnet
    B. a straight current- carrying wire
    C. a stream of electrons moving parallel to one another
    D. **a current- carrying wire loop**

73. The magnetic field of a magnetized iron bar when strongly heated
    A. **Becomes weaker**
    B. Becomes stronger
    C. Reverses in direction
    D. is unchanged

74. A permanent magnet does not exert a force on
    A. an unmagnetized iron bar
    B. a magnetized iron bar
    C. a moving electric charge
    D. a stationary electric charge

75. A current if flowing east along a power line. If the earth's field is neglected, the direction of the magnetic field below it is
    A. North
    B. South
    C. East
    D. West

76. The emf produced in a wire by its motion across a magnetic field does not depend upon the
    A. Diameter of the wire
    B. Length of the wire
    C. Orientation of the wire
    D. Flux density of the field

77. The induced emf in a wire loop that is moved parallel to a uniform magnetic field is
    A. Zero
    B. Dependent on the area of the loop
    C. Dependent on the shape of the loop
    D. Dependent on the magnitude of the field

78. When a wire loop is rotated in a magnetic field the direction of the induced emf changes one in every _____ revolution
    A. 1/3
    B. 1/2
    C. 1/4
    D. 2/3

79. The magnetic flux through a wire loop in a magnetic field does not depend on
    A. The area of the loop
    B. The magnitude of the field
    C. The shape of the loop
    D. The angle between the plane of the loop and the direction

80. Steel is hard to magnetize because of its
    A. **Low permeability**
    B. High permeability
    C. High density
    D. High retentivity

81. Paramagnetic substance has a relative permeability of
    A. Slightly less than one
    B. Equal to one
    C. **Slightly equal to one**
    D. Very much greater than one

82. A group of magnetically aligned atoms is called
    A. Range
    B. Lattice
    C. **Domain**
    D. Crystal

83. The force between two magnetic poles varies with the distance between them. The variation is _____ to the square of that distance.
    A. Equal
    B. Greater than
    C. Directly proportional
    D. **Inversely proportional**

84. Permeability means
    A. **The conductivity of the material for magnetic lines of force**
    B. The magnetization test in the material after exciting field has been removed
    C. The strength of an electromagnet
    D. The strength of the permanent magnet

85. _____ is an electromagnet with its core in the form of a close magnetic ring.
    A. Solenoid
    B. Paraboloid
    C. **Toroid**
    D. Cycloid

86. A magnetic material losses its ferromagnetic properties at a point called
    A. **Curie temperature**
    B. Inferred absolute temperature
    C. Room temperature
    D. Absolute temperature

87. Small voltages generated by a conductor with current in an external magnetic field.
    A. Skin effect
    B. Magnetic effect
    C. **Hall effect**
    D. Flywheel Effect

88. The emission of electrons from hot bodies is called
    A. Radiation effect
    B. **Edison effect**
    C. Skin effect
    D. Half effect

89. The ability of a mechanically stressed ferromagnetic wire to recognize rapid switching of magnetization when subjected to a dc magnetic field.
    A. Wartheim effect
    B. Wiedemann effect
    C. **Wiegand effect**
    D. Edison effect

90. An effect which is generally used in the gausameter to measure flux density.
    A. Skin effect
    B. Magnetic effect
    C. **Hall effect**
    D. Flywheel effect

91. The contribution to the ionization in an ionization chamber by electrons liberated from the walls.
    A. Skin effect
    B. **Walt effect**
    C. Hall effect
    D. Edison effect

92. The tiniest element of matter
    A. **Atom**
    B. Proton
    C. Electron
    D. Neutron

93. All matters (gas, liquid and solid) are composed of
    A. Neutrons
    B. Particles
    C. Electrons
    D. **Atoms**

94. The simplest type of atom to exist is the _____ atom.
    A. Helium
    B. **Hydrogen**
    C. Boron
    D. Oxygen

95. What revolves about the positive nucleus in a definite orbit?
    A. Atom
    B. Proton
    C. **Electron**
    D. Neutron

96. The uncharged particles which have no effect on its atomic charge.
    A. Nucleons
    B. Electrons
    C. Protons
    D. **Neutrons**

97. The diameter of a hydrogen atom is approximately _____ cm.
    A. 1.1 x 10^-6
    B. 1.1 x 10^-7
    C. **1.1 x 10^-8**
    D. 1.1 x 10^-9

98. The K shell or the first shell has how many permissible number of orbiting electrons?
A. 1
B. 2
C. 3
D. 4

99. Germanium atom has _____ protons and _____ electrons.
A. 32, 32
B. 32, 42
C. 42, 32
D. 34, 34

100. A germanium atom has an atomic weight of 72. How many neutrons are there?
A. 32
B. 40
C. 34
D. 36

101. How many neutrons does a copper atom have?
A. 32
B. 33
C. 34
D. 29

102. Bonding of atoms that is due to the force of attraction between positive ions and a group of negative ions
A. Ionic bond
B. Covalent Bond
C. Electrostatic Bond
D. Metallic bond

103. An alloy of 22 percent iron and 78 per cent nickel.
A. Permalloy
B. Alnico
C. Constantan
D. Manganin

104. An alloy of 40 percent iron and 60 percent nickel.
A. Alnico
B. Permalloy
C. **Hipernik**
D. Manganin

105. A commercial alloy of aluminum nickel, and iron with cobalt, copper and titanium added to produce about 12 grades.
A. **Alnico**
B. Brass
C. Aluminum
D. Constantan

106. The idea of preventing one component from affecting another through their common electric and magnetic field is referred to as
A. Hall effect
B. Grounding
C. **Shielding**
D. Limiting

107. The physical motion resulting from the forces of magnetic fields is called
A. **Motor action**
B. Rotation
C. Repulsion
D. Torque action

108. Flux linkages equals
A. Flux times area of core
B. Flux times number of turns times area of core
C. Flux times number of turns times length of core
D. **Flux times number of turns**

109. Which of the following is a vector quantity?
A. Magnetic potential
B. **Magnetic field intensity**
C. Magnetic permeability
D. Flux density

110. Which of the following electric quantities is vector in character?

A. Field

B. Charge

C. Energy

D. Potential Difference

111. The quantity 10^6 maxwells is equivalent to one

A. Weber

B. Gauss

C. Gilbert

D. Tesla

112. What is the unit of reluctance?

A. Maxwell

B. Gauss

C. At/Wb

D. Weber

113. What is the SI unit of magnetic flux?

A. Tesla

B. Weber

C. Maxwell

D. Gauss

114. What is the unit of magnetomotive force?

A. Volt

B. Tesla

C. Ampere- turn

D. Weber

115. What is the cgs unit of magnetomotive force?

A. Gilbert

B. Ampere- turn

C. Maxwell

D. Weber

116. The unit of flux is _____ in cgs system.
A. Tesia
B. Gilbert
C. **Maxwell**
D. Oersted

117. Flux density is measured in
A. **Tesia**
B. Weber
C. Ampere- turn
D. Maxwell

118. The customary energy unit in atomic and nuclear physics is
A. Joule
B. Volt- coulomb
C. **electron-volt**
D. Walt- second

119. One ampere- turn is equivalent to _____ gilberts
A. 1.16
B. **1.26**
C. 1.36
D. 1.46

120. The magnetic flux of 2000 lines is how many Maxwells?
A. 1000
B. **2000**
C. 4000
D. 8000

121. How much is the flux in Weber in the above problem?
A. **2 x 10^-5**
B. 2 x 10^-3
C. 2 x 10^5
D. 2 x 10^3

122. One oersted (Oe) is equivalent to _____ Gb/cm.

A. **1**
B. 10
C. 100
D. 1000

123. One electron volt (1 eV) is equivalent to _____ joules

A. 1.3 x 10^-19
B. 1.4 x 10^-19
C. 1.5 x 10^-19
D. **1.6 x 10^-19**

124. An electron- volt (eV) is a unit of

A. **Energy**
B. Potential difference
C. Charge
D. Momentum

125. The unit of electrical energy is

A. Joule
B. Watt- second
C. Kilowatt- hour
D. **All of these**

126. Electrons at the outer shell are called

A. Outer shell electrons
B. Inner shell electrons
C. Semiconductor electrons
D. **Valence electrons**

127. Which of the following has the least number of valence electrons?

A. **Conductor**
B. Semiconductor
C. Insulator
D. Semi- insulator

128. A good conductor has how many valence electrons?

A. 1

B. 4

C. 2

D. 8

129. Which element has four valence electrons?

A. Conductor

B. Insulator

C. Semiconductor

D. Semi- insulator

130. A negative ion results when an atom gains an additional

A. Electron

B. Proton

C. Neutron

D. Atom

131. An atom or a group of atoms that carries a net electric charge.

A. Positive ion

B. Negative ion

C. Ion

D. Electron

132. Hysteresis refers to the _____ between flux density of the material and the magnetizing force applied.

A. Leading effect

B. Ratio

C. Equality

D. Lagging effect

133. Hydrogen is an example of a _____ material.

A. Paramagnetic

B. Diamagnetic

C. Ferromagnetic

D. Non- magnetic

134. Cobalt is an example of a _____ material.
A. Paramagnetic
B. Diamagnetic
C. **Ferromagnetic**
D. Non- magnetic

135. The evaporation of electrons from a heated surface is called
A. Radiation
B. Convection
C. **Thermionic emission**
D. Conduction

136. Electron is a Greek word for
A. **amber**
B. Fire
C. Stone
D. Heat

137. Gases whose particles are charged are known as
A. Conductors
B. Insulators
C. Gaseous Conductors
D. **Plasma**

138. What principle states that each electron in an atom must have a different set of quantum numbers?
A. Inclusion principle
B. **Exclusion principle**
C. Quantum principle
D. Electron principle

139. The energy stored in an electrostatic field or electromagnetic field is called
A. Electromagnetic energy
B. Kinetic energy
C. **Potential energy**
D. Rest energy

140. Which of the following statements is TRUE?
A. Silicon dioxide is a good
B. **The current carriers in conductors are valence electrons**
C. For conductors, the valence electron are strongly attracted to the nucleus
D. The valence electrons are located in the nucleus of an atom

141. How many electrons are needed in the valence orbit to give a material's stability?
A. **8**
B. 4
C. 6
D. 5

142. Residual magnetism refers to the flux density, which exists in the iron core when the magnetic field intensity is
A. Minimized
B. **Reduced to zero**
C. Maximize
D. Unity

143. Magnetic intensity is a
A. Phasor quantity
B. Physical quantity
C. Scalar quantity
D. **Vector quantity**

144. The core of a magnetic equipment uses a magnetic material with
A. Least permeability
B. Low permeability
C. Moderate permeability
D. **High permeability**

145. Which of the following is a paramagnetic material?
A. Carbon
B. Copper
C. Bismuth
D. **Oxygen**

146. The permeability of permalloy is
A. **Very much greater than permeability of air**
B. Slightly greater than permeability of air
C. Slightly less than permeability of air
D. Equal to the permeability of air

147. A t/m is a unit of
A. Mmf
B. Emf
C. Reluctance
D. **Magnetizing force**

148. The force between two magnetic poles is _____ their poles strength.
A. equal to
B. **directly proportional to**
C. inversely proportional to
D. directly proportional to the square root of

149. The magnetic energy stored in an inductor is _____ current.
A. Directly proportional to
B. Inversely proportional to
C. **Directly proportional to the square of**
D. Inversely proportional to the square of

150. One of the common application of an air- cored choke.
A. **Radio frequency**
B. Audio frequency
C. Power supply
D. Power transformer

151. How is mutual inductance between two coils decreased?
A. By using a common core
B. By moving the coils closer
C. **By moving the coils apart**
D. By increasing the number of turns of either coil

152. A magnetic field is
A. The current flow through space around a permanent magnet
B. **The force set up when current flows through a conductor**
C. The force that drives current through a resistor
D. The force between the plates of a charged capacitor

153. Ohm's law can be used only to a _____ circuit or component.
A. Unilateral
B. Exponential
C. Trivalent
D. **Linear**

154. When the current flows, the magnetic field ……. conductor is in what direction?
A. The same as the current direction
B. Opposite the current direction
C. Omnidirectional
D. **In the direction determined by the left hand rule**

155. The magnetic field around the conductor is determined by the
A. Size of the conductor
B. **Amount of current**
C. Current divided by the resistance
D. Resistance divided by the current

156. Back emf refers to the
A. Current equal to the applied emf
B. Opposing emf
C. Current opposing the applied emf
D. **Voltage opposing the applied emf**

157. The magnetic flux through a coil changes. This results to the induced emf acting in a direction as to
A. **Oppose the change**
B. Aid the change
C. Either oppose or aid the change
D. Neither oppose nor aid the change

158. A magnetic flux of 2.5 x10^4 Wb through an area of 5 x10^4 square meters results in
A. 5 Wb
B. **0.5 Tesia of flux density**
C. 5x 10^-5 Wb of flux
D. 5000 Tesia of flux density

159. If a 20 V potential is applied across a relay coil with 50 turns having 1 Ω of resistance, the total magnetomotive producing magnetic flux in the circuit is
A. 10 Wb
B. 50 T
C. 1000 A t/m
D. **1000 A.t**

160. What is the reluctance of a magnetic path having a length of 2x 10^-3m and cross-sectional area of 2.5 x 10^-3 m^2?
A. **6366 A.t/Wb**
B. 6000 A.t/Wb
C. 8x10^-3 A.t/Wb
D. 0.8 A.t/Wb

161. Calculate the permeability (in T/A. t/m) of a magnetic material that has a relative permeability of 300
A. **3.78 x 10^-4**
B. 3.78 x 10^-5
C. 3.78 x 10^-3
D. 3.78 x 10^-6

162. Calculate the flux density that will be produced by the field intensity of 2000 a. t/m for a permeability of 126 x 10^-6 T/A.t/m
A. 0.252 G
B. 0.252 x 10^-2 T
C. **0.252 T**
D. 0.252 x 10^-2 G

163. How many turns are needed to produce a magnetomotive force of 1000 A.t for a coil with 6 amperes?
A. 6000 turns
B. 600 turns
C. **167 turns**
D. 67 turns

164. A 6- V battery is connected across a solenoid of 100 turns having a resistance of 2 **Ω**, Calculate the number of ampere turns?

A. 100

B. 50

C. **300**

D. 600

165. What determines the atomic number of an element?

A. **The number of protons**

B. The number of electrons

C. The number of neutrons

D. The number of neutrons and protons

166. One of the solid structures in which the position of the atoms or ions are predetermined

A**. Crystalline solid**

B. Amorphous solid

C. Polycrystalline solid

D. Poly- amorphous solid

167. Mmf in a magnetic circuit corresponds to _____ in an electric circuit

A. **Emf**

B. Voltage drop

C. Electric Field Intensity

D. Potential gradient

168. What solid has no defined crystal structure except perhaps in the arrangement of the nearest neighboring atoms or ions?

A. Crystalline

B. **Amorphous**

C. Polycrystalline

D. Poly- amorphous

169. Amorphous solid is also called

A. Crystalline

B. **Non- crystalline**

C. Polycrystalline

D. Homogenous

170. A principle that states that only two electrons with different spins are allowed to exist in a given orbit
A. Bohr's principle
B. Pauli exclusion principle
C. Avogadro's principle
D. Coulomb's principle

171. What bond is formed when one or more electrons in the outermost energy orbit of an atom are transferred to another?
A. Ionic
B. Covalent
C. Metallic
D. Van der Waals

172. In electro-mechanical conversion devices like generators and motors the reason why a small air gap is left between the rotor and stator is to
A. permit mechanical clearance
B. increase flux density in air gap
C. decrease the reluctance of magnetic path
D. complete the magnetic path

173. What bond is formed when electrons in the outermost energy orbits of the atoms are shared between two or more electrons?
A. Ionic
B. Covalent
C. Metallic
D. Van der Waals

174. Why is it that the magnitude of magnetomotive force required for air gap is much greater than that required for iron part of a magnetic circuit?
A. Because air is a gas
B. Because air has the highest relative permeability
C. Because air is a conductor of magnetic flux
D. Because air has the lowest relative permeability

175. What type of bond is formed when there exists some form of collective interactions between the (negatively charged) electrons and (positively charged) nuclei in a solid?
A. Ionic
B. Covalent
C. **Metallic**
D. Van der Waals

176. Permeance of a magnetic circuit is _____ the cross-sectional area of the circuit.
A. **directly proportional to**
B. inversely proportional to
C. dependent of
D. independent of

177. Formed when there exist distant electronic interactions between (opposite) charges present in the neighboring atoms or molecules.
A. Ionic bond
B. Covalent bond
C. Metallic bond
D. **Van der Waals bond**

178. Defined as the ratio of the volume occupied by the atoms or ions in a unit cell divided by the volume of the unit cell and is used to measure the compactness of a crystal.
A. **Atomic packing factor (APF)**
B. Ionic Packing Ratio (IPR)
C. Atomic compacting factor (ACF)
D. Ionic compacting ratio (ICR)

179. A factor used to correct for the electrostatic forces of the more distant ions in an ionic solid.
A. Avogadro's number
B. Planck's constant
C. Boltzmann's constant
D. **Madelung constant**

180. The conduction of electricity across the surface of a dielectric is called
A. **creepage**
B. skin effect
C. surface effect
D. crosstalk

181. A magnetic circuit carries a flux φ_i in the iron part and a flux φ_g in the air gap. What is the leakage coefficient?

A. φ_i / φ_g

B. $\varphi_i \times \varphi_g$

C. φ_g / φ_i

D. $\varphi_i + \varphi_g$

182. A law stating that the magnetic susceptibilities of most paramagnetic substances are inversely proportional to their absolute temperatures.

A. Curie's Law

B. Child's Law

C. CR Law

D. Curie-Weiss Law

183. The reluctance of the magnetic circuit is _____ relative permeability of the material comprising the circuit.

A. directly proportional to

B. inversely proportional to

C. independent of

D. dependent of

184. A law relating between the magnetic and electric susceptibilities and the absolute temperatures which is followed b ferromagnets, antiferromagnets, non-polar ferroelectrics, antiferroelectrics and some paramagnets.

A. Curie's Law

B. Child's Law

C. CR Law

D. Curie-Weiss Law

185. Theory of ferromagnetic phenomena which assumes each atom is a permanent magnet which can turn freely about its center under the influence of applied field and other magnets.

A. Ewing's theory of ferromagnetism

B. Oersted's ferromagnetism theory

C. Maxwell's magnetic theory

D. Ampere's circuital law

186. The reluctance of a magnetic circuit varies with
A. length × area
B. area ÷ length
C. length ÷ area
D. length + area

187. A theorem which states that an electric current flowing in a circuit produces a magnetic field at external points equivalent to that due to a magnetic shell whose bounding edge is the conductor and whose strength of the current.
A. Joule's law
B. Faraday's law
C. Volta's theorem
D. Ampere's theorem

188. What is the usual value of leakage coefficient for electrical machines?
A. 0.5 to 1
B. 1 to 5
C. 5 to 10
D. 1.15 to 1.25

189. The science of adapting electronics to aerospace flight.
A. Avionics
B. Aerotronics
C. Aerodynamics
D. Astrionics

190. The reluctance of a magnetic circuit is not dependent on which of the following?
A. Number of turns of coil
B. Magnetomotive force
C. Flux density in the circuit
D. Current in the coil

191. Another term for corona discharge.
A. Lightning
B. Sparking
C. Aurora
D. Corona Effect

192. The B-H curve for _____ is a straight line passing through the origin.
A. cobalt
B. **air**
C. hardened steel
D. soft iron

193. The phenomenon that when an electric current passes through an anisotropic crystal, there is an absorption or liberation of heat due to the non-uniformity in current distribution.
A. **Bridgman effect**
B. Corona effect
C. Dember effect
D. Destriau effect

194. The B-H curve of _____ is not a straight line.
A. air
B. wood
C. silicon steel
D. **soft iron**

195. If a magnetic flux cuts across 200 turns at a rate of 2Wb/s, the induced voltage according to Faraday's law is about
A. **400 V**
B. 100 V
C. 200 V
D. 600 V

196. What is the SI unit of reluctance?
A. At
B. At/m
C. N/Wb
D. **At/Wb**

197. A magnetizing force of 1000 AT/m will produce a flux density of _____ in air.
A. **1.257 mWb/m^2**
B. 0.63 Wb/m^2
C. 1.257 Wb/m^2
D. 0.63 mWb/m^2

198. Hysteresis loss can be reduced by one of the following.
A. Increasing mmf of the circuit
B. **Using material narrow hysteresis loop**
C. Using ferromagnetic core
D. Laminating the magnetic circuit

199. The core of a transformer heats up when its primary is fed from an ac source because of
A. permeability
B. ferromagnetism
C. reluctance of core
D. **hysteresis loss**

200. Which of the following materials has the least hysteresis loop area?
A. soft iron
B. **silicon steel**
C. hard steel
D. wrought iron

201. Core materials of a good relay have _____ hysteresis loop.
A. large
B. **narrow**
C. very large
D. very narrow

202. The magnetic materials should have a large hysteresis loss for one of the following applications.
A. Transformers
B. AC motors
C. **Permanent Magnets**
D. DC generators

203. If the magnetic material is located within a coil through which alternating current (60 Hz frequency) flows, then _____ hysteresis loops will be formed every second.
A. **60**
B. 120
C. 30
D. 180

204. There are how many compounds available in nature?
A. 105
B. 1000
C. 300,000
D. **Unlimited**

205. Hysteresis is a phenomenon of _____ in a magnetic circuit.
A. setting up constant flux
B. lagging of H behind B
C. **lagging B behind H**
D. leading B ahead H

206. What is the measure of the density and sign of the electric charge at a point relative to that at some time?
A. **Electric potential**
B. Electric charge
C. Electric current
D. Electric intensity

207. _____ is a substance of whose molecules consist of the same kind of atom.
A. Mixture
B. Compound
C. **Element**
D. Isotope

208. Hipernik is an alloy containing _____ iron and _____ nickel.
A. **40% ; 60%**
B. 60% ; 40%
C. 50% ; 50%
D. 70% ; 30%

209. The mass of proton is _____ the mass of an electron.
A. equal to
B. **about 1837 times**
C. less than
D. 200 times

210. What is the maximum number of electrons that can be accommodated in the last orbit of an atom?
A. 4
B. 2
C. **8**
D. 18

211. The electrons in the last orbit of an atom are called _____ electrons.
A. free
B. **valence**
C. bound
D. thermionic

212. If the number of valence electrons of an atom is less than 4, the substance is called
A. **a conductor**
B. a semiconductor
C. an insulator
D. a superconductor

213. If the number of valence electrons of an atom is more than 4, the substance is called
A. a semiconductor
B. a conductor
C. **an insulator**
D. a semi-insulator

214. If the number of valence electrons of an atom is exactly 4, then the substance is called
A. **a semiconductor**
B. a conductor
C. an insulator
D. a cryogenic conductor

215. If the number of valence electrons of an atom is less than 4, then the substance is probably
A. **a metal**
B. an insulator
C. a non-metal
D. a semiconductor

216. One coulomb of charge consists of _____ electrons.
A. **624 × 10^16**
B. 62.4 × 10^16
C. 6.24 × 10^16
D. 0.624 × 10^16

217. A one cubic cm of copper has how many free electrons at room temperature?
A. 80 × 10^18
B. **8.5 × 10^22**
C. 20 × 10^10
D. 50 × 10^20

218. Electronic current in a wire is the flow of _____ electrons.
A. **free**
B. valence
C. bound
D. loose

219. Electromotive force in a circuit
A. **causes free electrons to flow**
B. increases the circuit resistance
C. maintains circuit resistance
D. is needed to make the circuit complete

220. The resistance of a material is _____ its area of cross-section.
A. directly proportional
B. independent of
C. **inversely proportional to**
D. equal to

221. If the length and area of cross-section of a wire are doubled, then its resistance
A. becomes four times
B. becomes sixteen times
C. **remains the same**
D. becomes two times

222. A length of wire has a resistance of 10 ohms. What is the resistance of a wire of the same material three times as long and twice the cross-sectional area?
A. 30 ohms
B. 20 ohms
C. **15 ohms**
D. 7 ohms

223. What is the SI unit of specific resistance or resistivity?
A. Ohm-circular mil per inch
B. Ohm-circular mil per foot
C. **Ohm-m**
D. Ohm-cm

224. The resistivity of a conductor _____ with an increase in temperature.
A. **increases**
B. decreases
C. remains the same
D. becomes zero

225. What is the SI unit of conductance?
A. **Siemens**
B. Mhos
C. Ohms
D. 1/Ohms

226. If the resistance of a material 2 m long and 2 m^2 in area of cross-section is 1.6 ×10^-8 **Ω**, then its resistivity is
A. 3.2 × 10^-8 **Ω**-m
B. **1.6 × 10^-8 Ω-m**
C. 0.64 × 10^-8 **Ω**-m
D. 0.16 × 10^-8 **Ω**-m

227. What is the SI unit of conductivity?
A. Ohms/m
B. Ohms-m
C. Siemens-m
D. **Siemens/m**

228. The temperature coefficient of resistance of conductors is
A. **positive**
B. zero
C. negative
D. infinite

229. The temperature coefficient of resistance of semiconductors is
A. positive
B. zero
C. **negative**
D. infinite

230. What determines the value of the temperature coefficient of resistance of a material?
A. length
B. cross-sectional area
C. volume
D. **nature and temperature**

231. The temperature coefficient of resistance of a conductor _____ with an increase in temperature.
A. increases
B. **decreases**
C. remains the same
D. becomes negative

232. The temperature coefficient of resistance of insulators is
A. zero
B. **negative**
C. positive
D. infinite

233. The temperature coefficient of resistance of eureka is
A. positive
B. negative
C. **almost zero**
D. infinite

234. If the value of α_0 a conductor is 1/234 per ^oC, then the value of α_{18} is

A. 1/218 per ^oC

B. 1/252 per ^oC

C. 1/272 per ^oC

D. 1/273 per ^oC

235. If the value of α_{25} a conductor is 1/255 per ^oC, then the value of α_{20} is

A. 1/300 per ^oC

B. 1/250 per ^oC

C. 1/230 per ^oC

D. 1/260 per ^oC

236. If the value of α_{25} of a conductor is 1/230 per ^oC, then the value of α_0 is

A. 1/180 per ^oC

B. 1/150 per ^oC

C. 1/280 per ^oC

D. 1/230 per ^oC

237. Ohm's law cannot be applied to which material?

A. Copper

B. Silver

C. Silicon carbide

D. Aluminum

238. What is the practical unit of electrical energy?

A. Watt

B. Kilowatt-hour

C. Kilowatt-second

D. Megawat-hour

239. A 200-watt lamp working for 24 hours will consume approximately _____ units.

A. 50

B. 5

C. 24

D. 0.5

240. The hot resistance of an incandescent lamp is about _____ its cold resistance.
A. **10 times**
B. 100 times
C. 5 times
D. 50 times

241. Under ordinary conditions, a body is considered
A. positively charged
B. **neutral**
C. negatively charged
D. stable

242. A positively charged body has
A. **deficit of electrons**
B. excess of neutrons
C. excess of electrons
D. deficit of protons

243. A negatively charge body has
A. deficit of electrons
B. excess of protons
C. **excess of electrons**
D. deficit of neutrons

244. This paper does not exhibit electricity because it contains the same number of
A. **protons and electrons**
B. neutrons and electrons
C. neutrons and positrons
D. atoms

245. What is the value of the absolute permittivity of air?
A. 8.854 μF/m
B. 8.854 × 10^-12 mF/m
C. **8.854 × 10^-12 F/m**
D. 8.854 × 10^-12 μF/m

246. What is the relative permittivity of air?
A. 0
B. 1
C. 8.854 × 10^-12
D. 4π × 10^-7

247. If two similar charges 1 coulomb each are placed 1 m apart in air, then the force of repulsion is
A.8 × 10^6 N
B. 9 × 10 ^9 N
C. 10^6 N
D. 5 × 10^6 N

248. If the relative permittivity of a material is 10, then its permittivity is
A. 4π × 10^-7 F/m
B. 4π × 10^-6 F/m
C. 8.854 × 10^-11 F/m
D. 8.854 × 10^-12 F/m

249. The force between two charges placed a given distance apart _____ as the relative permittivity of the medium is increased.
A. increases
B. decreases
C. remains unchanged
D. becomes infinite

250. What is another name for relative permittivity?
A. Dielectric strength
B. Electric intensity
C. Potential gradient
D. Dielectric constant

251. The relation between absolute permittivity of air (ε_0), absolute permeability of air (μ_0) and velocity of light (c) is given by
A. $\mu_0\varepsilon_0 = c^2$
B. $\mu_0\varepsilon_0 = c$
C. $1/\mu_0\varepsilon_0 = c$
D. $1/\mu_0\varepsilon_0 = c^2$

252. The dielectric constant of most materials lies between
   A. 1 and 10
   B. 10 and 20
   C. 20 and 50
   D. 50 and 100

253. A test charge means a charge of
   A. -1 C
   B. 1 electron
   C. +1 C
   D. -20 C

254. Electric lines of force leave or enter the charge surface at an angle of
   A. 30^{o}
   B. 45^{o}
   C. 90^{o}
   D. depending upon the angle of launch and entry

255. Electric field intensity is measured in
   A. volts/meter
   B. Newton/meter
   C. Newton-meter
   D. Amperes/meter

256. Electric field intensity is a _____.
   A. scalar
   B. phasor
   C. vector
   D. variable

257. Electric field intensity at a point due to a given charge _____ if the relative permittivity of the medium decreases.
   A. decreases
   B. remains unchanged
   C. increases
   D. becomes zero

258. The electric field intensity between the parallel plate air capacitor is 20 N/C. If an insulating slab of relative permittivity 5 is placed between the plates, then electric field intensity will be
A. 20 N/C
B. 100 N/C
C. 4 N/C
D. 40 N/C

259. The electric flux density is a _____ quantity.
A. phasor
B. vector
C. scalar
D. variable

260. The permittivity of a material is given by one of the following formulas.
A. DE
B. E/D
C. D^2/E
D. D/E

261. Electric field intensity at a point is numerically equal to _____ at that point.
A. potential gradient
B. potential difference
C. dielectric constant
D. the force

262. Three charges of +5 C, -6 C and +9 C are placed inside a sphere. What is the total flux passing through the surface of sphere?
A. 8 C
B. 14 C
C. 20 C
D. -6 C

263. The potential at a point due to a charge is 15 V. If the distance is increased three times, the potential at the point will be
A. 5 V
B. 18 V
C. 45 V
D. 15 V

264. Electric potential is a _____ quantity.
A. **scalar**
B. phasor
C. vector
D. variable

265. The electric potential at a point in air due to a charge is 21 V. If the air is replaced by a medium of relative permittivity of 3, then electric potential at that point will be
A. 63 V
B. 21 V
C. **7 V**
D. 42 V

266. The electric potential across part AB of a circuit is 5 V; point A being at higher potential. If a charge of 5 C moves from A to B, then energy released as
A. 5 joules
B. **25 joules**
C. 10 joules
D. 100 joules

267. What is the other name for dielectric strength?
A. **Breakdown voltage**
B. Electric intensity
C. Potential gradient
D. Dielectric constant

268. Which of the following materials has the highest dielectric strength?
A. **Glass**
B. Oiled paper
C. Mica
D. Air

269. What is used as the insulating material or dielectric in an electric ion?
A. Oiled paper
B. **Mica**
C. Paraffin
D. Titanate compound

270. What is used as the dielectric material in high voltage transformers?
A. Mica
B. Paraffin
C. **Porcelain**
D. Oiled paper

271. One farad equals
A. **1 coulomb/volt**
B. 1 newton/coulomb
C. 1 newton-meter
D. 1 volt/second/ampere

272. Which of the following is used by permanent magnets as the magnetic material?
A. iron
B. nickel
C. soft steel
D. **hardened steel**

273. Which of the following is used by temporary magnets as the magnetic material?
A. Hardened steel
B. Cobalt steel
C. **Soft iron**
D. Tungsten steel

274. What is the main advantage of temporary magnets?
A. **The magnetic flux can be changed.**
B. Hysteresis can be decreased.
C. Magnetic materials can be used.
D. Abundance of ferromagnetic material that can be temporarily magnetized.

275. Permanent magnets can be found in
A. electric bells
B. **earphones**
C. relays
D. dynamic loudspeakers

276. Temporary magnets are commonly employed in
A. electric instruments
B. **motors**
C. moving coils loudspeakers
D. magnetos

277. The force between two magnetic poles is _____ their pole strengths.
A. **directly proportional to**
B. the sum of
C. inversely proportional to
D. the product of

278. If the distance between two magnetic poles decreases by 2 times, the force between them
A. decreases two times
B. **increases four times**
C. increases two times
D. decreases four times

279. The force between two magnetic poles is _____ the relative permeability of the medium.
A. directly proportional to
B. independent of
C. **inversely proportional to**
D. equal to

280. Two similar poles, each 1Wb, placed 1 m apart in air will experience a repulsive force of
A. **63000 N**
B. 63 × 10^-3 N
C. 8 × 10^12 N
D. 796 kN

281. One weber of flux is equal to _____ magnetic lines of force.
A. 10^6
B. 10^10
C. 4π × 10^7
D. **10^8**

282. The unit of flux density is

A. Wb/m

B. Tesla

C. At/m

D. N/Wb

283. What is the typical saturation flux density for most magnetic materials?

A. 4 Wb/m^2

B. 5 Wb/m^2

C. 1 Wb/m^2

D. 2 Wb/m^2

284. Magnetic field intensity is a _____ quantity.

A. scalar

B. phasor

C. vector

D. variable

285. The force acting on a pole of 5 Wb is 25 N. What is the intensity of the magnetic field?

A. 5 N/Wb

B. 25 N/Wb

C. 125 N/Wb

D. 0.2 N/Wb

286. The relative permeability of a magnetic material is 10^5. What is its permeability?

A. 4π × 10^5 H/m

B. 4π × 10^-12 H/m

C. 4π × 10^-2 H/m

D. 4π × 10^-7 H/m

287. Which of the following has the highest permeability?

A. Soft iron

B. Steel

C. Air

D. Permalloy

288. A magnetic pole produces 5000 field lines. How much is the flux in webers?
A. **50 × 10^-6**
B. 5 × 10^-6
C. 500 × 10^-6
D. 500 × 10^-5

289. As the magnetic intensity decreases, the relative permeability of a magnetic material
A. decreases
B. remains the same
C. **increases**
D. becomes zero

290. The permeability of a material having a flux density of 5 Wb/m^2 is 10^-5 H/m. What is the value of magnetizing force?
A. 5 × 10^-5 N/Wb
B. **500 × 10^3 N/Wb**
C. 4π × 10^-7 N/Wb
D. 4π × 10^7 N/Wb

291. When the relative permeability of a material is slightly less than 1, it is called _____ material.
A. **diamagnetic**
B. ferromagnetic
C. paramagnetic
D. non-magnetic

292. When the relative permeability of a material is slightly more than 1, it is called _____ material.
A. diamagnetic
B. ferromagnetic
C. **paramagnetic**
D. non-magnetic

293. Which of the following is a diamagnetic material?
A. Aluminum
B. Silver
C. **Air**
D. Cobalt

294. Which of the following is a paramagnetic material?
    A. Carbon
    B. Bismuth
    C. Copper
    D. **Oxygen**

295. The greater percentage of materials is _____.
    A. diamagnetic
    B. **paramagnetic**
    C. ferromagnetic
    D. non-magnetic

296. When the relative permeability of a material is much greater than 1, it is called _____ material.
    A. diamagnetic
    B. **ferromagnetic**
    C. paramagnetic
    D. non-magnetic

297. The flux density in an air-cored coil is 10^-3 Wb/m^2. With a cast iron core of relative permeability 100 inserted, the flux density will become
    A. 10^-3 Wb/m^2
    B. 10^-2 Wb/m^2
    C. 10^3 Wb/m^2
    D. **0.1 Wb/m^2**

298. At/m is a unit of
    A. mmf
    B. **magnetic force**
    C. reluctance
    D. magnetic flux density

299. The direction of force o a current carrying conductor placed in a magnetic field can be found by
    A. Cork screw rule
    B. **Fleming's left hand rule**
    C. Fleming's right hand rule
    D. using a compass

300. When a current carrying conductor is placed in a magnetic field, the maximum force will act on the conductor when the conductor is at an angle of _____ to the magnetic field.

A. 45^{o}
B. 60^{o}
C. 30^{o}
D. **90^{o}**

CHAPTER 2: ELECTRICAL CIRCUITS

1. Conventional flow assumes charges flow from
   A. Positive to negative
   B. Positive to positive
   C. Negative to positive
   D. Negative to negative

2. Electron flow assumes charges flow from
   A. Negative to positive
   B. Negative to negative
   C. Positive to negative
   D. Positive to positive

3. Series resonance occurs when
   A. $X_L = X_C$
   B. $X_L = R$
   C. $Z = R$
   D. Both A and C

4. The symbol Q refers to
   A. Resonance quotient
   B. Quality factor
   C. Power quotient
   D. Qualification test

5. The ratio of W/VA in an ac circuit means
   A. Power factor
   B. Reactive factor
   C. Quality factor
   D. Load factor

6. What is the reciprocal of quality factor?
   A. Power factor
   B. Reactive factor
   C. Dissipation factor
   D. 1/Q factor

7. In liquids and gases, ionization current results from a flow of
   A. Positive or negative ions
   B. Free electrons
   C. Ions that are lighter in weight than electrons
   D. Protons

8. $V_L = V_C$ in a series RLC circuit when
   A. The value of the impedance is minimum
   B. The power factor is zero
   C. The current leads the total voltage by 90˚
   D. The total voltage is zero

9. At what frequency will an inductor of 5mH have the same reactance as a capacitor of 0.1 μF?
   A. 7.12 kHz
   B. 7.12 Hz
   C. 7.12MHz
   D. 7.12 GHz

10. Property of an electric circuit that dissipates electric energy
   A. Reactance
   B. Impedance
   C. Resistance
   D. Conductance

11. What is the other name of relative permittivity?
   A. Dielectric strength
   B. Potential gradient
   C. Breakdown voltage
   D. Specific inductance capacity

12. In a series RLC circuit
   A. The current lags V_L by 90˚
   B. The current leads V_L by 90˚
   C. X_L leads X_c by 90˚
   D. $Z = jX_L$ at resonance

13. Resistor with colored bands in the body
    A. Wire-wound resistor
    B. Carbon-composition resistor
    C. Potentiometer
    D. Rheostat

14. In a resonant circuit, if Q ≥ 10 resonant frequency _____ bandwidth.
    A. Bisects
    B. Exceeds
    C. Is less than
    D. Is equal to

15. Which of the following conditions is not true for a series RLC circuit at resonance?
    A. $Z = jX_L$
    B. $X_L = X_C$
    C. The power factor is one
    D. The magnitude of Z is $\sqrt{R^2 + (X_L - X_C)^2}$

16. The current is ____ times the maximum current at half-power points of a resonance curve.
    A. 0.707
    B. 1.414
    C. 0.5
    D. 0.632

17. A gang capacitor is a variable capacitor in which capacitance is varied by changing the
    A. Dielectric
    B. Number of plates
    C. Plate area
    D. Distance between plates

18. In an ac circuit with inductive reactance, the
    A. Phase angle of the circuit is always 45˚
    B. Voltage across the inductance must be 90˚ out-of-phase with the applied voltage
    C. Current through the inductance lags its induced voltage by 90˚
    D. Current through the inductance and voltage across it are180˚ out-of-phase

19. If three 9 mH inductors are connected in parallel without mutual inductance then the total inductance is

A. 3 mH

B. 9 mH

C. 27 mH

D. 18 mH

20. What is the specific resistance of a pure germanium?

A. 55 Ω-cm

B. 55 Ω-m

C. 55 Ω-mm

D. 55 kΩ-m

21. Two capacitors of capacitance 9 μF and 18 μF in series will have a total capacitance of

A. 27 μF

B. 162 μF

C. 6 μF

D. 180 μF

22. In a series RLC circuit

A. Increasing the frequency decreases the resistance

B. Increasing the frequency increases the resistance

C. Both X_L and X_C change as frequency changes

D. Impedance will always decrease

23. A series RLC circuit has a _____ power factor at its half-power points

A. Unity

B. Leading

C. Lagging

D. Either B or C

24. Kirchhoff's laws (KCL and KVL) are applicable to

A. DC circuits

B. AC circuits

C. DC as well as AC circuits

D. Passive networks alone

25. A tank circuit is a
    A. Parallel LC circuit
    B. Series LC circuit
    C. A resonant circuit
    D. A non-resonant circuit

26. A capacitive load always has a _____ power facto
    A. Leading
    B. Lagging
    C. Zero
    D. Unity

27. What is the temperature coefficient of the resistance Eureka?
    A. Infinity
    B. Negative
    C. Almost zero
    D. Positive

28. As applied to a series RLC circuit, bandwidth means
    A. The frequency range for maximum power transfer
    B. The difference between the highest and lowest frequencies of the oscillator
    C. The separation of the half-power points
    D. The frequency at which $X_L = X_C$

29. Which is considered as the effect of a dielectric material?
    A. Increasing capacitance
    B. Decreasing capacitance
    C. Reducing the working voltage
    D. Increasing the distance between the plates

30. The open-circuit voltage at the terminal of load R_L is 60V. Under the condition of maximum power transfer, the load voltage will be
    A. 60 V
    B. 15 V
    C. 20 V
    D. 30 V

31. If a capacitor is rated for 200V dc, what is its effective ac working voltage?
    A. 50 V
    B. 100 V
    C. 200 V
    D. 400 V

32. If resonant frequency is 10 kHz and quality factor is 50, then
    A. Bandwidth is 200 Hz
    B. X_L = is 50,000 Ω
    C. R is 50 Ω
    D. X_C = is 50,000 Ω

33. Which statement is true?
    A. A series resonant circuit is of high impedance
    B. A parallel resonant circuit is of low impedance
    C. A series resonant circuit is inductive if it operates at a frequency higher than the resonant frequency
    D. A parallel resonant circuit is inductive if it operates at a frequency higher than the resonant frequency

34. What is considered as the most important value of a sine wave?
    A. Effective value
    B. Peak value
    C. Average value
    D. Instantaneous value

35. An ac series circuit is composed of a resistance of 20 Ω, inductive reactance of 40 Ω, and a capacitive reactance of 15 Ω. If a current of 1 ampere is flowing, what is the applied voltage
    A. 320 V
    B. 32 V
    C. 220 V
    D. 22 V

36. An intermittent and non-symmetrical alternating current like that obtained from the secondary winding of an induction coil
    A. Faradic current
    B. Transient ac current
    C. Inductive current
    D. Capacitive current

37. The value of temperature coefficient (α) is dependent upon
    A. The nature of material and temperature
    B. The length of material
    C. The cross-sectional area of the material
    D. The volume of the material

38. At what frequency will the current in a series RLC circuit reach its maximum value for an applied voltage of 15 V with R = 500 Ω, L = 100 μH and C = 0.001 μF?
    A. 503 kHz
    B. 403 kHz
    C. 603 kHz
    D. 303 kHz

39. If two equal resistances connected in series across a certain supply are now connected in parallel across the same supply, the power produced will be _____ that of series connection
    A. One-half
    B. One-fourth
    C. Two times
    D. Four times

40. The voltage lags the current by $\frac{\pi}{2}$ cycle in a
    A. Purely resistive circuit
    B. Purely inductive circuit
    C. Purely capacitive circuit
    D. Circuit containing resistance, capacitance and inductance

41. What is the half-power bandwidth of a parallel resonant circuit which has a resonant frequency of 3.6 MHz and Q of 218?
    A. 1.65 kHz
    B. 16.5 MHz
    C. 16.5 kHz
    D. 165 kHz

42. Which one of the following elements serves as a protection against overload?
    A. Fuse
    B. Switch
    C. Resistor
    D. Relay

43. Transient period is considered over after
    A. 5 τ
    B. 1 τ
    C. 100 τ
    D. 6 τ

44. What rating of a resistor determines its ability to absorb heat?
    A. Wattage
    B. Ohmic
    C. Current
    D. Voltage

45. An open inductor has
    A. Zero resistance and infinite inductance
    B. Infinite resistance and zero inductance
    C. Infinite resistance and infinite inductance
    D. Zero resistance and zero inductance

46. What is the reading of an ohmmeter for a shorted capacitor?
    A. Zero
    B. Infinity
    C. k Ω
    D. M Ω

47. What capacitance exists not through design but simply because two conducting surfaces are relatively close to each other?
    A. Surge
    B. Stray
    C. Natural
    D. Normal

48. The average value of a triangular or sawtooth wave is _____ times its peak value.
    A. 0.577
    B. 0.500
    C. 0.318
    D. 0.637

49. A series RLC circuit consists of a 10 Ω resistor in series with L = 10 μH, and C = 100 μF. Determine a new value of I, for which the resonant frequency is one –half the original value.

A. 40 μH

B. 40 mH

C. 40 pH

D. 40 nH

50. What is the peak factor of a triangular wave?

A. 1.16

B. 1.73

C. 1.41

D. 1.11

51. Effects of capacitance

A. It opposes any change in the amount of voltage

B. Voltage is lagged behind the current by a quarter cycle

C. Electric energy is stored in the capacitor in the form of electrostatic field

D. All of the above

52. Points to be considered in choosing a capacitor

A. Working voltage

B. Type of dielectric

C. Capacitance

D. All of the above

53. Permeability is otherwise known as

A. Magnetic conductivity

B. Magnetic susceptibility

C. Electric conductivity

D. Electric susceptibility

54. The impedance in the study of electronics is represented by resistance and

A. Inductance

B. Capacitance

C. Inductance and capacitance

D. Reactance

55. Loop currents should be assumed to flow in which direction
    A. Straight
    B. Clockwise
    C. Counter-clockwise
    D. Either B or C arbitrarily selected

56. What determines the direction of induced emf in a conductor or coil?
    A. Cork screw rule
    B. Fleming's left hand rule
    C. Ampere's circuital law
    D. Fleming's right hand rule

57. The reason why electrical appliances are connected in parallel.
    A. It is a simple circuit
    B. This makes the operation of appliances independent with each other
    C. This results in reduced power consumption
    D. All of the above

58. Which of the following does not affect resistance?
    A. Resistivity
    B. Cross-sectional area
    C. Mass
    D. Length

59. Which of the following is not considered a physical factor affecting resistance?
    A. Length
    B. Material type
    C. Temperature
    D. Cross-sectional

60. A 0.09 microfarad capacitor is charged to 220 volts. How long in milliseconds will it discharged resistor has a resistance of 20,000 ohms?
    A. 1.5
    B. 2.5
    C. 1.25
    D. 0.5

61. A trigger circuit consisting of a capacitor of 0.01 μF is connected in series with a resistor. If the circuit requires 100 V_{dc} to operate, determine the value of the resistor when time constant is 0.009s.
    A. 900 Ω
    B. 900 kΩ
    C. 900 MΩ
    D. 900 GΩ

62. The graph between an alternating quantity and time is called
    A. Sine wave
    B. Curve
    C. Waveform
    D. A plot

63. Which of the following is the most popular waveform?
    A. Sinusoidal
    B. Square wave
    C. Triangular
    D. Sawtooth

64. Which of the following does not refer to electrical energy?
    A. Volt-ampere
    B. Joule
    C. Watt-second
    D. Volt-coulomb

65. What is the resonant frequency of a circuit when L of 25 microhenrys and C of 10 picofarads are in parallel?
    A. 10.1 kHz
    B. 10.1 MHz
    C. 101 MHz
    D. 101 kHz

66. And ideal current source has an internal conductance of _____ siemen(s)
    A. Infinite
    B. One
    C. Zero
    D. One million

67. A capacitance of 6 μμF means
    A. 6 pF
    B. 6 nF
    C. 6 fF
    D. 6 aF

68. The voltage cannot be exactly in phase with the current in a circuit that contains
    A. Only capacitance
    B. Only resistance
    C. Inductance and capacitance
    D. Inductance, capacitance and resistance

69. The charge in the capacitor is stored at the
    A. Terminals
    B. Plates
    C. Dielectric
    D. Air

70. The reactance curve is a plot of frequency versus _____ for a series RLC circuit
    A. Current
    B. Voltage
    C. Gain
    D. Impedance

71. For a series circuit, the higher the quality factor
    A. The greater the bandwidth
    B. The narrower the passband
    C. The broader the resonance curve
    D. The wider the passband

72. "Any resistance R in a branch of a network in which a current I is flowing can be replaced by a voltage equal to IR". This states
    A. Compensation theorem
    B. Reciprocity theorem
    C. Millman's theorem
    D. Superposition theorem

73. The internal resistance of an ideal current source is
    A. Infinite
    B. Zero
    C. Equal to the load resistance
    D. To be determined

74. If three 100-pF capacitors are connected in series, then the total capacitance is
    A. 300 pF
    B. 100 pF
    C. 50 pF
    D. 33.3 pF

75. An inductance of 1 mH is
    A. 0.001 H
    B. 0.01 H
    C. 0.0001 H
    D. 0.10 H

76. A capacitor is basically constructed of
    A. Two conductors separated by a dielectric
    B. Two dielectric separated by a conductor
    C. Conductors and dielectric
    D. Conductors and semiconductors

77. In an inductive coil, the rate of rise of current is maximum
    A. Near the final maximum value of current
    B. At mid-value of current
    C. At half-power points
    D. After one time constant

78. Two complex numbers or phasors are said to be conjugate if they
    A. Differ only in the algebraic sign of their quadratic components
    B. Differ only in the algebraic sign of their real components
    C. Are equal in their real and quadrature components including algebraic signs
    D. Are equal in their real components but differ in their quadrature components including algebraic signs.

79. In an ac circuit with a resistive branch and an inductive branch in parallel, the
    A. Voltage across the inductance leads the voltage across the resistance by 90°
    B. Resistive branch current is 90° out of phase with the inductive branch current
    C. Resistive and inductive branch currents have the same phase
    D. Resistive and inductive branch currents are 180° out-of-phase

80. In an ac circuit with X_L and R in series, the
    A. Voltages across R and X_L are in phase
    B. Voltage across R lags the voltage across X_L by 90°
    C. Voltages across R and X_L are 180° out-of-phase
    D. Voltage across R leads the voltage across X_L by 90°

81. Leakage resistance in a capacitor results into
    A. Internal heating
    B. Internal bleeding
    C. Shorter useful life
    D. Short-circuiting

82. Voltage resonance means
    A. Series resonance
    B. Parallel resonance
    C. Current magnification
    D. Gain magnification

83. The unit of elastance is
    A. Farad
    B. Daraf
    C. Siemen
    D. Henry

84. The farad is not equivalent to which of the following combination of units
    A. CV^2
    B. C^2/J
    C. C/V
    D. J/V^2

85. Which component opposes voltage change?
    A. Resistor
    B. Inductor
    C. Capacitor
    D. Transistor

86. What is the peak factor for alternating current or voltage varying sinusiodally?
    A. 1.4142
    B. 0.707
    C. 0.636
    D. 1.11

87. Which of the following is not a factor affecting dielectric strength?
    A. Mass
    B. Moisture content
    C. Temperature
    D. Thickness

88. The superposition theorem is used when the circuit contains
    A. Reactive elements
    B. Active elements
    C. Number of voltage sources
    D. Single voltage source

89. What refers to such work at very low temperatures, near absolute zero?
    A. Cryogenics
    B. Superconductivity
    C. Subsonic
    D. Thermionic

90. A factor that states how much the resistance changes for a change in temperature?
    A. Resistivity
    B. Specific resistance
    C. Coefficient of temperature change
    D. Temperature coefficient of resistance

91. An alloy composed of 84 % copper, 12 % manganese and 4 % nickel.
    A. Manganin
    B. Constantan
    C. Nichrome
    D. German silver wire

92. A law which states that when a constant electromotive force is applied to a circuit consisting of a resistor and capacitor connected in series, the time taken for the potential on the plates of the capacitor to rise to any given fraction of its final value depends only on the product of capacitance and resistance.
    A. Child's law
    B. CR law
    C. Coulomb's law
    D. Debye T^3 law

93. At parallel resonance, the currents flowing through L and C are
    A. Infinite
    B. Zero
    C. Unequal
    D. Equal

94. In a rectangular wave, the peak factor is
    A. 1.16
    B. 1.73
    C. 1.11
    D. 1.0

95. In an RL series circuit,
    A. Current lags voltage by less than 90˚
    B. Current lags voltage by 180˚
    C. Current lags voltage by 90˚
    D. Current leads voltage by 90˚

96. In a pure capacitance,
    A. Current leads voltage by 90˚
    B. Current leads voltage by 180˚
    C. Current lags voltage by 90˚
    D. Current lags voltage by 180˚

97. The ohmic value of a resistor with negative temperature coefficient
   A. Increases with increasing temperature
   B. Increase with decreasing temperature
   C. Stays unchanged with temperature change
   D. Stays unaffected even with increasing temperature

98. Which of the statements below is not true?
   A. Current source is an active element
   B. Resistor is a linear element
   C. Voltage source is a passive element
   D. Diode is a non-linear element

99. Which of the following elements is active?
   A. Resistor
   B. Inductor
   C. Capacitor
   D. Ideal voltage source

100. What is the complex impedance of a circuit with an absolute resistance of 300 Ω?
   A. 0 + j 300 Ω
   B. 300 + j 90 Ω
   C. 0 – j 300 Ω
   D. 300 + j 0 Ω

101. The potential gradient in a cable is maximum in
   A. Conductor
   B. Outer sheath
   C. Insulation
   D. Uniformly all over

102. The Q-factor of a parallel resonant circuit is also known as
   A. Current magnification factor
   B. Voltage magnification factor
   C. Load factor
   D. Leakage factor

103. The Q-factor of a series resonant circuit is also known as

A. Current magnification factor
B. Voltage magnification factor
C. Load factor
D. Leakage factor

104. What is the form factor of a triangular wave?

A. 1.16
B. 1.11
C. 1.73
D. 1.41

105. In a rectangular wave, the form factor is

A. 1.11
B. 1.16
C. 1.0
D. 1.73

106. Which of the following dielectric materials makes the highest-capacitance capacitor?

A. Air
B. Barium-strontium titanite
C. Mica
D. Electrolyte

107. In a circuit, an active element is one which

A. Supplies energy
B. Receives energy
C. Both supplies and receives energy
D. Amplifies signal

108. An electric circuit contains

A. Passive elements
B. Active elements
C. Both active and passive elements
D. Reactive elements

109. What is the hot resistance of a 100 W, 220 V incandescent lamp?

A. 2.2 Ω
B. 22 Ω
C. 484 Ω
D. 4.84 Ω

110. Which statement is true about a passive circuit?

A. A circuit with neither a source of current nor a source of potential difference
B. A circuit with a voltage source
C. A circuit with a current source
D. A circuit with only resistance as a load

111. What is a closed path made of several branches of the network called?

A. Junction
B. Node
C. Terminal
D. Loop

112. The internal resistance of an ideal voltage source is

A. Infinite
B. Equal to the load resistance
C. Zero
D. To be determined

113. What is the conductance of a circuit having three 10 Ω resistors in parallel?

A. 0.3 S
B. 3.33 S
C. 0.33 S
D. 30 S

114. Electric energy refers to

A. Volt divided by coulomb
B. Volt-ampere
C. Volt-coulomb
D. Watt divided by time

115. A capacitor requires 12 μC of charge to raise its potential of 3 V. What is the capacitance of the capacitor?

A. 36 μF
B. 15 μF
C. 0.25 μF
D. 4 μF

116. A capacitor opposes change in
A. Voltage
B. Current
C. Voltage and current
D. Neither voltage nor current

117. What is the total resistance of a two equal valued resistors in series?
A. The difference of both
B. The product of both
C. Twice as one
D. The sum of their reciprocals

118. The ratio of maximum value to the effective value of an alternating quantity is called
A. Form factor
B. Peak factor
C. Dynamic factor
D. Leakage factor

119. For series capacitors, total charge is
A. The sum of individual charges
B. Equal to the charge of either capacitors
C. Equal to the product of the charges
D. The quotient of the charges

120. Series resonant circuit is sometimes known as
A. Rejector circuit
B. Acceptor circuit
C. Inductive circuit
D. Capacitive circuit

121. Parallel resonant circuit is sometimes called as

A. Acceptor circuit
B. Rejector circuit
C. Inductive circuit
D. Capacitive circuit

122. When two pure sine waves of the same frequency and the same amplitude which are exactly 180° out-of-phase are added together, the result is

A. A wave with twice the amplitude
B. A wave with half the amplitude
C. Zero signal
D. A wave with twice the frequency

123. If two complex conjugates are added, ___ components results.

A. In-phase
B. Quadrature
C. Complex
D. Out-of-phase

124. If an emf in circuit A produces a current in circuit B, then the same emf in circuit B produces the same current in circuit A. this theorem is known as

A. Maximum power transfer theorem
B. Millman's theorem
C. Reciprocity theorem
D. Norton's theorem

125. According to Gauss theorem, flux can be equated to

A. Charge
B. Field intensity
C. Current
D. Voltage

126. An open resistor when checked with an ohmmeter reads

A. Zero
B. Infinite
C. High but within the tolerance
D. Low but not zero

127. Norton's theorem is ____ Thevenin's theorem.

A. The same as
B. The converse of
C. Older that
D. More accurate than

128. What value of R is needed with a 0.05 μF C for an RC time constant of 0.02 s?

A. 400 Ω
B. 400 MΩ
C. 400 GΩ
D. 400 kΩ

129. Which of the following is the statement of Ohm's law?

A. Electric current is directly proportional to both voltage and resistance
B. Electric current varies directly as the voltage and inversely as the resistance
C. Electrical power is directly proportional to the resistance and inversely as the current squared
D. Electrical power is directly proportional to both voltage squared and the resistance

130. The admittance of a parallel RLC circuit is found to be the ___ sum of conductance and susceptances.

A. Algebraic
B. Arithmetic
C. Vector
D. Phasor

131. A wire of one kilometre length has a resistance of 20 Ω. If the length is halved, then the new resistance is ___ the original resistance.

A. Half
B. Twice
C. One-fourth
D. Three times

132. A series-parallel combination of identical resistors will

A. Increase the power rating compared with one resistor alone
B. Increase the voltage rating compared with one resistor alone
C. Reduce the voltage rating compared with resistor alone
D. Result in an expensive circuit

133. The ___ of an alternating quantity is defined as the fractional part of a period or cycle through which the quantity has advanced from selected origin.

A. Phase

B. Frequency

C. Amplitude

D. Waveform

134. An inductive circuit of resistance 16.5 Ω and inductance of 0.14 H takes a current of 25 A. if the frequency is 50 Hz, find the supply voltage.

A. 1501 V

B. 1174 V

C. 1877 V

D. 991 V

135. Which of the following has a positive temperature coefficient?

A. Mica

B. Manganin

C. Silicon

D. Carbon

136. The ratio of the flux density to the electric field intensity in the dielectric is called

A. Permittivity

B. Field intensity

C. Permeability

D. Elasticity

137. It is impossible to change the voltage across a capacitor instantly, as this would produce ___ current.

A. Infinite

B. Zero

C. Low

D. High

138. Which of the following is not a factor affecting capacitance of a basic capacitor?

A. Area of plates

B. Number of plates

C. Distance between plates

D. Dielectric material used

139. When voltage is applied across a ceramic dielectric the electrostatic field produced is 50 times greater than air dielectric. The dielectric constant of ceramic therefore is

A. 50

B. 100

C. 16.67

D. 5

140. The reason why alternating current can induce voltage is

A. It has high peak value

B. It has a stronger magnetic field than direct current

C. It has a constant magnetic field

D. It has a varying magnetic field

141. When two unequal values of resistors are connected in parallel across a dc source, greater current flows through the

A. Higher resistance

B. Lower resistance

C. Higher wattage resistance

D. Lower wattage resistance

142. A real current source has

A. Infinite internal resistance

B. Zero internal resistance

C. Large internal resistance

D. Small internal resistance

143. What is the cross-sectional are of a conductor whose diameter is 0.001 inch?

A. One micron

B. One angstrom

C. One steradian

D. One circular mil

144. Which of the following describes the action of a capacitor?

A. Stores electrical energy

B. Opposes changes in current flow

C. Creates a dc resistance

D. Converts ac to dc

145. High resistance values are a consequence of the ___ of the film.

A. Thickness
B. Length
C. Thinness
D. Area

146. For parallel capacitors, total charge is

A. The sum of individual charges
B. Equal to the charge of either capacitors
C. Equal to the product of the charges
D. The quotient of the charges

147. Which waveform in which the rms value and the mean value are equal?

A. Square wave
B. Triangular wave
C. Sine wave
D. Sawtooth

148. In a series circuit with unequal resistances the

A. Highest R has the highest V
B. Lowest R has the highest V
C. Lowest R has the highest I
D. Highest R has the highest I

149. In a parallel bank with unequal branch resistances

A. The highest R has the highest I
B. The lowest R has the highest V
C. The lowest R has the highest V
D. The highest R has the highest V

150. A rheostat is a form of

A. Variable resistor
B. Variable capacitor
C. Potentiometer
D. Thermocouple

151. Metal tin becomes superconductor at approximately

A. 6 K

B. 3.7 K

C. 5 K

D. 4.7 K

152. In a complex resistance-reactance plane, X_L is represented

A. By an axis opposite the R axis

B. By an axis perpendicular to the X_C axis

C. By an axis opposite the X_C axis

D. By an axis parallel to the R axis

153. When the net reactance in a series coil-capacitor circuit is zero at frequency f, the nature of its reactance of frequency 2f is

A. Inductive

B. Capacitive

C. Resistive

D. Infinite

154. Which of the following is a way of decreasing mutual inductance?

A. Moving the coils closer

B. Moving the coils apart

C. Decreasing the number of turns of either coil

D. Increasing the number of turns of either coil

155. The charging of a capacitor through a resistance obeys

A. Exponential law

B. Logarithmic law

C. Linear law

D. Square law

156. The Q-factor of a parallel resonant circuit is also known as

A. Voltage magnification factor

B. Current magnification factor

C. Gain magnification factor

D. Resonance magnification factor

157. What is the specific resistance of a pure silicon?

A. 55 Ω-mm
B. 55 Ω-m
C. 55 Ω-cm
D. 55 kΩ-m

158. A capacitance of 0.05 μF equals

A. 0.05×10^{6} F
B. 0.05×10^{-6} F
C. 0.05×10^{-12} F
D. 0.05×10^{12} F

159. A 5 μF capacitor charge to 5V has a stored charge equal to

A. 1 μc
B. 5 μc
C. 25 μC
D. 200 μc

160. The factor 0.707 for converting peak to rms applies only to

A. Square waves
B. Triangle waves
C. Sawtooth waves
D. Sine waves

161. When two in-phase sine waves that have identical frequency and amplitude are added together, then the result is a sine wave with ___ the amplitude of either.

A. Half
B. Twice
C. Four times
D. One-fourth

162. Liquids that are good conductors because of ionization are called

A. Electrolytic
B. Bases
C. Acid
D. Electrolytes

163. Tungsten filament of bulbs has a hot resistance higher than its cold resistance due to its temperature coefficient which is

A. Positive

B. Negative

C. Zero

D. Infinite

164. A term used to express the amount of electrical energy stored in electrostatic field.

A. Joules

B. Coulombs

C. Watts

D. Electron-volt

165. With double the number of turns by the same length and area, the inductance is

A. The same

B. Doubled

C. Quartered

D. Quadrupled

166. The temperature coefficient of resistance of electrolytes is

A. Negative

B. Positive

C. Zero

D. Infinite

167. What refers to the lowest voltage across any insulator that can cause current flow?

A. Conduction voltage

B. Critical voltage

C. Breakdown voltage

D. Voltage capacity

168. Capacitance increase with

A. Larger plate area and less distance between plates

B. Larger plate area and greater distance between plates

C. Smaller plate area and less distance between plates

D. Higher values of applied voltage

169. What is the resonant frequency of a circuit when L of 3 microhenrys and C of 40 picofarads are in series?

A. 14.5 kHz
B. 145 MHz
C. 14.5 MHz
D. 145 kHz

170. For a triangular and sawtooth waveform the rms voltage or current equals

A. 0.707 times peak value
B. 0.577 times peak value
C. 0.577 times average value
D. 0.707 times rms value

171. If two resistances of 9 Ω and 6 Ω are connected in parallel, the total resistance is

A. 54 Ω
B. 0.3 Ω
C. 15 Ω
D. 3.6 Ω

172. Refers specifically to steady state values of quantities in ac circuits which are complex numbers.

A. Domain
B. Scalar quantity
C. Vector quantity
D. Phasor quantity

173. A capacitor is used to

A. Block dc current
B. Pass dc current
C. Open voltage source
D. Short the voltage source

174. The usual load of a dc circuit is a/an

A. Resistor
B. Capacitor
C. Inductor
D. Both inductor and capacitor

175. The second strip of an electronic resistor color-code represents

A. The multiplier

B. The second digit of the value

C. The temperature

D. The tolerance

176. Which of the following is a preferred resistor value?

A. 520

B. 47

C. 43,000

D. 54,321

177. A three-by-three, series-parallel matrix of resistors, all having the same ohmic value, would have a net resistance of

A. One-third the value of a single resistor

B. Three times the value of a single resistor

C. The same value as a single resistor

D. Nine times the value of a single resistor

178. In an ac wave, 30 degrees of phase is ___ of a cycle.

A. ½

B. 1/12

C. 1/3

D. 1/30

179. What is the value of a carbon composition resistor with the following color code: Brown, white, orange, red

A. 190 Ω; 10 %

B. 19 kΩ; 2 %

C. 19 kΩ; 20 %

D. 1.9 kΩ; 2 %

180. The electric field strength between capacitor plates has a unit of

A. Volts per meter

B. Volts per mil

C. Amperes per meter

D. Amperes per mil

181. For multi-plate capacitor, capacitance is proportional to

A. Number of plates less one(n – 1)

B. Number of plates plus one(n + 1)

C. Number of plates less two(n - 2)

D. Number of plates (n)

182. A capacitor consists of two

A. Conductors only

B. Dielectric only

C. Conductors separated by a dielectric

D. Dielectric separated by a conductor

183. How many coulombs are delivered by a storage battery in 25 hours if it is supplying current at the rate of 3 A?

A. 2.592×10^5 C

B. 2.592×10^3 C

C. 2.592×10^8 C

D. 2.592×10^{12} C

184. When frequency of an ac wave decreases, the value of X_L in a coil

A. Approaches zero

B. Gets larger positively

C. Gets larger negatively

D. Stays constant

185. The temperature-resistance coefficient of pure gold is

A. 0.0034

B. 0.0037

C. 0.0038

D. 0.0039

186. The capacitor opposes any change in voltage across it by

A. Passing a voltage proportional to the rate of change of current

B. Acting as a short circuit at time equal to zero

C. Passing a current proportional to the rate of change of voltage

D. Acting as a short circuit at time equal to infinity

187. What is the most common non-sinusoidal waveform?

A. Square wave

B. Triangular wave

C. Trapezoidal wave

D. Sawtooth wave

188. Which of the following capacitors is suitable for dc filter circuits?

A. Mica

B. Ceramic

C. Paper

D. Electrolytic

189. A series RL circuit has R of 10 Ω and X_L of 5 Ω, its impedance in rectangular form is given by

A. 10 + j 5 Ω

B. 10 + j 10 Ω

C. 10 – j 5 Ω

D. 10 – j 10 Ω

190. What is the reciprocal of capacitance?

A. Reluctance

B. Susceptance

C. Elastance

D. Conductance

191. If the output resistance of a voltage source is 4 Ω, it internal resistance should be

A. 4 Ω

B. 8 Ω

C. 2 Ω

D. Infinite

192. The curve between current and frequency is termed as

A. Voltage curve

B. Gain curve

C. Power curve

D. Resonance curve

193. What is the total effective capacitance of two 0.25 µF capacitors connected in series?

A. 0.125 µF

B. 1.25 µF

C. 0.50 µF

D. 2.5 if

194. What can be used to estimate resonant frequency and to find reactance at any frequency for any value of capacitor or inductor?

A. Smith chart

B. Reactance chart

C. Impedance chart

D. Resonance chart

195. For a parallel AC circuit, ___ is used as a reference phasor.

A. Voltage

B. Power

C. Current

D. Resistance

196. For a series AC circuit, ___ is not used as a reference phasor.

A. Voltage

B. Impedance

C. Current

D. Conductance

197. If a certain circuit has a current that is lagging the voltage by 45˚, then it displays

A. Pure inductive reactance

B. Resistance and capacitance reactance

C. Resistance and inductive reactance

D. Pure capacitive reactance

198. What maximum voltage can be applied across the capacitor for very short period of time?

A. Working voltage

B. Surge voltage

C. Stray voltage

D. Peak voltage

199. What is expected when two 20 kΩ, 1 watt resistor in parallel are use instead of one 10 kΩ, 1 watt?

A. Provides higher current
B. Provides less power
C. Provides more power
D. Provides wider tolerance

200. Which of the following materials has the lowest dielectric strength?

A. Glass
B. Paper
C. Mica
D. Teflon

201. The distance between the capacitor plates increases two times, then its capacitance

A. Increases two times
B. Increases four times
C. Decreases two times
D. Decreases four times

202. The ratio between the active power and the apparent power of a load in an ac circuit is called

A. Quality factor
B. Power factor
C. Power ratio
D. Power reactive

203. When the power factor of a circuit is zero,

A. Power absorbed is maximum
B. Power absorbed is minimum
C. Power absorbed is zero
D. The impedance is minimum

204. How many degrees of phase represents one full cycle?

A. 360
B. 180
C. 270
D. 90

205. Which of the following does not generally affect the value of a capacitor?

A. The dielectric material used
B. The surface area of the plates
C. The thickness of the dielectric
D. The voltage applied to the plate

206. What is the purpose of a load in an electric circuit?

A. To increase the circuit current
B. To decrease the circuit current
C. To utilize electrical energy
D. To make the circuit complete

207. The power factor of a certain circuit in which the voltage lags behind the current is 80 %. To increase the power to 100 %, it is necessary to add ___ to the circuit.

A. Inductance
B. Capacitance
C. Resistance
D. Impedance

208. Refers to the outward-curving distortion of the lines of force near the edges of two parallel metal plates that form a capacitor.

A. Skin effect
B. Night effect
C. Edge effect
D. Hall effect

209. If voltage across the plates of 2 F capacitor is increased by 4 V, then charge on the plates will

A. Decrease by 2 C
B. Increase by 2 C
C. Decrease by 4 C
D. Increase by 4 C

210. What does a capacitor store?

A. Voltage
B. Charge
C. Current
D. Power

211. The mutual inductance between two coils is ___ the reluctance of magnetic path.

A. Directly proportional to
B. Inversely proportional to
C. Independent to
D. Equal to

212. The result of rust in electrical (wire) connection is

A. Inductance
B. Conductance
C. Impedance
D. Resistance

213. Which of the following is a disadvantage of a wire-wound resistor?

A. It has reactance in radio-frequency circuits
B. It cannot handle much power
C. It draws a large amount of current
D. It cannot handle high voltage

214. The resistance of an insulator ___ when its temperature is increased.

A. Decreases
B. Remains the same
C. Increases
D. Varies

215. The wavelength of an alternating waveform depends upon the ___ of the variation.

A. Period
B. Number
C. Frequency
D. Amplitude

216. Delta to wye or wye to delta transformation technique is applied to a ___ network.

A. One-terminal
B. Two-terminal
C. Three-terminal
D. Complex

217. For greater accuracy, the value of phase angle θ should be determined from

A. Cos θ

B. Tan θ

C. Sin θ

D. Sec θ

218. Inductive reactance applies only to sine waves because it

A. Increases with lower frequencies

B. Increases with lower inductance

C. Depends on the factor 2 π

D. Decreases with higher frequencies

219. What increases the resistance of wire at high frequencies?

A. Temperature

B. Voltage

C. Skin effect

D. Insulation

220. An inductor carries 2 A dc. If its inductance is 100 μH, then what is its inductive reactance?

A. Zero

B. 1.3 kΩ

C. 628 Ω

D. -628 Ω

221. Barium-strontium titanite dielectric material is also called

A. Ceramic

B. Polyster

C. Electrolytic

D. Bakelite

222. In the 5-band method of capacitor color coding, the first band indicates

A. Temperature coefficient

B. Tolerance

C. 1st digit

D. Capacitance value

223. What is the most convenient way of achieving large capacitance?

A. By using multiplate construction

B. By using air as dielectric

C. By decreasing distance between plates

D. By using dielectric of low permittivity

224. A linear circuit is one whose parameters

A. Change with change in voltage

B. Change with change in current

C. Do not change with voltage and current

D. Change with change in voltage and current

225. For a linear circuit, ___ voltage or current is used to calculate average power.

A. Rms

B. Peak

C. Average

D. Instantaneous

226. When two coils of identical reactance are in parallel without mutual inductance, the reactance of the combination is ___ the reactance of each coil.

A. One half

B. Twice

C. Four times

D. One fourth

227. Which of the following is also known as anti-resonant circuit?

A. Parallel resonant circuit

B. Series resonant circuit

C. Tuned circuit

D. Tank circuit

228. In a complex number 5 + j 10, 10 is called ___ part.

A. Imaginary

B. Real

C. Conjugate

D. Integer

229. The presence of an electric current is made known by

A. Electric shock
B. Effects produced
C. Magnetic shock
D. Flashing

230. The reciprocal of a complex number is

A. A complex number
B. A real number
C. An imaginary number
D. A whole number

231. Which of the following has negative temperature coefficient?

A. Carbon
B. Nickel
C. Brass
D. Constantan

232. Which of the following is a common material used in wire-wound resistors?

A. Manganin
B. Carbon
C. Bronze
D. German silver wire

233. If one resistance in a series connection is open, then

A. The current is zero in all the other resistances
B. The current is maximum in all the other resistances
C. The voltage is zero across the open resistance
D. The voltage is infinite across the open resistance

234. What determines the magnitude of electric current?

A. The rate at which electrons are produced
B. The type of material used
C. The current carrying capacity of the circuit
D. The rate at which electrons pass a given point

235. For a carbon composition resistor, typical resistance values range from

A. 2.7 Ω to 22 MΩ

B. 1000 Ω to 10000 Ω

C. 10 Ω to 10 MΩ

D. 2.7 Ω to 2.7 GΩ

236. A lead conductor has a resistance of 25 Ω at 0 ˚C. Determine its resistance at -30 ˚C

A. 22 Ω

B. 24 Ω

C. 12 Ω

D. 11 Ω

237. An impedance given by 90∠-45˚ is a/an ___ impedance.

A. Inductive

B. Conductive

C. Resistive

D. Capacitive

238. If a coil has a Q of 10, it means that

A. The energy stored in the magnetic field of the coil is 10 times the energy wasted in its resistance

B. The energy wasted in its resistance is 10 times the energy stored in the magnetic field of the coil

C. It is a low Q coil

D. It is a high Q coil

239. What is the rms value of a square wave?

A. Equals its peak value

B. Equals its peak-to-peak value

C. Peak divided by square root of two

D. Peak divided by pi

240. The rms value of a triangular or sawtooth waveform is ___ times its peak value.

A. 0.577

B. 0.500

C. 0.25

D. 0.707

241. In a multiple capacitor, the plate area is

A. Increased

B. The same

C. Decreased

D. Variable

242. What is the time constant for L of 240 mH in series with R of 20 Ω?

A. 12 ms

B. 4.8 s

C. 83.3 s

D. 12 s

243. In an ac circuit, the power dissipated as heat depends on

A. Impedance

B. Capacitive reactance

C. Resistance

D. Inductive reactance

244. Which of the following dielectric materials makes the lowest-capacitance capacitor?

A. Paper

B. Mica

C. Air

D. Electrolyte

245. In adding or subtracting phasor quantities, ___ form is the most convenient.

A. Polar

B. Rectangular

C. Trigonometric

D. Exponential

246. In dividing or multiplying phasor quantities, ___ form is used.

A. Polar

B. Rectangular

C. Trigonometric

D. Exponential

247. The power factor of a circuit is equal to

A. RZ
B. X_C/Z
C. X_L/Z
D. R/Z

248. The capacitance of a capacitor is ___ relative permittivity.

A. Directly proportional to
B. Inversely proportional to
C. Equal to
D. Inversely proportional to the square of

249. If a multiplate capacitor has 10 plates, each of area 10 cm^2, then

A. 10 capacitors will be in parallel
B. 10 capacitors will be in series
C. 9 capacitors will be in parallel
D. 9 capacitors will be in series

250. Of the equivalent combination of units, which one is not equal to watt?

A. Ω^2/V
B. AV
C. $A^2\Omega$
D. J/s

251. A neon glow lamp used as a night light ionizes at approximately

A. 70 V
B. 80 V
C. 90 V
D. 100 V

252. What dielectric is generally employed by a variable capacitor?

A. Mica
B. Air
C. Electrolyte
D. Ceramic

253. A switch designed to have low capacitance between its terminal when open.

A. LOCAP switch
B. AntiLOCAP switch
C. Anticapacitance switch
D. Capacitance switch

254. A resistor wound with a wire doubled back on itself to reduce the inductance.

A. Bifilar resistor
B. Wire-wound resistor
C. Anti-inductive resistor
D. Bleeder resistor

255. What fusion of elements is without chemical action between them?

A. Mixture
B. Compound
C. Alloy
D. Ionization

256. In calculating maximum instantaneous power ___ voltage or current is used.

A. Peak
B. Average
C. Rms
D. Instantaneous

257. The area of capacitor plates increases two times, then its capacitance

A. Increases two times
B. Increases four times
C. Decreases two times
D. Decreases four times

258. If the inductance is decreased, the impedance of the circuit containing a resistor a capacitor and an inductor connected in series to an ac source

A. Decreases
B. Increases
C. Decreases or increases
D. Decreases, increases or remains the same

259. When the movable plates of a gang capacitor completely overlap the fixed plates, the capacitance of the capacitor is

A. Halfway between maximum and minimum

B. Maximum

C. Minimum

D. Zero

260. In a circuit, a passive element is one which

A. Supplies energy

B. Receives energy

C. Both supplies and receives energy

D. Attenuates signal

261. Rationalizing the denominator of a complex number means

A. Eliminating the j component in the denominator

B. Adding j component in the denominator

C. Eliminating the j component in the numerator

D. Adding j component in the numerator

262. When two complex conjugates are subtracted, the result is a

A. Quadrature component only

B. Complex component

C. In-phase component

D. Real component

263. A coil of inductance L has an inductive reactance of X_L in an ac circuit in which the effective current is I. The coil is made from a superconducting material. The rate at which power is dissipated in the coil is

A. 0

B. I^2X_L

C. IX_L

D. IX_L^2

264. If the capacitance of mica capacitor is 5 times the capacitance of air capacitor, then the relative permittivity of mica is

A. 2.5

B. 5

C. 10

D. 25

265. The hot resistance of an incandescent lamp is about ___ times its cold resistance.

A. 10

B. 5

C. 50

D. 100

266. When the temperature of copper wire is increased its resistance is

A. Increased

B. Decreased

C. Constant

D. Zero

267. A trimmer is a variable capacitor in which capacitance is varied by changing the

A. Number of plates

B. Dielectric

C. Distance between plates

D. Plate area

268. The reason why electrical appliances are not connected in series.

A. Greater electrical power saving

B. Power loss is minimum

C. Appliances have different current ratings

D. All of the above

269. Form its definition, the unit of electric field, ξ is the N/C and equivalent unit of ξ is the

A. $V(m)^2$

B. V(m)

C. V/m^2

D. V/m

270. Which of the following is the peakiest?

A. Square wave

B. Sinusoidal wave

C. Triangular wave

D. Rectangular wave

271. Why are inductance and capacitance not relevant in a dc circuit?

A. Because it is a simple circuit
B. Because dc circuits require only resistance as load
C. Because they do not exist in a dc circuit
D. Because frequency of dc is zero

272. When capacitors are connected in parallel, the total capacitance is

A. Greater than the largest capacitor
B. Smaller than the largest capacitor
C. Smaller than the smallest capacitor
D. Greater than the smallest capacitor

273. When current and voltage arte in phase in an ac circuit, the ___ is equal to zero.

A. Resistance
B. Reactance
C. Inductance
D. Capacitance

274. Thevenin's theorem is what form of an equivalent circuit?

A. Current
B. Voltage
C. Both current and voltage
D. Neither current nor voltage

275. Which of the following combination of length and cross-sectional area will give a certain volume of copper the least resistance?

A. 2L and1/2 A
B. Does not matter because the volume of copper remains the same
C. L and A
D. ½ L and 2 A

276. The ratio between the reactive power and the apparent power of an ac load is called

A. Quality factor
B. Power factor
C. Power ratio
D. Reactive power

277. What is the efficiency under the conditions of maximum power transfer?

A. 50 %

B. 100 %

C. 25 %

D. 75 %

278. The charging of a capacitor through a resistance follows what law?

A. Linear law

B. Hyperbolic law

C. Inverse-square law

D. Exponential law

279. Norton's theorem is what form of an ac equivalent circuit?

A. Voltage

B. Current

C. Both voltage and current

D. Neither voltage nor current

280. What is the total capacitance of 10 capacitors, each of 20 μF in series?

A. 200 μF

B. 2 μF

C. 100 μF

D. 0.5 μF

281. An inductive load always has a ___ power factor

A. Leading

B. Lagging

C. Zero

D. Unity

282. When resistance are connected in parallel, the total resistance is

A. Less than the smallest resistance in the connection

B. Greater than the smallest resistance in the connection

C. Between the smallest and greatest resistance in the connection

D. Increasing and decreasing depending upon the supply voltage

283. The arc across a switch when it open an RL circuit is a result of the

A. Large self-induced voltage across L

B. Long time constant

C. Low resistance of the open switch

D. Surge of resistance

284. What is a rotating vector whose projection can represent either current or voltage in an ac circuit?

A. Polar diagram

B. Scalar quantity

C. Velocity

D. Phasor

285. Which factor does not affect resistance?

A. Length

B. Resistivity

C. Cross-sectional area

D. Mass

286. Which of the following capacitors are used only in dc circuits?

A. Mica

B. Ceramic

C. Mylar

D. Electrolytic

287. The maximum power transfer theorem is used in

A. Power system

B. Electronic system

C. Refrigeration

D. Air conditioning

288. In Norton's theorem, the short circuit current is obtained by

A. Opening the load terminals

B. Shorting the load terminals

C. Opening the voltage source

D. Shorting the voltage source

289. For maximum power transfer, what is the relation between load resistance R_L and internal resistance R of the voltage source?

A. $R_L = 2$ r
B. $R_L = 1.5$ r
C. R_L = r
D. $R_L = 3$ r

290. A capacitor of 0.5 μF charged to 220 V is connected across an uncharged 0.5 μF capacitor. What is the voltage across each capacitor?

A. 220 V
B. 150 V
C. 110 V
D. 22 V

291. When capacitors are connected in series, the total capacitance is

A. Smaller than the smallest capacitor
B. Smaller than the largest capacitor
C. Greater than any of the capacitor
D. Greater than the largest capacitor

292. What theorem is generally used in the analysis of vacuum tubes?

A. Superposition theorem
B. Millman's theorem
C. Thevenin's theorem
D. Norton's theorem

293. Another term of the quality factor of the resonant circuit.

A. Figure of merit
B. Figure of demerit
C. Noise factor
D. Noise figure

294. Which of the following represents the energy stored in a capacitor?

A. $CV^2/2$
B. $2Q^2/C$
C. C^2/V
D. CV

295. What theorem is usually used in the analysis of transistor circuit?

A. Superposition theorem
B. Millman's theorem
C. Thevenin's theorem
D. Norton's theorem

296. Which of the following capacitors has the highest cost per μF?

A. Plastic
B. Air
C. Mica
D. Electrolytic

297. Under the conditions of maximum power transfer, a voltage source is delivering a power of 15 W to the load. What is the power generated by the source?

A. 60 W
B. 30 W
C. 15 W
D. 4 W

298. Which of the following is neither a basic physical law nor deliverable from one?

A. Ohm's law
B. Coulomb's law
C. Kirchhoff's first law
D. Kirchhoff's second law

299. Another term for superconductor.

A. Generic conductor
B. Ultraconductor
C. Cryotron
D. Cryogenic conductor

300. A circuit whose parameters change with voltage or current.

A. Non-linear circuit
B. Linear circuit
C. Complex circuit
D. Passive circuit

CHAPTER 3: SOLID STATE DEVICES

1. How many electrons are there in the fourth orbit of a copper atom?
   A. 1
   B. 2
   C. 3
   D. 4

2. The maximum permissible number of electrons in the third orbit is
   A. 18
   B. 8
   C. 32
   D. 2

3. Varactor diodes are commonly used
   A. As voltage controlled capacitance
   B. As a constant current source
   C. As voltage multiplier
   D. As a constant voltage source

4. The reason why electrons are not pulled into the nucleus of an atom.
   A. Because of the centrifugal or outward force created by their orbital motion.
   B. Because of the force of attraction between them and the nucleus is weak.
   C. Because they are not being attracted by the positive nucleus.
   D. Because of the strong bonding between them that resists any force pulling them towards the nucleus.

5. The electrons in the largest orbit travel _____ than the electrons in the smaller orbits.
   A. More slowly
   B. Faster
   C. In the same velocity
   D. A little bit slower

6. A transistor configuration with the lowest current gain.
   A. Common base
   B. Common emitter
   C. Common collector
   D. Emitter-follower

7. A semiconductor in its purest form is called
    A. Pure semiconductor
    B. Doped semiconductor
    C. Intrinsic semiconductor
    D. Extrinsic semiconductor

8. Valence orbit is the other form for
    A. Outer orbit
    B. 3rd orbit
    C. 4th orbit
    D. 2nd orbit

9. K shell means
    A. First orbit
    B. 2nd orbit
    C. 3rd orbit
    D. 4th orbit

10. For either germanium or silicon diodes, the barrier potential decreases _____ for each Celsius degree rise.
    A. 1 mV
    B. 3 mV
    C. 4 mV
    D. 2 Mv

11. A diode modeling circuit which considers the threshold voltage, average resistance and switch as the diode's equivalent circuit.
    A. Ideal model
    B. Simplified model
    C. Piecewise linear model
    D. Real model

12. There are two mechanisms by which holes and electrons move through a silicon crystal. They are
    A. Covalent bond and recombination
    B. Diffusion and drift
    C. Free and charge particles
    D. Forward and reverse bias

13. A semiconductor is an element with a valence of
    A. Four
    B. Eight
    C. Two
    D. One

14. What orbit controls the electrical property of the atom?
    A. Valence orbit
    B. First orbit
    C. Fourth orbit
    D. M shell

15. _____ is a substance that contains atoms with several bands of electrons but with only one valence electron.
    A. Insulator
    B. Conductor
    C. Semiconductor
    D. Resistor

16. Pure silicon crystal atoms contain how may valence electrons as a result of covalent bonding?
    A. 1
    B. 4
    C. 8
    D. 16

17. The peak inverse voltage of a full wave center tapped rectifier circuit is equal to _____ of the input signal.
    A. Thrice the peak
    B. Twice the peak
    C. One half
    D. One third

18. Diffusion or storage capacitance is the term used to refer to
    A. The reverse bias capacitance of a diode
    B. The forward bias capacitance of a diode
    C. The breakdown capacitance of a zener diode
    D. The effective capacitance of the rectifier

19. What is considered as the key electrical conductivity?

A. The number of electrons in the valence orbit

B. The number of protons in the nucleus

C. The number of neutrons in the nucleus

D. The number of protons plus the number of electrons in the atom

20. Each atom in the silicon crystal has how many electrons in its valence orbit?

A. 8

B. 32

C. 2

D. 4

21. Lifetime is the amount of time between the creation and disappearance of a/an

A. Free electron

B. Proton

C. Ion

D. Neutron

22. A silicon crystal is an intrinsic semiconductor

A. If every atom in the crystal is a silicon atom

B. If majority of the atoms in crystal is a silicon atom

C. If the crystal contains 14 silicon atoms

D. If the crystal is undoped

23. At room temperature, a silicon crystal acts approximately like a/an

A. Insulator

B. Semiconductor

C. Conductor

D. Superconductor

24. An extrinsic semiconductor is a

A. Doped semiconductor

B. Pure semiconductor

C. Good insulator

D. Good conductor

25. What is associated with random motion due to thermal agitation in the movement of holes and electrons in a silicon crystal?
    A. Drift
    B. Diffusion
    C. Doping
    D. Recombination

26. The peak inverse voltage of a half wave rectifier circuit is approximately equal to the _____ of the input signal.
    A. Peak amplitude
    B. Frequency
    C. Voltage sinusoidal
    D. Current

27. Silicon that has been doped with a trivalent impurity is called a/an
    A. P-type semiconductor
    B. N-type semiconductor
    C. Intrinsic semiconductor
    D. Extrinsic semiconductor

28. Silicon that has been doped with a pentavalent impurity is called a/an
    A. N-type semiconductor
    B. P-type semiconductor
    C. Intrinsic semiconductor
    D. Extrinsic semiconductor

29. What is another name for a pn crystal
    A. Junction diode
    B. PN junction
    C. Diode
    D. Lattice

30. An acceptor atom is also called
    A. Pentavalent atom
    B. Trivalent atom
    C. Minority carrier
    D. Majority carrier

31. Which is a donor atom?
    A. Trivalent atom
    B. Aluminum
    C. Boron
    D. Pentavalent atom

32. In an n-type semiconductor, free electrons are called
    A. Minority carriers
    B. Valence electrons
    C. Majority carriers
    D. Charge carriers

33. in an n-type semiconductor, holes are called
    A. minority carriers
    B. majority carriers
    C. protons
    D. charge carriers

34. What is the barrier potential of germanium at 25˚C
    A. 0.7 V
    B. 0.3 V
    C. 0.5 V
    D. 0.4 V

35. The barrier potential for a silicon diode at 25˚C is approximately
    A. 0.4 V
    B. 0.3 V
    C. 0.7 V
    D. 0.5 V

36. Each pair of positive and negative ions at the junction is called a/an
    A. Anion
    B. Positron
    C. Cation
    D. Dipole

37. When temperature increases, barrier potential _____

A. Remains the same
B. Decreases
C. Increases
D. Either increases or decreases depending on the semiconductor material used

38. Avalanche effects occurs at

A. Higher reverse voltages
B. Lower reverse voltages
C. Higher forward voltages
D. Lower forward voltages

39. The creation of free electrons through zener effect is also known as

A. Avalanche emission
B. Thermionic emission
C. Low-field emission
D. High-field emission

40. Zener effect only depends on the

A. High-speed minority carriers
B. High-speed majority carriers
C. Intensity of the electric field
D. Intensity of the magnetic field

41. What temperature is inside the diode, right at the junction of the p and n-type materials?

A. Junction temperature
B. Ambient temperature
C. Internal temperature
D. Absolute temperature

42. What is the input control parameter of a FET?

A. Gate voltage
B. Source voltage
C. Drain voltage
D. Gate current

43. One of the important diode parameters which gives the magnitude of current the diode candle without burning.
    A. Reverse saturation current
    B. Reverse current
    C. Forward current
    D. Forward breakdown current

44. The maximum reverse voltage that can be applied before current surges is called
    A. Reverse recovery time
    B. Maximum junction voltage
    C. Forward voltage
    D. Reverse breakdown voltage

45. What is the other name of Esaki diode?
    A. Diac
    B. Hot-carrier diode
    C. Shockley diode
    D. Tunnel diode

46. The most important application of schottky diodes is in
    A. Digital computers
    B. Power supplies
    C. Amplifier circuits
    D. Voltage regulators

47. A diode is a nonlinear device because
    A. It produces a nonlinear graph
    B. Its current is not directly proportional to its voltage
    C. It has a built-in barrier potential
    D. It can rectify alternating current

48. The sum of the resistance of the p-region and the n-region is called
    A. Junction resistance
    B. Extrinsic resistance
    C. Intrinsic resistance
    D. Bulk resistance

49. What is the typical bulk resistance of rectifier diodes?

A. Less than 1Ω

B. Greater than1Ω

C. Equal to 1Ω

D. It depends on the doping level

50. The reverse bias diode capacitance is termed as

A. Transition region capacitance

B. Diffusion capacitance

C. Storage capacitance

D. Reverse capacitance

51. The time taken by the diode to operate in the reversed condition from forward conduction.

A. Maximum power time

B. Reverse recovery time

C. Lifetime

D. Time allocation

52. Approximately, the atomic weight of germanium is

A. 32

B. 28.09

C. 72.7

D. 16

53. Atomic weight of silicon at 300 K is

A. 28.09

B. 72.7

C. 5.32

D. 16

54. An LED and phototransistor is equivalent to a/an

A. Thermocouple

B. FET

C. Optocoupler

D. Regulator

55. Optocoupler is otherwise known as
    A. Laser
    B. Photodiodes
    C. Optoisolator
    D. Photoconductive cell

56. When the emitter junction is forward biased while the collector junction is reverse biased, the transistor is at _____ region.
    A. Cut-off
    B. Saturation
    C. Active
    D. Breakdown

57. When both emitter and collector junction are forward biased, the transistor is said to be at _____ region.
    A. Active
    B. Cut-off
    C. Breakdown
    D. Saturation

58. An equivalent circuit of a diode in which it is represented as a switch in series with a barrier potential.
    A. First approximation
    B. Second approximation
    C. Third approximation
    D. Fourth approximation

59. Which of the following is the equivalent circuit for a diode for third approximation?
    A. A switch only
    B. A switch in series with a battery in series with a resistance
    C. A switch in series with battery
    D. A switch in series with a resistance

60. A silicon crystal is a/an _____ of a semiconductor if every atom in the crystal is a silicon atom.
    A. Extrinsic
    B. Intrinsic
    C. P-type
    D. N-type

61. With pnp voltage divider bias, you must use
    A. Ground
    B. Negative power supplies
    C. Positive power supplies
    D. Resistors

62. Two pn silicon diodes are connected in series opposing. A 5 V voltage is impressed upon them. Find the voltage across each junction at room temperature when $nV_T = 0.052$ V.
    A. 0.236 V, 3.2 V
    B. 4.764 V, 0.236 V
    C. 0.036 V, 4.964 V
    D. 3.21 V, 1.79 V

63. A half-wave signal has a period of
    A. 16.7 ms
    B. 8.3 ms
    C. 16.7 µs
    D. 8.3 µs

64. A full-wave signal has a period of
    A. 16.7 µs
    B. 8.3 µs
    C. 8.3 ms
    D. 16.7 ms

65. When doping increases, _____ of a semiconductor decreases.
    A. Impurity
    B. Conductivity
    C. Bulk resistance
    D. Minority carrier

66. Which of the following has the least noise level?
    A. FET
    B. BJT
    C. Triode
    D. Tetrode

67. Which of the following has the highest input impedance
    A. FET
    B. BJT
    C. MOSFET
    D. Crystal diode

68. The frequency of a half-wave signal is
    A. Twice the line frequency
    B. Equal to the line frequency
    C. One-half of the line frequency
    D. One-fourth the line frequency

69. For a full-wave rectifier, the output frequency
    A. Equals one-half the input frequency
    B. Equals the line frequency
    C. Equals two times the input
    D. Is three times the line frequency

70. The averaged dc voltage of a half wave rectifier circuit is _____ of the value of the peak input voltage.
    A. 63.6%
    B. 31.8%
    C. 4.8%
    D. 6.2%

71. The average dc voltage of a full wave rectifier circuit is _____ of the value of the peak input voltage.
    A. 31.8%
    B. 48.1%
    C. 63.6%
    D. 1%

72. Typical leakage current in a pn junction is in the order of
    A. µA
    B. mA
    C. nA
    D. pA

73. The resistance of a forward biased pn junction is in the order of

A. Ω

B. mΩ

C. μΩ

D. kΩ

74. The removal by electronic means of one extremity of an input waveform is called _____.

A. Filtering

B. Clamping

C. Amplifying

D. Clipping

75. Which of the choices below does not describe a clipper circuit?

A. Limiter

B. Amplitude selector

C. Slicer

D. Baseline stabilizer

76. The varactor diode is also called as

A. Voltage-variable capacitance

B. Varicap

C. Epicap

D. All of the above

77. What diode has no depletion layer

A. Varactor

B. Varistor

C. Schottky diode

D. Shockley diode

78. Varistors are used for line filtering to eliminate spikes and dips and is also called

A. Transient regulator

B. Transient limiter

C. Transient filter

D. Transient suppressor

79. Defined as random motion of holes and free electrons due to thermal agitation
    A. Fission
    B. Fusion
    C. Diffusion
    D. Ionization

80. The temperature coefficient of resistance of a semiconductor is
    A. Positive
    B. Negative
    C. Zero
    D. Infinity

81. A large signal amplifier which is biased so that collector current flow continuously during the complete electrical cycle of the signal as well as when no signal is present
    A. Class A
    B. Class B
    C. Class AB
    D. Class C

82. A large signal amplifier which is biased so that current is non zero for less than one-half cycle.
    A. Class AB
    B. Class C
    C. Class A
    D. Class B

83. A class ____ amplifier stage operates with a small forward bias of the transistor so that some collector current flows at all times
    A. A
    B. B
    C. AB
    D. C

84. What factor is shown on a data sheet that tells how much you have to reduce the power of a device?
    A. Power factor
    B. Derating factor
    C. Reactive factor
    D. Reduction factor

85. The time it takes to turn off a forward-biased diode is called the

A. Forward recovery time
B. Reverse recovery time
C. Recombination
D. Turn-off time

86. A heavily doped semiconductor has

A. High resistance
B. No effect on the semiconductor characteristics
C. More heat dissipation
D. Low resistance

87. Gallium arsenide, aluminum arsenide and gallium phosphide are classified as

A. Elementary semiconductor
B. Secondary semiconductor
C. Intrinsic material made by doping
D. Insulators

88. A lightly doped semiconductor has

A. Low resistance
B. High resistance
C. No effect on a semiconductor
D. More heat dissipated behaviors

89. The property or ability of a material to support charge flow or electron flow

A. Resistance
B. Conductance
C. Resistivity
D. Permeance

90. What is also known as photodiffusion effect?

A. Dember effect
B. Skin effect
C. Destriau effect
D. Night effect

91. An effect that occurs within the entire bulk of a semiconductor material rather than in a localized region or junction
    A. Silicon effect
    B. Dember effect
    C. Bulk effect
    D. Destriau effect

92. The creation voltage in a conductor or semiconductor by illumination of one surface
    A. Dember effect
    B. Skin effect
    C. Destriau effect
    D. Night effect

93. What device uses a material catwhisker as its anode and is classified as a hot-carrier diode?
    A. PIN
    B. Point-contact diode
    C. Shockley diode
    D. Crystal diode

94. What is the typical operating current of an LED?
    A. 50 mA
    B. 10 mA
    C. 20 mA
    D. 5 mA

95. At absolute zero temperature, a semiconductor behaves as a/an
    A. Good conductor
    B. Superconductor
    C. Insulator
    D. Variable resistor

96. Avalanche breakdown in a semiconductor takes place
    A. When forward current exceeds a certain value
    B. When potential barrier is reduced to zero
    C. When reverse bias exceeds a certain value
    D. When forward bias exceeds a certain value

97. A cold-cathode glow-discharge diode having a copper anode and a large cathode of sodium or other material.
    A. Tunnel diode
    B. BARITT diode
    C. Anotron
    D. READ diode

98. A microwave diode in which the carriers that transverse the drift region are generated by minority carrier injection from a forward-biased junction instead of being extracted from the plasma of an avalanche region.
    A. IMPATT
    B. TRAPAT
    C. BARITT diode
    D. Esaki diode

99. What electronic circuit converts AC to DC where the DC output peak value can be greater than the AC input peak value?
    A. Voltage multiplier
    B. Rectifier
    C. Clamper
    D. Clipper

100. Which of the item below does not mean a VARACTOR diode?
    A. VOLTACAPS
    B. VARICAPS
    C. Voltage variable capacitors
    D. Variable resistance diode

101. What is the charge of the hole?
    A. Equal to that of a proton
    B. Equal to that of an electron
    C. Equal to that of a neutron
    D. Equal to zero

102. It is the current gain for the common-emitter configuration
    A. α
    B. β
    C. δ
    D. ρ

103. when a factor a junction transistor is 0.98,the factor would be equivalent to _____ value of transistor's beta.

A. 49
B. 60
C. 20
D. 38

104. An emitter resistor is used for _____ in most amplifier circuits.

A. Temperature stabilization
B. Biasing a bipolar junction transistor
C. Current limitation
D. Voltage amplification

105. What line is drawn between the open-circuit current on a JFET characteristic curve?

A. Operating point
B. Load line
C. Tangent line
D. Quiescent point

106. Which of the choices below is another name for a photoconductive cell?

A. Varicap
B. Varistor
C. Photoresistive device
D. Photodiode

107. When both emitter and collector junctions are reverse biased, the transistor is said to be at _____ region.

A. Active
B. Cut-off
C. Saturation
D. Amplifying

108. What type of diode is used for tuning receivers and is normally operated with reverse bias and derived its name from voltage variable capacitor?

A. Hot-carrier diode
B. Varactor diode
C. Tunnel diode
D. Zener diode

109. What silicon npn tetrode serves as bistable negative-resistance device?

A. BJT

B. Binistor

C. FET

D. Thermistor

110. A multiple-terminal solid-state device similar to a transistor that generates frequencies up to about 10000 MHz by injecting electrons or holes into a space-charge layer which rapidly forces these carriers to a collecting electrode.

A. Magnetron

B. IMPATT

C. Klystron

D. Spacistor

111. Which of the items below is not a good conductor?

A. Electrolytes

B. Ionized gases

C. Silicon

D. Silver

112. What is the net charge if a certain semiconductor losses 4 valence electrons?

A. +4

B. -4

C. +8

D. -8

113. What is the net charge if a certain semiconductor gains one valence electron?

A. +1

B. -1

C. +4

D. -4

114. What is the approximate voltage drop of LED?

A. 0.3 V

B. 0.7 V

C. 1.5 V

D. 3.8 V

115. Under standard conditions, pure germanium has a resistivity of

A. 60 Ω-cm

B. 60 Ω-m

C. 60 Ω-mm

D. 60 x 10^{-4}

116. The holding of one extreme amplitude of the input waveform to a certain amount of potential is called

A. Slicing

B. Limiting

C. Rectifying

D. Clamping

117. Clamper is also known as

A. DC restorer

B. Rectifier

C. Charger

D. Clipper

118. Percentage ripple can be calculated by getting the _____ and multiplying the result by100%.

A. Ratio of the input resistance and input voltage

B. Product of the ac current to dc current

C. Ratio of the ac voltage to dc voltage

D. Addition of the ac and dc component of the given signal

119. Which of the following materials has the smallest leakage current?

A. Germanium

B. Carbon

C. Sulfur

D. Silicon

120. What refers to annihilation of a hole and electron?

A. Doping

B. Recombination

C. Diffusion

D. Bonding

121. What are the two possible breakdown mechanisms in pn junction diodes?

A. Reverse and breakdown effects

B. Threshold and knee effects

C. Avalanche and forward effects

D. Zener and avalanche effects

122. What occurs in pn diodes when the electric field in the depletion layer increases to the point where it can break covalent bonds and generate electron hole pairs?

A. Covalent breakdown

B. Diffusion

C. Zener breakdown

D. Avalanche effect

123. The amount of additional energy required to emit an electron from the surface of metal is called

A. Potential barrier

B. Junction voltage

C. Work function

D. Knee voltage

124. When temperature of a pure semiconductor is increased, its resistance

A. Decreases

B. Remains the same

C. Increases

D. Cannot be estimated

125. As a general rule, _____ are found only in semiconductors.

A. Electrons

B. Bulk resistances

C. Depletion layers

D. Holes

126. What in a semiconductor is defined as the incomplete part of an electron pair bond?

A. Hole

B. Valence electron

C. Impurity

D. Ion

127. When the number of free electrons is increased in doped semiconductor, it becomes a/an _____ semiconductor.

A. N type
B. P type
C. PN type
D. NP type

128. Reducing the number of free electrons in a doped semiconductor forms a/an _____ semiconductor.

A. N type
B. P type
C. PNPN type
D. NPN type

129. Pure semiconductor atoms contain how many valence electrons?

A. 1
B. 2
C. 4
D. 8

130. An acceptor atom contains how many valence electrons?

A. 1
B. 2
C. 3
D. 4

131. What is the resistivity of an extrinsic semiconductor?

A. 1 Ω-cm
B. 2 Ω-cm
C. 3 Ω-cm
D. 4 Ω-cm

132. The forward resistance crystal diode is in the order of

A. Ω
B. mΩ
C. μΩ
D. kΩ

133. What is the ideal value stability factor?

A. 1

B. 0.5

C. Infinite

D. 100

134. What is the approximate mass of a neutron at rest?

A. 1.6726 x 10^-27 kg

B. 9.1096 x 10^-31 kg

C. 1.6022 x 10^-19 kg

D. No mass

135. Approximate mass at rest of a proton is _____ to that of a neutron.

A. Greater than

B. Equal

C. Less than

D. Comparable

136. Charge of an electron is approximately equal to

A. 1.6022 x 10^-19 C

B. -1.6726 x 10^-27 C

C. -1.6022 x 10^-19 C

D. No charge

137. What capacitors are used in transistor amplifiers?

A. Mica

B. Air

C. Electrolytic

D. Paper

138. What is the reason why a common collector is used for impedance matching?

A. Its output impedance is very high

B. Its output impedance is very low

C. Its input impedance is very low

D. Its input impedance is very high

139. In power supplies, circuits that are employed in separating the ac and dc components and bypass the ac components around the load, or prevent their generation are called

A. Filters
B. Limiters
C. Series capacitors
D. Diode circuits

140. A nuclei with a common number of protons, but with different number of neutrons

A. Fission
B. Isotope
C. Atom
D. Core

141. What is the reason why FET has high input impedance?

A. Because its input is a forward biased
B. Because of the impurity atoms
C. Because its input is reverse biased
D. Because it is made of semiconductor material.

142. A MOSFET is sometimes called _____FET

A. Open gate
B. Shorted gate
C. Metallic gate
D. Insulated gate

143. Which of the following choices is an advantage of a MOSFET over a BJT in an RF amplifier circuit?

A. Low voltage operation
B. Low noise
C. Low amplification of signals
D. Compatibility

144. The voltage gain of an emitter follower circuit is

A. High
B. Low
C. Very high
D. Moderate

145. A _____ is considered a current controlled device.

A. Diode
B. Field effect transistor
C. Transistor
D. Resistor

146. A _____ is considered a voltage controlled device

A. FET
B. Diode
C. Transistor
D. Capacitor

147. The value of coupling capacitor, Cc in RC coupling is about

A. 0.01 µF
B. 0.1 µF
C. 10 µF
D. 100 µF

148. FET has a pinch-off voltage of about

A. 0.5 V
B. 5 V
C. 10 V
D. 20 V

149. What is the point of intersection between a diode characteristic and a load line?

A. Q point
B. Quiescent point
C. Operating point
D. All of the above

150. A measure of the ability of an LED to produce the desired number of lumens generated per applied watt of electrical energy.

A. Luminous intensity
B. Luminous efficiency
C. Luminous efficacy
D. Luminous ability

151. Photoconductive effect means
A. The decreased conductivity of an illuminated semiconductor junction
B. The increased conductivity of an illuminated semiconductor junction
C. The conversion of photonic energy to electromagnetic energy
D. The conversion of an electromagnetic energy to photonic energy

152. What happens to the photoconductive material when light strikes on it?
A. The conductivity of the material decreases
B. Nothing important happens
C. The conductivity of the material stays the same
D. The conductivity of the material increases

153. What type of diode is used for tuning receivers; operate with reverse bias and derived its name from voltage-variable capacitor?
A. Zener diode
B. Tunnel diode
C. Varactor diode
D. Crystal diode

154. What semiconductor material is used in the construction of LED?
A. Silicon
B. Germanium
C. Gallium
D. Gallium arsenide

155. What is approximately the sum of the number of protons and neutrons of an atom?
A. Atomic mass
B. Atomic number
C. Atom subscript
D. Valence shell

156. What is the number of protons in the nucleus or the number of electrons in an atom?
A. Atomic mass
B. Atomic weight
C. Atomic number
D. Free electrons

157. The charge of proton has the same value to that of an electron but

A. Opposite in sign

B. Greater in some cases

C. Lesser than in some cases

D. Usually not important

158. Mass of proton or neutron is _____ times that of an electron.

A. 1386

B. 2000

C. 1836

D. 10

159. A photodiode which conducts current only when forward biased and is exposed to light.

A. LAD

B. LED

C. PIN

D. Photoconductor

160. What is the most commonly used color of an LED?

A. Orange

B. Blue

C. Red

D. Green

161. If the temperature of a semiconductor material increases, the number of free electrons

A. Decreases

B. Increases

C. Remains the same

D. Becomes zero

162. Varactor diode's transition capacitance is directly proportional to the product of the permittivity of the semiconductor material and PN junction area but inversely proportional to its

A. Resistance

B. Voltage

C. Depletion width

D. Threshold voltage

163. A _____ is a light-sensitive device whose number of free electrons generated is proportional to the intensity of the incident light.

A. Varicap
B. Photodiode
C. Schottky diode
D. LED

164. Which of the following is NOT one of the three distinct regions in the characteristic curve of a diode?

A. Forward bias region
B. Reverse bias region
C. Breakdown region
D. Saturation region

165. Another name for saturation current in a diode, which arises from the fact that it is directly proportional to the cross-sectional are of the diode.

A. Steady-state current
B. Constant current
C. Thermal current
D. Scale current

166. How much voltage would you measure across the base-emitter junction of a silicon transistor at class A?

A. 0 V
B. 0.3 V
C. 3.6 V
D. 0.7 V

167. In an amplifier, the emitter junction is

A. Forward biased
B. Reverse biased
C. Grounded
D. Shorted

168. A manufacturer quotes in his specifications that a germanium diode conducts 50 mA at 1 volt. Determine the bulk resistance.

A. 100 ohms
B. 60 ohms
C. 14 ohms
D. 20 ohms

169. A silicon diode has a maximum allowable junction temperature of 150ºC. Find the maximum allowable power dissipation at 25ºC temperature if the diodes thermal resistance is 0.4 ºC/mW.

A. 238 mW
B. 313 mW
C. 600 mW
D. 117 mW

170. What is the principal characteristic of a zener diode?

A. A constant current under conditions of varying voltage
B. A high forward current rating
C. A constant voltage under conditions of carrying current
D. A very high PIV

171. What device whose internal capacitance varies with the applied voltage?

A. Zener diode
B. Photodiode
C. Tunnel diode
D. Varactor diode

172. The _____ transistor configuration has the highest value of input resistance.

A. Common base
B. Common emitter
C. Emitter-stabilized
D. Common collector

173. A method of connecting amplifiers in cascade

A. Configuration
B. Coupling
C. Link
D. Stages

174. What is the largest region of a bipolar transistor?

A. Base
B. Emitter
C. Collector
D. P-region

175. A diode that has a negative resistance region and widely used in the design of oscillators, switching networks and pulse generators.

A. Hot-carrier diode
B. Tunnel diode
C. LED
D. Schottky diode

176. Refers to a three-layer diode.

A. Shockley diode
B. Schottky diode
C. Diac
D. Triac

177. Diode that operates in the reverse breakdown voltage and is used as a voltage regulator.

A. Varactor diode
B. PIN diode
C. Tunnel diode
D. Zener diode

178. Another name for metal-oxide semiconductor field effect transistor is

A. JFET
B. GFET
C. IGFET
D. Transistor

179. In enhancement-type MOSFETs, the _____ region is used if the FET is to operate as an amplifier.

A. Triode region
B. Diode region
C. Cut-off region
D. Saturation region

180. In enhancement-type MOSFETs, the _____ regions are used for operation as a switch.

A. Triode and saturation
B. Cut-off and saturation
C. Saturation and active
D. Cut-off and triode

181. Unijunction transistor has three terminals, namely

A. Gate, cathode and anode
B. Grid, plate and cathode
C. Base 1, base 2 and emitter
D. Gate, base 1 and base 2

182. What two elements widely used in semiconductor devices exhibit both metallic and nonmetallic characteristics?

A. Gold and silicon
B. Germanium and gold
C. Bismuth and galena
D. Silicon and germanium

183. What happens to the voltage drop across the diode when current flow increases rapidly in a forward-biased diode?

A. Increases
B. Decreases
C. Becomes zero instantly
D. Remains relatively constant

184. What are the majority current carriers in the N-type silicon?

A. Free electrons
B. Holes
C. Bounded electrons
D. Protons

185. What diode gives off light when energized?

A. Photodiode
B. LED
C. Photoconductive cell
D. Tunnel diode

186. What are the solid state gallium arsenide devices that emit beam of radiant flux when forward biased?

A. LEDs
B. Photoconductive cells
C. IR emitters
D. Photodiodes

187. A graphical representation in transistor wherein the emitter current is plotted against the variable emitter base voltage V_{EB} for constant value of collector-base voltage $V_{CB.}$

A. Static curve
B. Input characteristic curve
C. Output characteristic curve
D. Semilog curve

188. When the collector current Ic is plotted against the collector base voltage at constant emitter Ie, the curve obtain is called

A. Output characteristic curve
B. Linear curve
C. V-I curve
D. Semilog curve

189. Eg for silicon is 1.12 eV and germanium is 0.72 eV. It can be concluded that

A. Less number of electron hole pairs will be generated in silicon than in germanium at room temperature
B. More number of electrons and hole pairs will be generated in silicon than in germanium at room temperature
C. High energy of charges is a property of silicon
D. The relationship of the two is not significant

190. Junction diodes are commonly rated by its

A. Maximum current and PIV
B. Inductance and PIV
C. Capacitance and maximum reverse current
D. Circuits resistance and maximum forward current

191. A special type of diode which is often used in RF switches, attenuators and various types of phase shifting devices is called

A. Zener diode
B. PIN diode
C. Tunnel diode
D. Varactor diode

192. A volt-ampere characteristic curve that describes the relationship of the output voltage of a transistor to its output current is a set input current.

A. Input characteristic
B. Output characteristic
C. Load line
D. Saturation curve

193. The use of _____ coupling is particularly desirable in low level, low noise audio amplifier stages to minimize hum pick up from stray magnetic fields.

A. Transformer
B. Direct
C. RC
D. LC

194. The way in which the gain of an amplifier varies with the frequency is called

A. Logarithmic response
B. Frequency response
C. Voltage response
D. Phase response

195. The maximum rectification efficiency of a half wave rectifier is

A. 81.2 %
B. 40.6 %
C. 20.6 %
D. 25 %

196. The maximum rectification efficiency of a full-wave rectifier is

A. 40.6 %
B. 81.2 %
C. 110 %
D. 92 %

197. A coupled amplifier which has the major advantage of permitting power to be transported from the relatively high output impedance of the first stage to the relative low input impedance of the second stage.

A. RC coupling
B. Transformer coupling
C. Direct coupling
D. Stabilized coupling

198. Electron mobility property of silicon at 300 K is approximately equal to _____ m^2/V-s

A. 1.1
B. 0.135
C. 0.048
D. 45

199. In a push-pull power amplifier, an input transformer can be used as a _____ providing equal amplitude input signals opposite in polarity

A. Phase reversal
B. Phase-splitter
C. Limiter
D. Discriminator

200. If the line frequency is 60 Hz, the output frequency of a bridge rectifier is

A. 30 Hz
B. 60 Hz
C. 120 Hz
D. 240 Hz

201. Which of the following is considered a unipolar device?

A. Capacitor
B. Inductor
C. FET
D. BJT

202. Who invented the feedback amplifier in 1928?

A. Henry Brattain
B. Mark Twain
C. Harold Black
D. Bell Labs

203. The arrow in semiconductor symbol

A. Always points towards the P region and away from the N region
B. Always points towards the N region and away from the P region
C. Is not a significant symbol
D. Always points toward the PN junction

204. If the input power of a half wave rectifier has a frequency of 400 Hertz, then the ripple frequency will be equal to _____.

A. 800 Hertz
B. 200 Hertz
C. 100 Hertz
D. 400 Hertz

205. If the input frequency of a full-wave rectifier is 400 Hertz, the ripple frequency will be _____.

A. Twice as great as the input frequency
B. Equal to the input frequency divided by two
C. Quadruple of the input frequency
D. Equal to a quarter of its input frequency

206. What is also called as the conventional amplifier?

A. Common-collector circuit
B. Emitter follower circuit
C. Common base circuit
D. Common emitter circuit

207. Which of the following is true about the emitter follower circuits?

A. The output signal is 180º out of phase with the input signal
B. The output signal is in phase with the input signal
C. The input signal is always equal to the output signal
D. An emitter follower circuit is equivalent to a common emitter connection

208. The equation for JFET's transconductance.

A. $g_m = \Delta Ic/\Delta V_{GS}$
B. $g_m = I_G/V_G$
C. $g_m = V_{GS}/Ic$
D. $g_m = Ic/V_{DS}$

209. another name for a light activated diode (LAD) is

A. IR emitter
B. LED
C. Photodiode
D. LCD

210. The semiconductor device that radiate light or utilize light are called
A. Active devices
B. Photoelectric devices
C. Optoelectronic devices
D. Passive devices

211. Structural category of a semiconductor diodes can be either
A. Electrolytic and point contact
B. Junction and point contact
C. Electrolytic and vacuum
D. Vacuum and gaseous

212. Zener diodes can be primarily classified as
A. Forward and reverse biased
B. Varactor and rectifying
C. Voltage regulation and voltage reference
D. Gaseous and hot-carrier

213. The principal characteristics of a tunnel diode.
A. A constant current under conditions of varying voltage
B. A negative resistance region
C. A very high PIV device
D. An internal capacitance that varies with the applied voltage

214. A special type of semiconductor diode which varies its internal capacitance as the voltage applied to its terminal varies.
A. Varactor diode
B. Point contact diode
C. Zener diode
D. Silicon controlled rectifier

215. The maximum forward current in a junction diode is limited by its
A. Peak inverse voltage
B. Maximum forward voltage
C. Leakage current
D. Junction temperature

216. What are the three terminals of a FET?

A. Gate, source and drain

B. Plate, cathode and grid

C. Gate source and battery

D. Input, output and ground

217. When a transistor is fully saturated,

A. The emitter current is at its minimum value

B. The transistor alpha is at its maximum value

C. The beta of the transistor is at minimal value

D. The collector current is at its maximum value

218. A FET without a channel and no current occurs with zero gate voltage is

A. Enhancement-mode FET

B. Depletion-mode FET

C. CMOS

D. Metal-oxide transistor

219. Which of the items below is a special precaution necessary in handling FET and CMOS devices?

A. They have fragile leads that it might break off

B. The are light sensitive

C. The are susceptible to damage and static charges

D. They have microwelded semiconductor junctions that are susceptible to breakage

220. A datasheet gives these JFET values; I_{DSS} = 20 mA and pinch-off voltage is 5 volts. What is the gate-source cut-off voltage?

A. 15 volts

B. 10 volts

C. -5 volts

D. 5 volts

221. What is the dc resistance of the JFET in the ohmic region if the drain to source current at gate shorted is equal to 20 mA and the pinch off voltage is 5 \ volts?

A. 300 Ω

B. 250 Ω

C. 1 kΩ

D. 100 Ω

222. Suppose a JFET has I_{DSS} = 7 mA and $V_{GS(off)}$ = -3 V. calculate the drain current for a gate-source voltage of -1V.

A. 3.1 mA
B. 0.455 A
C. 4.45 mA
D. 31.2 mA

223. What are often called square law devices?

A. Transistors
B. Diodes
C. SCRs
D. JFETs

224. Equivalent of transistor at saturation in JFETs is _____?

A. Breakdown
B. Constant-current
C. Pinch-off
D. Ohmic

225. When a JFET is cut-off, the depletion layers are

A. Touching
B. Separated
C. Very far apart
D. Close together

226. The voltage that turns on an enhancement-mode device is the

A. Gate-source cut-off voltage
B. Pinch off voltage
C. Threshold voltage
D. Knee voltage

227. Depletion–mode MOSFET acts mostly as

A. A JFET
B. A voltage source
C. A resistor
D. Enhancement-mode MOSFET

228. JFET's input impedance is
A. Approaches unity
B. Approaches zero
C. Approaches infinity
D. Is unpredictable

229. The current gain of an emitter follower circuit is
A. High
B. Low
C. Moderate
D. Very low

230. The drift transistor has a high frequency cut off
A. Due to the resistance of the base area
B. Since high collector voltage can be used
C. Due to its low inherent internal capacitance and low electron transmit time through the base
D. Due to the large area

231. The maximum operating frequency of a transistor should be _____ percent of the frequency cut-off of the transistor to ensure best performance.
A. 100
B. 20
C. 80
D. 50

232. When transistor applications call for a temperature operating condition which exceeds 185ºF, which element is most suitable?
A. Gallium
B. Antimony
C. Silicon
D. Impossible to operate transistor above 185ºF

233. What is the most important factor of a power transistor?
A. Output resistance
B. Heat dissipation
C. Input voltage
D. Output parameter

234. When the electron transmit time through the base region is very short, this
A. Creates a higher potential barrier
B. Makes the transistor unable to amplify its signal
C. Provides higher cut-off frequency
D. Provides a zener effect

235. When the transistors are used in video amplifiers, its main limitation is
A. Low peak voltage
B. Poor frequency response
C. Low peak current
D. Poor filtering of signals

236. Impedance matching in circuit is important for _____ transfer of energy.
A. Minimum
B. Enough
C. Maximum
D. Limited

237. An amplifier has an output power of 3 watts. Determine the power output level with reference to 1 mW.
A. 34.77 dBm
B. 40 dBm
C. -30 dBm
D. -40 dBm

238. A unijunction transistor is a three terminal consisting of _____ semiconductor layers.
A. One
B. Two
C. Three
D. Four

239. It is the process by which atoms are constantly losing and regaining free electrons.
A. Ionization
B. Covalent bond
C. Recombination
D. Parasitism

240. Termed as unwanted oscillation that may occur in most any type of circuits, oscillator, amplifier, power supply, receiver and transmitters

A. White noise
B. Parasitic oscillations
C. Ripple
D. Pulsating dc signal

241. Which of the items below describes an RF amplifier which will amplify a weak signal voltage in relatively the same proportion as it will amplify a stronger signal voltage?

A. Class A amplifier
B. Linear amplifier
C. Non-linear amplifier
D. Inverting amplifier

242. Its maximum amount of reverse voltage which can be applied on a diode before breakdown point is reached.

A. Zener voltage
B. Peak inverse voltage
C. Breakdown voltage
D. Threshold voltage

243. It refers to any of the over 100 different substances which have never been separated into simpler substances by chemical means and which alone or in combination constitute all matter.

A. Elements
B. Atom
C. Holes
D. Electrons

244. It is also known as a solid state lamp which utilizes the fall of an electron from the conduction level to the valence level to develop an energy release in the form of heat or light.

A. LCD
B. LED
C. Photodiode
D. Photoconductive cell

245. Which of the items below is not true with α of a transistor?

A. It is the current gain of a common-base configuration
B. It is the ratio of the change in collector current to the change in emitter current
C. It is usually having a value of unity in some approximations
D. It is the ratio of the change in collector current to the change in base current.

246. Present atomic theories place the mass and positive charge of an atom in a central nucleus composed of protons and

A. Holes
B. Core
C. Neutrons
D. Magnetron

247. The _____ as fundamental particle is considered as a bundle of radiant energy or light, the amount energy being related to the frequency.

A. Protons
B. LED
C. Photons
D. Comet

248. Electron emitted by the mechanical impact of an ion striking a surface is called

A. Primary electrons
B. Secondary electrons
C. Moderately doped electrons
D. Polarized charge

249. The break up of nuclei into nuclear fragments that are themselves nuclei is called

A. Fission
B. Isotope
C. Neutrino
D. Atom

250. What particles are of zero charge and zero mass?

A. Fusion
B. Neutrino
C. Fission
D. Isotopes

251. What is approximate mass of an electron at rest?

A. 9.1096 x 10^-31 kg

B. 1.6726 x 10^-27 kg

C. 1.6762 x 10^-31 kg

D. 1.7588 x 10^11 kg

252. What term is used to describe the outermost shell of an atom?

A. Valence shell

B. Free shell

C. Electron shell

D. Conductive cell

253. What are the electrons at the outermost shell which are usually weakly attracted by the core such that an outside force can easily dislodge these electrons from the atom?

A. Free electrons

B. Orbiting electrons

C. Bound electrons

D. Loose electrons

254. The reason why electrons are not pulled in the positive charged nucleus is because of the _____ which usually became exactly equals the inward attraction of the nucleus.

A. Kinetic energy

B. Energy at rest

C. Centrifugal force

D. Frictional force

255. Which of the following items is not a type of material?

A. Conductor

B. Semiconductor

C. Insulator

D. Diode

256. The highest energy band of an atom which can be filled with electrons.

A. Valence band

B. Conduction band

C. Insulation band

D. Energy level

257. An energy band in which electrons can move freely

A. Valence band

B. Conduction band

C. Energy gap

D. Insulation gap

258. Approximate energy gap in insulator is

A. Eg = > 5 eV

B. Eg = 1.1 eV

C. Eg = 0.67 eV

D. Eg = 4 eV

259. The energy gap for semiconductors made of silicon is

A. Eg = 5 eV

B. Eg = 1.1 eV

C. Eg = 0.67 eV

D. Eg = 4 eV

260. The energy gap for germanium made semiconductor is

A. Eg = 5 eV

B. Eg = 1.1 eV

C. Eg = 0.67 eV

D. No energy gap

261. What type of material usually has one valence electron?

A. Insulator

B. Semiconductor

C. Conductor

D. Transistor

262. What type of material usually has four valence electrons?

A. Insulator

B. Semiconductor

C. Conductor

D. IGFET

263. Which of the following is considered as the best conductor?

A. Gold

B. Silicon

C. Germanium

D. Mica

264. Which of the items below is not taking place inside a silicon crystal?

A. Some free electrons and holes are being created by thermal energy

B. Other free electrons and holes are recombining

C. Some free electrons and holes exist in an in-between state

D. Some free electrons disappears in the lattice due to vaporization

265. It is an arrangement of silicon atoms combine to form a solid such that there are now 8 electrons in the valence shell.

A. Crystal

B. Bonding

C. Recombination

D. Solid silicon

266. The sharing of valence electrons to produce a chemically stable atom

A. Bound electrons

B. Crystal

C. Covalent bond

D. Recombination

267. The eight electrons which are tightly held by the atom are called

A. Valence electrons

B. Outermost electrons

C. Bound electrons

D. Covalent electrons

268. When an atom has bound electrons, it is described as

A. All charges do recombination

B. Valence electrons disappear due to vaporization

C. Filled or saturated since valence orbit can hold not more than 8 electrons

D. Merging of electrons and other particles

269. What refers to the temperature of the surrounding air?

A. Atmospheric temperature
B. Ambient temperature
C. Freezing point
D. Cooling temperature

270. What term is used to describe the released electrons dislodged from its original shell due to the increase in temperature which joins into a larger orbit?

A. Free electrons
B. Bound electrons
C. Covalent electrons
D. Merge electrons

271. What term is used to refer to the vacancy left by the free electron when it departs from its original shell?

A. Proton
B. Hole
C. Neutron
D. Nucleus

272. The merging of a free electron and a hole inside the silicon crystal

A. Covalent bond
B. Recombination
C. Merged electron
D. Valence bond

273. The amount of time between the creation and disappearance of a free electron.

A. Recombination time
B. Bonding time
C. Lifetime
D. Propagation time

274. The purpose of adding an impurity atom to an intrinsic crystal is

A. To alter its insulating property
B. To increase its electric conductivity
C. To stop conduction
D. To increase the resistivity of the semiconductor material

275. An extrinsic semiconductor produces _____ when a pentavalent atom is added to the molten silicon

A. Intrinsic
B. P-type
C. N-type
D. Hybrid type

276. Which of the items below is not a pentavalent atom?

A. Phosphorus
B. Aluminum
C. Antimony
D. Arsenic

277. What extrinsic semiconductor is produced when a trivalent atom is added to the molten silicon?

A. Aluminum
B. N-type
C. P-type
D. Holes

278. The reduction of power handling capability of the diode due to the increase of ambient temperature form room temperature.

A. Maximum junction temperature
B. Linear power derating factor
C. Power factor
D. Amplification factor

279. The maximum temperature the diode can operate before burning.

A. Maximum dissipation factor
B. Maximum junction temperature
C. Ambient temperature
D. Boiling temperature rating

280. Reverse recovery time of the diode is computed as the _____ of the storage time and transition interval from the forward to reverse bias.

A. Sum
B. Product
C. Quotient
D. Difference

281. The nucleus of a copper atom contains how many protons?

A. 2

B. 1

C. 18

D. 29

282. How many protons does the nucleus of a silicon atom contain?

A. 4

B. 14

C. 29

D. 32

283. An intrinsic semiconductor has some holes in it at room temperature. What causes these holes?

A. Doping

B. Thermal energy

C. Free electrons

D. Valence electrons

284. When a diode is forward biased, the recombination of free electrons and holes may produce _____?

A. Heat

B. Light

C. Radiation

D. All of the above

285. Which of the following doping elements have a valence of 5?

A. Gallium

B. Boron

C. Aluminum

D. Phosphorous

286. Which of the following doping elements have a valence of 4?

A. Arsenic

B. Gallium

C. Aluminum

D. Silicon

287. Which of the following doping elements have a valence of 3?

A. Gallium
B. Boron
C. Aluminum
D. Phosphorous

288. It is a stable positive charge in the nucleus that is not free to move

A. Hole
B. Proton
C. Neutron
D. Electron

289. A positive charge outside the nucleus which is present only in semiconductor due to unfilled covalent bonds.

A. Electron
B. Proton
C. Hole
D. Neutron

290. When charges are forced to move by the electric field of a potential difference, _____ current is said to flow.

A. Reverse
B. Drift
C. Leakage
D. Threshold

291. When PN junction is connected to a battery in such a way that P-side is connected to positive terminal of the battery and negative terminal to N-side, this connections is known as

A. Forward bias
B. Reverse bias
C. Back bias
D. Knee bias

292. When PN junction is connected to a battery in such a way that P-side is connected to negative terminal of the battery and positive terminal to N-side, this connections is known as

A. Forward bias
B. Reverse bias
C. Depletion connection
D. Positive bias

293. An electron in the conduction band

A. Losses its charge easily
B. Jumps to the tip of the crystal
C. Has higher energy than the electron in the valence band
D. Has lower energy that the electron in the valence band

294. An ideal diode

A. Should have a zero resistance in the forward bias as well as in reverse bias
B. Should have an infinitely large resistance in the forward bias and zero resistance in reverse bias
C. Should have zero resistance in forward bias and an infinitely large resistance in reverse bias
D. Should have infinitely large resistance in forward as well as reverse bias

295. Thermal voltage Vt is approximately equal to _____ at room temperature (20ºC)

A. 25 mV
B. 25 V
C. 100 mV
D. 100 V

296. Boltzmann's constant is equivalent to

A. 1.62 x 10^-18 C
B. 8032 x 10^-5 eV/ºK
C. 0.7 V
D. 1.3 x 10^8 V/m

297. The preferred form of biasing a JFET amplifier is through the

A. Voltage divider bias
B. Gate bias
C. Self bias
D. Source bias

298. The gate-to0source on voltage if an n-channel enhancement mode MOSFET is

A. Less than V_{th}

B. Equal to $V_{gs(off)}$

C. Greater than $V_{DS(on)}$

D. Greater than $V_{GS(th)}$

299. A mechanism for carrier motion in semiconductors which occurs when an electric field is applied across a piece of silicon

A. Carrier diffusion

B. Carrier drift

C. Recombination

D. Diffusivity

300. What occurs in pn diodes when the minority carriers that cross the depletion region under the influence of the electric field gain sufficient kinetic energy to be able to break covalent bonds in atoms with which they collide?

A. Drift

B. Avalanche breakdown

C. Diffusion

D. Saturation

CHAPTER 4: POWER GENERATOR / SOURCES: PRINCIPLE AND APPLICATIONS

1. A _____ is a group of cells that generates electric energy from their internal chemical reaction
   A. battery
   B. regulator
   C. power supply
   D. solar energy

2. Which of the following is the main function of a battery?
   A. To provide a source of steady DC voltage to fixed polarity
   B. To provide a source of steady dc voltage of variable polarity
   C. To provide a source of variable dc voltage of fixed polarity
   D. To provide a source of variable dc voltage of variable polarity

3. Volt is a unit of _____
   A. electromotive force
   B. energy
   C. force
   D. magneto motive force

4. A transformer will work on
   A. ac only
   B. ac as well as dc
   C. dc only
   D. pulsating dc

5. In a chemical cell current is the movement of
   A. positive and negative ions
   B. positive charges
   C. positive ions only
   D. negative ions only

6. What is the nominal output of an automotive battery having six lead acid cells in series?
   A. 12V
   B. 24V
   C. 6V
   D. 3V

7. The speed of a dc motor is
   A. directly proportional to flux per pole
   B. inversely proportional to flux per pole
   C. inversely proportional to applied voltage
   D. inversely proportional to armature current

8. low speed alternators are driven by
   A. hydraulic turbines
   B. steam turbines
   C. steam engines
   D. diesel engines

9. High speed alternators are driven by
   A. diesel engine
   B. steam turbines
   C. hydraulic turbines
   D. diesel engine

10. The common 9v flat battery for transistor radio has ____ cells connected ins series
    A. 12
    B. 3
    C. 6
    D. 9

11. For the same rating, the size of low speed alternator is _____ that of high speed alternator
    A. about the same as
    B. less than
    C. more than
    D. twice

12. Which of the following is not a secondary cell?
    A. Silver-zinc
    B. Nickel-iron
    C. Silver-oxide
    D. Lead-acid

13. Which of the following is not a primary cell?
    A. Carbon-zinc
    B. Zinc-chloride
    C. Edison call
    D. Mercuric oxide

14. The brush voltage drop in a dc machine is about
    A. 0.1V
    B. 2V
    C. 10V
    D. 20V

15. Carbon brushes are used in a dc machine because
    A. carbon lubricates and polishes the commutator
    B. contact resistance is decreased
    C. carbon is cheap
    D. carbon is abundant

16. considered as the main types of battery
    A. Lithium cell and alkaline
    B. Carbon-zinc dry cell and lead sulphuric wet cell
    C. Leclanche cell and carbon zinc
    D. Voltaic cell and lithium cell

17. Which of the following is the main function of a dc motor?
    A. to generate power
    B. to change mechanical energy to electrical energy
    C. to change electrical energy to mechanical energy
    D. to change chemical energy to mechanical energy

18. Which motor has the best speed regulation?
    A. Series
    B. Shunt
    C. Commutatively compounded
    D. Differentially compounded

19. A method of converting chemical energy into electric energy by dissolving two different conducting materials in an electrolyte
    A. Battery
    B. Cell
    C. Voltaic cell
    D. Charging

20. A commutatively compounded motor does not run at dangerous speed at light loads because of the presence of
    A. shunt winding
    B. interpoles
    C. series
    D. compensating windings

21. DC shunt motors are used in those applications where _____ is required
    A. high starting torque
    B. high no load speed
    C. practically constant speed
    D. variable speed

22. Galvanic cell is the other name of
    A. voltaic cell
    B. primary cell
    C. secondary cell
    D. solar cell

23. For the same rating _____ motor has the highest staring torque
    A. shunt
    B. differentially compounded
    C. commutatively compound
    D. series

24. The voltage regulation of an alternator with a power factor of 0.8 lagging is _____ at unity power factor
    A. greater than
    B. the same as
    C. smaller than
    D. 100%

25. Which is the most suitable for punch presses?
    A. shunt motor
    B. differentially compounded motor
    C. series motor
    D. commutatively compounded motor

26. In a vacuum cleaner, _____ motor is generally used
    A. shunt
    B. series
    C. commutatively compounded
    D. differentially compounded

27. A type of secondary cell that can be recharged but with an electrolyte that cannot be refilled
    A. Sealed rechargeable cell
    B. Sealed secondary cell
    C. Lealanche cell
    D. Alkaline cell

28. Silver cadmium is secondary cell with a nominal opne circuit voltage of
    A. 1.1V
    B. 1.2V
    C. 1.5V
    D. 1.35V

29. Which is a variable speed motor?
    A. series
    B. commutatively compounded
    C. shunt
    D. differentially compounded

30. The most commonly used method of speed control of a dc motor is by vbarying
    A. voltage applied to the motor
    B. felids strength
    C. effective number of conductors in series
    D. armature circuit resistance

31. What gives the relative activity in forming ion charges for some of the chemical elements?
    A. Electrochemical series
    B. Electrical series
    C. Electromotive series
    D. Both A and C above

32. The ac armature winding of an alternator is
    A. always star connected
    B. star delta connected
    C. generally delta connected
    D. pi connected

33. The air gap in an alternator is _____ in an induction machine
    A. much shorter than
    B. about the same as
    C. much longer than
    D. one-half than

34. Nickel-iron cells is a secondary cell with a nominal open- circuit voltage output of 1.2 and is otherwise known as
    A. Leclanche cell
    B. Galvanic cell
    C. Voltaic cell
    D. Edison cell

35. A dc series motor is most suitable for
    A. cranes
    B. lathes
    C. pump
    D. punch presses

36. Which of the most suitable motor fro elevator
    A. Series
    B. Differentially compounded
    C. Shunt
    D. Commutatively compounded

37. The voltage output of a cell depends on
    A. its elements
    B. electromotive series
    C. its electrodes
    D. electrochemical series

38. The alternators driven by _____ do not have a tendency to hunt
    A. diesel engines
    B. steam engines
    C. water turbines
    D. prime movers

39. Damper windings are used in alternators to
    A. prevent hunting
    B. achieve synchronism
    C. reduce wind age losses
    D. reduce eddy current loss

40. Leclanche cell is the other name of
    A. lead acid cell
    B. zinc chloride
    C. carbon zinc cell
    D. mercuric cell

41. the primary leakage flux links
    A. primary winding only
    B. secondary winding only
    C. both primary and secondary windings
    D. neither primary nor secondary windings

42. Overheating of a dc motor is often due to
    A. insufficient end play
    B. overloads
    C. loose parts
    D. rough commutator

43. A small 9V battery might be used to provide power to
    A. an electric stove
    B. an electronic calculator
    C. a personal computer
    D. a radio transmitter

44. The frequency of the system with which several alternators are parallel can be increased by simultaneously _____ of all generators
    A. increasing the field excitation
    B. decreasing the field excitation
    C. increasing the speed of prime movers
    D. decreasing the speed of prime movers

45. A transformer is an efficient device because it
    A. is a static device
    B. uses capacitive coupling
    C. uses inductive coupling
    D. uses electric coupling

46. The amount of back emf of shunt motor will increase when
    A. the load is increased
    B. the field is strengthen
    C. the field is weakened
    D. the load is decreased

47. Three cells connected in series from a
    A. battery
    B. voltage divider
    C. voltage multiplier
    D. hybrid

48. What can be found in a transformer with open-circuit test?
    A. Copper losses
    B. Turns ratio
    C. Total equivalent resistance
    D. Total equivalent leakage resistance

49. Transformers having ratings less than 5kva are generally
    A. oil cooled
    B. water cooled
    C. natural air cooled
    D. self cooled

50. An example of rechargeable dc source is an/a
    A. lithium battery
    B. photovoltaic cell
    C. optoisolator
    D. lead acid battery

51. The voltage of the bus bar to which several alternators are paralleled may be raised by simultaneously _____ of all alternators
    A. increasing field excitation
    B. decreasing field excitation
    C. increasing input to prime movers
    D. decreasing input to prime movers

52. The rating of an alternator is expressed in
    A. kW
    B. kVA
    C. HP
    D. KVAR

53. Cumulatively compounded motors are used in applications where _____ is required
    A. variable speed
    B. poor speed regulation
    C. sudden heavy loads for a short duration
    D. constant speed

54. Which motor never use belt connected loads?
    A. Series
    B. Commulatively compounded
    C. Shunt
    D. Differentially compounded

55. A stand alone solar power system
    A. relies on the electric utility at night
    B. uses solar panels and batteries
    C. requires the use of dry cells
    D. need a full wave rectifier

56. A transformer will have zero efficiency at
    A. full load
    B. half full load
    C. no load
    D. twice the load

57. The efficiency of a transformer will be at maximum when
    A. leakage reactance of the two windings are equal
    B. resistance of the two windings are equal
    C. copper loss is equal to constant loss
    D. copper loss is zero

58. The armature winding of a dc Machine is _____ winding
    A. an open circuit
    B. a closed circuit
    C. partly open circuit and partly closed circuit
    D. lap

59. The speed at which a 6 pole alternator should be drive to generate 50 cycles per second is
    A. 1500rpm
    B. 500rpm
    C. 1000rpm
    D. 1200rpm

60. A 12v battery is rated at 48ah. If it must deliver an average of 2.0a, how long will the battery lat before it needs recharging
    A. 48hrs
    B. 4hrs
    C. 96hrs
    D. 24hrs

61. Connecting batteries of equal voltage in parallel
    A. multiplies the voltage available
    B. increases the internal resistance
    C. reduces the power available
    D. multiplies the current available

62. A storage battery in which the electrodes are grids of lead containing lead oxides that changes in composition during charging and discharging and the electrolyte is dilute sulfuric acid
    A. Leclanche battery
    B. Nickel cadmium battery
    C. Lead and battery
    D. Faure storage battery

63. The common dry cell, which is a primary cell having a carbon positive electrode and a zinc negative electrode in an electrolyte of sal ammoniac and a depolarizer
    A. Leclanche cell
    B. Faure storage cell
    C. Lead acid cell
    D. Lithium cell

64. The maximum flux produced in the core of a transformer is
    A. directly proportional to supply frequency
    B. inversely proportional to supply frequency
    C. inversely proportional to primary voltage
    D. inversely proportional to secondary voltage

65. A transformer is so designed that primary and secondary windings have
    A. loose magnetic coupling
    B. tight magnetic coupling
    C. critical magnetic coupling
    D. good electric coupling

66. Four carbon zinc cell in series will provide about
    A. 2Vdc
    B. 6Vdc
    C. 9Vdc
    D. 8Vdc

67. What refers to a method in which the charger and the battery are always connected to each other for supplying current to the load
    A. Continuous charging
    B. Float charging
    C. Infinite charging
    D. On line charging

68. A series motor designed to operate on dc or ac
    A. Shunt motor
    B. Series motor
    C. Universal motor
    D. Compound motor

69. Combination of ac motor, dc generator, and exciter to provide adjustable voltage dc power to a dc motor.
    A. Ward-Leonard system
    B. Half wave SCR adjustable voltage supply
    C. Compound motor
    D. Universal motor

70. A motor takes a large current at starting because
    A. the armature resistance is high
    B. back emf is low
    C. back emf is high
    D. shunt field is producing weak field

71. A series motor will over speed when
    A. the load is increased
    B. the armature circuit is open
    C. the field id opened
    D. load is removed

72. When the load on an alternator is increased, the terminal voltage increases if the load power factor is
    A. unity
    B. leading
    C. lagging
    D. zero

73. The efficiency of the turbo-alternator _____ with increase in speed
    A. decreases
    B. remains the same
    C. increases
    D. becomes 100%

74. What is the output of a lead acid cell?
    A. 2.1V
    B. 1.5V
    C. 1.35V
    D. 1.25V

75. One of the following is a false statement
    A. storage cell has a reversible chemical reaction
    B. carbon zinc cell has unlimited shelf life
    C. lead acid cell is rechargeable
    D. primary cell is not rechargeable

76. In an alternator, the effect of armature reaction is minimum at power factor of
    A. 0.866 lagging
    B. 0.5 lagging
    C. 0.866 leading
    D. Unity

77. For given number of poles (2) and armature conductors, a lap winding will carry _____ a wave winding
    A. more current than
    B. same current as
    C. less current than
    D. half the current than

78. An 8 pole duplex lap winding will have _____ parallel paths
    A. 8
    B. 32
    C. 4
    D. 16

79. To increase the voltage output, cells are connected in
    A. parallel
    B. series-parallel
    C. parallel-series
    D. series

80. To increase current capacity, cells are connected in
    A. parallel
    B. series
    C. series- parallel
    D. parallel- series

81. Two things which are same for primary and secondary of transformer are
    A. ampere turns and voltage per turn
    B. resistance and leakage reactance
    C. current and inducted voltage
    D. number of turns and power

82. A transformer operates poorly at very low frequcnies because
    A. permeability of core is increased
    B. magnetizing current is abnormally high
    C. primary reactance is too much
    D. permeability core is reduced

83. In an auto transformer, the primary and secondary are _____ coupled
    A. only magnetically
    B. magnetically as well as electrically
    C. only electrically
    D. directly

84. A storage battery in which the plates consist if lead antimony supporting grids covered with a lead oxide paste immersed in weak sulfuric acid
    A. Leclanche cell
    B. primary battery
    C. secondary battery
    D. Faure storage battery

85. Which of the following is a dry storage cell?
    A. Leclanche cell
    B. Edison cell
    C. Mercury cell
    D. Nickel cadmium cell

86. The field structure of a dc machine uses
    A. Salient pole arrangement
    B. Non salient pole arrangement
    C. Silicon steel
    D. Cast steel

87. Small Dc machines generally have _____ poles
    A. 4
    B. 2
    C. 6
    D. 8

88. The armature of a dc machine is laminated in order to reduce
    A. Eddy current loss
    B. Copper loss
    C. Hysteresis loss
    D. Frictional loss

89. To produce an output of 7.5v, how many carbon zinc cells are connected in series?
    A. 4
    B. 5
    C. 6
    D. 3

90. The demand for a large increase in torque of a dc series motor is met by a
    A. large decrease in current
    B. large increase in speed
    C. large decrease in speed
    D. small decrease in speed

91. As the load increases a, _____ motor will speed uo
    A. series
    B. commutatively compounded
    C. shunt
    D. differentially compounded

92. The flux in the core o a single phase transformer is
    A. purely alternating one
    B. purely rotating one
    C. partly alternating and partly rotating
    D. constant

93. When the primary of a transformer is connected to a dc supply
    A. a primary draw small current
    B. primary leakage reactance is increased
    C. core losses are increased
    D. primary may burned out

94. a constant voltage source has
    A. High internal resistance
    B. minimum efficiency
    C. minimum current capacity
    D. low internal resistance

95. If the excitation of an alternator operating in parallel with other alternators is increased above the normal value excitation of excitation its
    A. power factor becomes more lagging
    B. output current decreases
    C. power factor becomes more leading
    D. output kw decreases

96. This synchronous reactance of an alternator is generally _____ armature resistance
    A. 5 times smaller than
    B. 10 – 100 times greater than
    C. 5 times greater than
    D. 10 times smaller than

97. DC series motors are used in those applications where _____ required

A. high starting torque

B. low no load speed

C. constant speed

D. variable speed

98. A dc motor is still used in industrial applications because it

A. is cheap

B. provides fine speed control

C. is simple in construction

D. has no replacement

99. The stator of n alternator is wound for _____ on the rotor

A. a more number of poles than

B. the same number of poles as

C. less number of poles than

D. twice the number of poles

100. Why are carbon brushes preferable compared to copper brushes

A. they have longer life

B. they have lower resistance

C. they are cheaper

D. they reduce sparking

101. The synchronous reactance of an alternator _____ as the iron is saturated

A. decreases

B. remains the same

C. increases

D. becomes doubled

102. A 4 pole dc machine has magnetic circuits

A. 2

B. 4

C. 8

D. 6

103. The current in armature conductors of a dc machine is

A. pure dc
B. ac
C. pulsating dc
D. pure dc plus pulsating dc

104. The ac armature winding of an alternator operates at _____ the field of winding

A. the same voltage as
B. much higher voltage than
C. much lesser voltage than
D. half the voltage than

105. Why are the field poles and the armature of a dc machine laminated?

A. to reduce the weight of the machine
B. to reduce eddy current
C. to decrease the speed
D. to reduce armature reaction

106. The back emf or counter emf in a dc motor

A. opposes the applied voltage
B. aids the armature current
C. aids the supplied voltage
D. opposes the armature current

107. The synchronous reactance of an alternator is due to

A. leakage flux
B. armature reaction
C. dc field excitation
D. hysteresis loss

108. Back emf in a dc motor is maximum at

A. no load
B. half full load
C. full load
D. three fourth full load

109. The mechanical power developed in a dc motor is maximum when back emf is equal to _____ the applied voltage

A. twice
B. one third
C. one half
D. one fourth

110. The core type transformer is generally suitable for

A. high voltage and small output
B. low voltage and high output
C. high voltage and high output
D. low voltage and low output

111. The transformer that should never have the secondary open circuited when primary is energized is

A. power transformer
B. auto transformer
C. voltage transformer
D. current transformer

112. The field winding of an armature is _____ excited

A. dc
B. ac
C. both ac and dc
D. battery

113. The salient pole construction for field structure of an alternator is generally used for _____ machine

A. 2 pole
B. 8 pole
C. 4 pole
D. 6 pole

114. When the speed of a dc motor increases, its armature current

A. increases
B. remains the same
C. decreases
D. becomes infinite

115. The frequency og emf generated in an 8 pole alternator at 900 rpm is

A. 50hz
B. 120hz
C. 60hz
D. 240hz

116. In case if a 4 pole machine, 1 mechanical degree corresponds to _____ electrical degree

A. 2
B. 8
C. 4
D. 6

117. The torque developed by a dc motor is directly proportional to

A. flux per pole x armature current
B. armature resistance x applied voltage
C. armature resistance x armature current
D. flux per pole x applied voltage

118. AC machine in which the torque is produced by the interaction of currents in the stator and currents induced in the motor by transformer action

A. squirrel cage motor
B. stepper motor
C. synchronous motor
D. induction motor

119. Machine in which torque is produced by the interaction of ac current in the stator and dc currents in the rotor turning synchronism

A. synchronous motor
B. induction motor
C. squirrel cage motor
D. stepper motor

120. The main drawback of a dc shunt generator is that

A. terminal voltage drops considerably with load
B. shunt field circuit has high resistance
C. generated voltage is small
D. it is expensive

121. DC machines which are subjected to abrupt changes of load are provided with
A. interpole windings
B. compensating winding
C. equalizers
D. copper brushes

122. The shaft torque in a dc motor is less than total armature torque because of _____ in the motor
A. copper losses
B. iron and friction losses
C. field losses
D. hysteresis loss

123. Armature reaction in a dc motor is increased
A. When the armature current increases
B. when the armature current decreases
C. when the field current increases
D. by interpole

124. An ideal transformer is one which
A. has no losses and leakage reactance
B. does not work
C. has the same number of primary and secondary turns
D. has the same primary and secondary voltage

125. If a power transformer is operated at very high frequencies then
A. primary reactance is too much increased
B. primary will draw large power
C. core losses will be excessive
D. core loss is negligible

126. With respect to the direction of rotation, interpoles on a dc motor must have the same polarity as the main poles
A. ahead of them
B. in parallel with them
C. behind them
D. beside them

127. The open circuit test on a transformer is always made on

A. low voltage winding

B. high voltage winding

C. either low or high voltage

D. neither low or high voltage

128. In the short circuit test in a transformer, _____ winding is generally short circuited

A. high voltage

B. low voltage

C. either low or high voltage

D. neither low nor high voltage

129. In a dc motor, the brushes are shifted from the mechanical neutral palne in a direction opposite to the rotation to

A. decreased speed

B. reduced sparking

C. increase speed

D. produce flat characteristics

130. The number of cycles generated in a 6 pole alternator in one revolution is

A. 3

B. 5

C. 6

D. 2

131. If the lagging load power factor of an alternator is decreased, the demagnetizing effect of the armature reaction

A. remains the same

B. is increased

C. is decreased

D. becomes infinite

132. In a very large dc motor with severe heavy duty, armature reaction effects are corrected by

A. using interpole only

B. using compensatory windings in addition to interpoles

C. shifting the brush position

D. fixing the brush position

133. The amount of copper in the primary is _____ that of the secondary

A. about the same as

B. smaller than

C. greater than

D. twice

134. The open circuit test on a transformer gives

A. copper losses

B. iron losses

C. friction losses

D. total losses

135. The speed of a _____ motor is practically constant

A. commutatively compounded

B. differentially compounded

C. series

D. shunt

136. The running speed of a dc series motor is basically determined by

A. field excitation

B. armature resistance

C. load

D. applied voltage

137. If the excitation of an alternator operating in parallel with pther alternators is decreased, its

A. power factor becomes more leading

B. output kW will change

C. power factor becomes more lagging

D. power factor becomes unity

138. The distribution of load between two alternators operating in parallel can be changed by changing

A. phase sequence

B. field excitation of alternators

C. driving torques of prime movers

D. current direction

139. After a shunt motor is up to speed the speed may ne increased considerably by

A. increasing field circuit resistance
B. decreasing field circuit resistance
C. increasing the armature circuit resistance
D. reducing the load

140. When the secondary of a transformer is short circuited, the primary inductance

A. is decreased
B. remains the same
C. is increased
D. becomes zero

141. For the same rating _____ motor has the least starting torque

A. commulatively compounded
B. shunt
C. series
D. differentially compounded

142. The deciding factor in the selection of a dc motor for a particular application is its _____ characteristics

A. speed torque
B. torque armature current
C. speed armature current
D. speed

143. The rotor of a turbo alternator is made cylindrical in order to reduce

A. eddy current loss
B. wind age loss
C. hysteresis loss
D. copper loss

144. The disadvantage of a short pitched coil is that

A. harmonics are introduced
B. waveform becomes non-sinusoidal
C. voltage round the coil is reduced
D. voltage round coil is increases

145. The demand for a large increase in torque of a dc shunt motor is met by a
A. large decreased in speed
B. large increased in current
C. large increased in speed
D. small increased in current

146. For 20% increase in current, the motor that will give the greatest increase in torque is _____ motor
A. shunt
B. series
C. differentially compounded
D. commulatively compounded

147. What cell is used to detect infrared radiation, either its generated voltage or its change of résistance may be used as a measure of the intensity of the radiation?
A. lead sulfide cell
B. Faure storage cell
C. infrared cell
D. Leclanche cell

148. A galvanic cell resulting from difference in potential between adjacent on the surface of a metal immersed in an electrolyte
A. NiCd cell
B. lead acid cell
C. local cell
D. lithium cell

149. Which motor is used to start heavy loads?
A. series
B. differentially compounded
C. shunt
D. commulatively compounded

150. When load is removed, the motote that will run at the highest speed is the _____ motor
A. shunt
B. commulatively compounded
C. series
D. differentially compounded

151. The friction and wind age losses in a dc motor depends upon

A. speed

B. armature current

C. flux

D. field and armature resistance

152. If a transformer core has air gaps then

A. reluctance of magnetic path is decreased

B. hysteresis loss is decreased

C. magnetizing current is greatly increased

D. eddy current is increased

153. The effect of leakage flux in a transformer is to

A. increase copper losses

B. decrease copper losses

C. cause voltage drop in the windings

D. reduce eddy current losses

154. The iron losses in a dc motor depend upon

A. flux only

B. both flux and speed

C. speed only

D. temperature

155. The greatest percentage of power loss in a dc motor is due to

A. wind age loss

B. core loss

C. copper loss

D. friction loss

156. Excessive sparking at the brushes may caused due to

A. dirt on the commutator

B. misalignment of machine

C. loose coupling

D. worn bearings

157. The temperature rise of a transformer is directly proportional to

A. apparent power

B. leakage reactance

C. reactive power

D. true power

158. A graphical relation between the generated emf and the field current of a machine

A. current generation curve

B. voltage generation curve

C. voltage current curve

D. magnetization curve

159. Majority of alternators in use have

A. revolving ac armature winding

B. stationary field type construction

C. revolving field type construction

D. stationary ac armature winding

160. The stator of an alternator is identical to that of a

A. dc generator

B. 1 phase induction motor

C. 3 phase induction motor

D. Rosenberg generator

161. Excessive motor vibration is caused by

A. too much brush tension

B. open armature coil

C. worn bearings

D. bent shaft

162. Hot bearings of a dc motor may be caused by

A. poor ventilation

B. loose coupling

C. incorrect voltage

D. lack of dirty lubricant

163. Intermittent sparking at the brushes of dc motor may be caused due to

A. an open armature coil

B. loose coupling

C. intermittent load

D. incorrect voltage

164. When the load on a transformer is increased, the eddy current loss

A. is decreased

B. remains the same

C. is increased

D. becomes zero

165. The yoke of a dc machine is made of

A. silicon steel

B. aluminium

C. soft iron

D. cast steel

166. The armature of a dc machine is made of

A. silicon steel

B. cast steel

C. wrought iron

D. soft iron

167. The voltage per turn of the primary of a transformer is _____ the voltage per turn of the secondary

A. more than

B. the same as

C. less than

D. twice

168. The winding of the transformer with greater number of turns will be

A. high voltage winding

B. low voltage winding

C. either high or low voltage winding

D. high power

169. The coupling field between electrical and the mechanical systems of a dc machine is

A. electric field
B. both electric and magnetic fields
C. magnetic field
D. electromagnetic field

170. The real working Part of a dc machine is the

A. commutator
B. armature winding
C. field winding
D. stator

171. Which DC machines are the most common?

A. 2 pole
B. 6 pole
C. 4 pole
D. 8 pole

172. The core type transformer provides

A. much longer magnetic pattern
B. lesser average length per turn
C. shorter magnetic path
D. longer magnetic path

173. A machine with field excitation by botrh shunt and series windings

A. complex machine
B. compound machine
C. universal machine
D. shunt/ series machine

174. The armature winding of a dc machine is placed on the rotor to

A. save iron
B. facilitate commutation
C. reduce losses
D. reduce armature reaction

175. The yoke of a dc machine carries _____ poke flux
A. one third of
B. two times of
C. one half of
D. one fourth of

176. The greatest eddy current loss occurs in the _____ of a dc machine
A. field poles
B. commutating process
C. yoke
D. armature

177. The commutator pitch for a simplex lap winding is equal to
A. number of poles of the machines
B. 1
C. poles pairs
D. 2

178. In a simplex wave winding, the number of parallel paths is equal to
A. number of poles in the machine
B. 2
C. number of pair poles
D. 1

179. In a practical transformer, copper losses account for how many percent of the total losses?
A. 75%
B. 25%
C. 85%
D. 95%

180. By laminating the core of a transformer, _____ decreases
A. leakage reactance
B. eddy current loss
C. hysteresis loss
D. copper loss

181. The number of parallel paths in a simplex lap winding is equal to

A. 2

B. number of poles

C. number of pair poles

D. 1

182. In a dc machine the number of commutator segments is equal to

A. number of conductors

B. number of coils

C. twice the number of poles

D. twice the number of coils

183. A dc compound generator having full load terminal voltage equal to the no load generator voltage is called _____ generator

A. under compounded

B. flat compounded

C. over compounded

D. un compounded

184. The terminal voltage of a _____ generator vary widely with changes in load current

A. series

B. flat compounded

C. shunt

D. over compounded

185. The nature of armature winding of a dc machine is decided by

A. front pitch

B. back pitch

C. commutator path

D. number of coils

186. The voltage regulation of an alternator is larger than of a dc generator because of

A. large armature resistance

B. large leakage reactance

C. complex effects of armature reaction

D. small armature resistance

187. High voltage dc machines use what winding?

A. Lap
B. wave
C. either lap or wave
D. open circuit

188. In a lap winding, the number of the brushes required is equal to

A. number of poles
B. commutator pitch
C. number of pairs of poles
D. number of coils

189. What is the approcimate efficiency of large transformer?

A. 65%
B. 80%
C. 50%
D. 95%

190. In a wave winding, the commutator pitch is approximately equal to

A. pole pitch
B. thrice the pole pitch
C. twice the pole pitch
D. half the pole pitch

191. A triplex wave winding will have _____ parallel paths

A. 6
B. 4
C. 2
D. 8

192. For a given dc generator, the generated voltage depends upon

A. flux only
B. both speed and flux
C. speed only
D. armature rotation

193. For the same rating, a dc machine has _____ an ac machine

A. the same weight as
B. less weight than
C. more weight than
D. half the weight than

194. Difference between the speed of a rotating magnetic field and the associated rotor

A. split
B. salient pole
C. slip
D. pull out torque

195. The field winding of a dc shunt machine usually carries _____ of the rated current of the machine

A. 2% to 5%
B. more than 20%
C. 15% to 20%
D. less than 0.5%

196. A separately excited dc generator is not used because

A. it is costly
B. a separate dc source is required for field circuit
C. voltage drops considerably with load
D. it is bulky

197. The effect of armature reaction is to

A. decreased the total flux
B. make the air gap flux uniform
C. increase the total flux
D. make the flux constant

198. In a dc generator armature reaction _____pole tip

A. weakens the flux at the trailing
B. weakens the flux at the leading
C. strengthens the flux at the leading
D. strengthens the flux at the trailing

199. The greatest percentage of the heat loss in a dc machine is due to

A. eddy current loss

B. copper loss

C. hysteresis loss

D. frictional loss

200. The size of a dc generator can be reduced by using

A. lap winding

B. high resistance winding material

C. iron commutator

D. magnetic material of high permeability

CHAPTER 5: ELECTRONIC CIRCUITS

1. Which of the following amplifier is considered linear?
   A. Class A
   B. Class B
   C. Class C
   D. Either A or B

2. The voltage gain of a common collector configuration is
   A. Unity
   B. Zero
   C. Very high
   D. Moderate

3. A two-transistor class B power amplifier is commonly called
   A. Push-pull amplifier
   B. Dual amplifier
   C. Symmetrical amplifier
   D. Differential amplifier

4. If a transistor is operated in such a way that output current flows for 160 degrees of the input signal, then it is _____ operation.
   A. Class A
   B. Class C
   C. Class B
   D. Class AB

5. Which coupling has the best frequency response?
   A. Direct
   B. RC
   C. Transformer
   D. Transistor

6. A transistor amplifier has high output impedance because
   A. Emitter is heavily doped
   B. Collector is wider than emitter or base
   C. Collector has reverse bias
   D. Emitter has forward bias

7. Which of the following is considered an amplifier figure of merit?
   A. Gain-bandwidth product
   B. Beta(β)
   C. Alpha(α)
   D. Temperature

8. What piece of equipment in an oscilloscope is used to indicate pulse condition in a digital logic circuit?
   A. Probe
   B. Test prods
   C. Connector
   D. Logic probe

9. What linear circuit compares two input signals and provides a digital level output depending on the relationship of the input signals?
   A. Comaparator
   B. Controller
   C. Compressor
   D. Switch

10. What type of coupling is generally used in power amplifiers?
    A. Transformer
    B. Direct
    C. RC
    D. Inductive

11. Which amplifier whose output current flows for the entire cycle?
    A. Class A
    B. Class B
    C. Class C
    D. Class AB

12. The coupling capacitor Cc must be large enough to _____ in an RC coupling scheme.
    A. Pass dc between the stages
    B. Dissipate high power
    C. Prevent attenuation of low frequency
    D. Prevent attenuation of high frequency

13. What is the point of intersection of dc and ac load lines called?
    A. Operating point
    B. Cut off point
    C. Saturation point
    D. Breakdown

14. An oscillator produces _____ oscillations.
    A. Damped
    B. Modulated
    C. Undamped
    D. Sinusoidal

15. What is the operating point in the characteristic curve called?
    A. Quiescent point
    B. Load point
    C. Biasing point
    D. Saturation point

16. Oscillators operate on the principle of
    A. Positive feedback
    B. Negative feedback
    C. Signal feedthrough
    D. Attenuation

17. In a class A amplifier, the output signal is
    A. Distorted
    B. The same as the input
    C. Clipped
    D. Smaller in amplitude than the input

18. What happens if the input capacitor of a transistor amplifier is short-circuited?
    A. Biasing conditions will change
    B. Transistor will be destroyed
    C. Signal will not reach the base
    D. Biasing will stabilize

19. Which is used to establish a fixed level of current or voltage in a transistor?
    A. Biasing
    B. Loading
    C. Load line
    D. Coupling

20. Which power amplifier has the highest collector efficiency?
    A. Class A
    B. Class C
    C. Class B
    D. Class AB

21. What is a non-linear type of amplifier?
    A. Class C
    B. Class AB
    C. Class B
    D. Class A

22. An AF transformer is shielded to
    A. Keep the amplifier cool
    B. Prevent the induction due to stray magnetic fields
    C. Protect from rusting
    D. Prevent electric shock

23. Amplitude distortion is otherwise known as _____ distortion.
    A. Intermodulation
    B. Harmonic
    C. Phase
    D. Resonant

24. What represents common-emitter small signal input resistance?
    A. h_{ie}
    B. h_{fe}
    C. h_{ib}
    D. h_{oe}

25. The ear is not sensitive to _____ distortion.
    A. Frequency
    B. Amplitude
    C. Harmonic
    D. Phase

26. Class C is an amplifier whose output current flows for
    A. Less than one-half the entire input cycle
    B. The entire input cycle
    C. Twice the entire input cycle
    D. Greater than one-half the entire input cycle

27. If gain without feedback and feedback factor are A and β respectively, then gain with negative feedback is given by
    A. A/ 1-A β
    B. A/ 1+ A β
    C. 1+A β / A
    D. (1+A β) A

28. The collector current in an common base configuration is equal to
    A. Alpha times emitter current plus leakage current
    B. Alpha times base current plus leakage current
    C. Beta times emitter current plus leakage current
    D. Beta times collector current plus leakage current

29. Which is not a basic BJT amplifier configuration?
    A. Common-drain
    B. Common-base
    C. Common-emitter
    D. Common-collector

30. The value of collector load resistance in a transistor amplifier is _____ the output impedance of the transistor.
    A. Equal to
    B. More than
    C. Less than
    D. Not related

31. What is the purpose of RC or transformer coupling?
    A. To block ac
    B. To separate bias of one stage from another
    C. To increase thermal stability
    D. To block dc

32. The bandwidth of a single stage amplifier is _____ that of multistage amplifier.
    A. Equal to
    B. Less than
    C. More than
    D. Independent

33. What is the time taken by the electrons or holes to pass from the emitter to the collector?
    A. Transit time
    B. Recombination
    C. Transient time
    D. Duty cycle

34. To obtain good gain stability in a negative feedback amplifier, AB is
    A. Equal to 1
    B. Very much greater than 1
    C. Less than 1
    D. Zero

35. The basic concept of the electric wave filter was originated by
    A. Campbell and Wagner
    B. Norton
    C. Foster
    D. Bode and Darlington

36. Which configuration has the lowest current gain?
    A. Common-base
    B. Common-collector
    C. Common-emitter
    D. Emitter follower

37. Which transistor configuration offers no phase reversal at the output?
    A. Common-base
    B. Common-collector
    C. Common-emitter
    D. Both A and B

38. The number of stages that can be directly coupled is limited because
    A. Change in temperature can cause thermal instability
    B. Circuit becomes heavily and costly
    C. It becomes difficult to bias the circuit
    D. Circuits' resistance becomes too large

39. The input capacitor in an amplifier is called _____ capacitor.
    A. Coupling
    B. Stray
    C. Bypass
    D. Electrolytic

40. AC load line has a/an _____ slope compared to that of dc load line.
    A. Zero
    B. Smaller
    C. Bigger
    D. Infinite

41. A multistage amplifier uses at least how many transistors?
    A. One
    B. Three
    C. Four
    D. Two

42. RC coupling is used for _____ amplification.
    A. Voltage
    B. Current
    C. Signal
    D. Power

43. An ammeter's ideal resistance should be
    A. Zero
    B. Unity
    C. Infinite
    D. The same with the circuits resistance

44. What circuit increases the peak –to-peak voltage, current or power of a signal?
    A. Power supply
    B. Attenuator
    C. Amplifier
    D. Filter

45. When the non-linear distortion in an amplifier is D without feedback, with negative voltage feedback it will be
    A. D/ 1+A β
    B. 1+A β / D
    C. D (1+A β)
    D. D (1-A β)

46. A tuned amplifier uses what load?
    A. Resistive
    B. Capacitive
    C. LC tank
    D. Inductive

47. The voltage gain over mid- frequency range in an RC coupled amplifier
    A. Changes instantly with frequency
    B. Is constant
    C. Is independent of the coupling
    D. Is maximum

48. The input impedance of an amplifier _____ when negative voltage feedback is applied.
    A. Decreases
    B. Becomes zero
    C. Increases
    D. Is unchanged

49. The input impedance of an amplifier _____ when negative current feedback is applied.
    A. Remains unchanged
    B. Decreases
    C. Increases
    D. Becomes zero

50. To obtain the frequency response curve of an amplifier _____ is kept constant.
    A. Generator output level
    B. Amplifier output
    C. Generator frequency
    D. Amplifier frequency

51. A type of oscillator wherein the frequency is determined by the charge and discharge of resistor-capacitor networks used in conjunction with amplifiers or similar devices.
    A. Sine wave oscillator
    B. Beta generating circuit
    C. Relaxation oscillator
    D. Simply an oscillator

52. The driver transformer has center- tapped secondary to provide
    A. Forward bias to transistors of push-pull circuit
    B. Two signals 180 degrees out of phase to transistors of push-pull circuit
    C. Impedance matching
    D. Two signals in phase with each other

53. What is the advantage of RC coupling scheme?
    A. Good impedance matching
    B. Economy
    C. High efficiency
    D. Simplicity

54. A type of filter which is having a single continuous transmission band with neither the upper nor the lower cut-off frequencies being zero or infinite is called
    A. Band stop filter
    B. Low pass filter
    C. High pass filter
    D. Band pass filter

55. An instrument use to measure ones location in terms of coordinates
A. GPS
B. ILS
C. FANS
D. GSM

56. Transformer coupling is used for _____ amplification.
A. Current
B. Power
C. Voltage
D. Signal

57. What is the typical value of coupling capacitor Cc in RC coupling?
A. About 100 pF
B. About 0.1μF
C. About 10μF
D. About 0.01μF

58. An electronic transfer from one stage to the next is termed as _____
A. Doping
B. Mixing
C. Coupling
D. Connecting

59. An amplifier configuration where the input signal is led to the emitter terminal and the output from the collector terminal is called
A. Common base
B. Common emitter
C. Clipper
D. Common collector

60. If the noise factor of an ideal amplifier expressed in dB, then it is
A. 0
B. 0.1
C. 1
D. 10

61. A feedback circuit is _____ frequency
    A. Independent of
    B. Strongly dependent on
    C. Moderately dependent on
    D. Relatively dependent on

62. What is the basic purpose of applying negative feedback to an amplifier?
    A. To increase gain
    B. To reduce distortion
    C. To keep the temperature within limits
    D. To increase input signal

63. The capacitors are considered _____ in the dc equivalent circuit of a transistor amplifier.
    A. Short
    B. Partially short
    C. Open
    D. Partially open

64. Which frequency produces the highest noise factor?
    A. 10kHz
    B. 500Hz
    C. 1kHz
    D. 100 Hz

65. Power amplifiers handle _____ signals.
    A. Very small
    B. Small
    C. Large
    D. Very large

66. The operating point is generally located at _____ of dc load line in class A operation
    A. The middle
    B. Saturation point
    C. Cut off point
    D. End point

67. Which of the following describes a common collector amplifier?
    A. Low voltage gain
    B. Low current gain
    C. Low power gain
    D. Low input resistance

68. The general characteristics of a common base amplifier are
    A. High voltage gain, low current gain, high power gain and very low input resistance
    B. High voltage, high current gain, high power gain and low input resistance
    C. Low voltage gain, high current gain, very high power gain and low input resistance
    D. None of the choices

69. To amplify dc signals, multistage amplifier uses what coupling?
    A. RC
    B. Direct
    C. Transformer
    D. Resistor

70. What oscillator is used on order to produce frequencies in the microwave region?
    A. Wien bridge
    B. Hartley
    C. Klystron
    D. Crystal

71. Practically, the voltage gain of an amplifier is expressed
    A. In volts unit
    B. In dB unit
    C. As an absolute value
    D. As a whole number

72. What coupling provides maximum voltage gain?
    A. RC
    B. Direct
    C. Transformer
    D. Resistor

73. The gain of an amplifier _____ when negative feedback is added.
    A. Increases
    B. Remains unchanged
    C. Reduces
    D. Becomes infinite

74. Feedback factor is always
    A. Less than 1
    B. Equal to 1
    C. More than 1
    D. Zero

75. What class of operation is used for general amplification where no distortion can be tolerated?
    A. Class A
    B. Class B
    C. Class AB
    D. Class C

76. What class of operation is used either where the signal needs to be cut in half, such as in pulse detector or noise detectors or where push-pull operation of two stages is required?
    A. Class A
    B. Class B
    C. Class AB
    D. Class C

77. What class of operation is used where a portion of a signal only is required, such as the synchronizing pulse separator of a television receiver?
    A. Class A
    B. Class B
    C. Class AB
    D. Class C

78. What class of operation has little use in general purpose amplifiers, but is used in high frequency oscillators?
    A. Class A
    B. Class AB
    C. Class B
    D. Class C

79. Why is transformer coupling provides high frequency?
A. DC resistance is low
B. Collector voltage is stepped up
C. Collector voltage is stepped down
D. AC resistance is high

80. For constant- K high-pass filter cut-off frequency (in Hz) is given by
A. $1/(4\pi\sqrt{LC})$
B. $1/(\pi\sqrt{LC})$
C. $1/(2\pi\sqrt{LC})$
D. $\pi/\sqrt{LC}$

81. Class C operation can have _____ percent efficiency.
A. 100%
B. 78.5%
C. 50%
D. 70%

82. The efficiency of class AB operation has a maximum of between _____ percent.
A. 90 to 100%
B. 60 to 80%
C. 50 to 78.5%
D. 40.5 to 60%

83. Transformer coupling is generally employed when load resistance is
A. Large
B. Very large
C. Small
D. Zero

84. A dc voltage supply provides 60V when the output is unloaded. When connected to a load the output drops to 56V. Calculate the value of the voltage regulation.
A. 8.1%
B. 7.1%
C. 5%
D. 12%

85. The _____ the voltage regulation, the better the operation of the voltage supply circuit.
A. Smaller
B. Bigger
C. Moderate
D. Biggest

86. In transistor amplifiers, what transformer is used for impedance matching?

A. Step up
B. Power
C. Step down
D. Isolation

87. If an amplifier has a power gain of 100, then its dB gain is
A. 10
B. 40
C. 20
D. 100

88. In order to have more voltage gain from a transformer amplifier the transistor used should have
A. Thin collector
B. Thin base
C. Wide emitter
D. Thin emitter

89. The final stage of an amplifier uses _____ coupling.
A. Direct
B. RC
C. Transformer
D. Impedance

90. The largest theoretical voltage gain obtained with a common collector amplifier is
A. 100
B. 10
C. Unity
D. Infinite

91. Increasing the overall Beta is an advantage of
A. Clap oscillator
B. Crystal oscillator
C. Darlington pair
D. CE amplifier

92. The frequency of oscillation is _____ L and C in an LC oscillator.
A. Inversely proportional to square root of
B. Directly proportional to
C. Independent of the values of
D. Proportional to square of

93. An oscillator employs _____ feedback.

A. Positive
B. Negative
C. Both positive and negative
D. Neither positive nor negative

94. What is the reason why RC coupling is not used to amplify extremely low frequencies?
A. There is considerable power loss
B. Electrical size of coupling capacitor becomes very large
C. There is a hum in the output
D. Electrical size of coupling capacitor becomes very small

95. Given three amplifiers with a gain of 10 and are connected in cascade. How much is the overall gain?
A. 24
B. 10,000
C. 30
D. 20

96. A pair of filter common on high fidelity system which separate audio frequency band signals into two separate groups, where one is fed to the tweeter and the other to the woofer is called
A. Equalizer
B. Synthesizer
C. Cross over network
D. Hybrid

97. The frequency response of transformer coupling is
A. Good
B. Excellent
C. Poor
D. Very good

98. The simplest variable frequency sinusoidal oscillator is the
A. Complicated Colpitts circuit
B. Crystal circuit
C. Armstrong circuit
D. Phase shift circuit

99. Which of the following is provided by a CB transistor amplifier?
A. Voltage gain
B. Power gain
C. Current gain
D. Gain stability

100. In the initial stages of a multistage amplifier, _____ coupling is used.
A. Link
B. RC
C. Transformer
D. Impedance

101. The three amplifiers are connected in a multistage arrangement each with a voltage gain of 30. Compute for the overall voltage gain.
A. 90
B. 27,000
C. 10
D. 30

102. If Av is 50 Ai is 200, what is the power gain of a common emitter amplifier?
A. 1,000
B. 10,000
C. 100
D. 100,000

103. The gain of an amplifier with feedback is known as _____ gain.
A. Closed loop
B. Resonant
C. Open loop
D. Unity

104. Negative feedback is employed in
A. Oscillators
B. Rectifiers
C. Amplifiers
D. Receivers

105. The gain of an amplifier is expressed in dB unit because
A. It is a simple unit
B. Calculations become easy
C. Human ear response is logarithmic
D. It is the most appropriate unit

106. What is the typical value of the emitter bypass capacitor CE in a multistage amplifier?
A. About 0.1μF
B. About 50μF
C. About 100pF
D. About 0.01μF

107. In a multistage amplifier, if the stages have R and C component only, _____ operation is apparent.
A. Class B
B. Class C
C. Class A
D. Class AB

108. In practice, what is normally varied in order to change the frequency of oscillation?
A. Capacitance
B. Inductance
C. Resistance
D. Impedance

109. What is the main consideration in the output stage of an amplifier?
A. Power output
B. Voltage gain
C. Power gain
D. Current gain

110. Transformer coupling provides high gain because
A. Transformer is very efficient
B. Impedance matching can be achieved
C. Transformer steps up the voltage
D. Transformer steps up the current

111. When negative voltage feedback is applied to an amplifier, its output impedance
A. Remains unchanged
B. Decreases
C. Increases
D. Becomes zero

112. An LC oscillator cannot be used to produce _____ frequencies.
A. High
B. Very high
C. Audio
D. Very low

113. A transistor converts
A. Dc power into ac power
B. Ac power into dc power
C. High resistance into low resistance
D. Low resistance into high resistance

114. Hartley oscillator is commonly used in which of the following?
A. Radio receivers
B. TV receivers
C. Radio transmitters
D. CATV

115. An oscillator oscillates due to
A. Negative feedback
B. Positive feedback
C. Both positive and negative feedback
D. Neither positive nor negative feedback

116. Generally tuned amplifiers are operated in
A. Class C
B. Class A
C. Class B
D. Class AB

117. A tuned amplifier is used in what application?
A. Radio frequency
B. Audio frequency
C. Intermediate frequency
D. Low frequency

118. What is the ratio of output to input impedance of a CE amplifier?
A. Very low
B. Very high
C. Moderate
D. Approximately 1

119. For a constant output frequency, the simplest sinusoidal oscillator is the _____.
A. Crystal oscillator
B. Phase-shift circuit
C. Colpitts circuits
D. Hartley circuit

120. The frequency stability of the oscillator output is maximum in _____ oscillator.
A. LC
B. Crystal
C. Phase-shift
D. Wien bridge

121. Transformer coupling introduces what type of distortion?
A. Amplitude
B. Frequency
C. Phase
D. Intermodulation

122. A pulsating dc applied to power amplifiers causes
A. Burning of transistor
B. Hum in the circuit
C. Excessive forward voltage
D. Excessive reverse voltage

123. What is the disadvantage of impedance matching?
A. It gives distorted output
B. It requires a transformer
C. It gives low power output
D. It is expensive

124. In a phase-shift oscillator, _____ RC sections are generally used.
A. Three
B. Four
C. Two
D. Five

125. In phase-shift oscillator, what are the frequency determining elements?
A. L and C
B. R, L and C
C. R and C
D. R and L

126. When the gain is 20 without feedback and 12 with negative feedback, feedback factor is
A. 0.033
B. 3/5
C. 5/3
D. 1/5

127. The input impedance of which amplifier depends strongly on load resistance?
A. CE
B. CC
C. CB
D. CD

128. What capacitors are used in transistor amplifiers?
A. Paper
B. Electrolytic
C. Mica
D. Mylar

129. An important limitation of crystal oscillator is
A. Its low output
B. Its high Q
C. Less availability of quartz crystal
D. Its high output

130. What type of feedback is used in Wien bridge oscillator?
A. Positive
B. Negative
C. Both positive and negative
D. Either positive or negative

131. Which of the items below is not a description of the two-stage amplifier?
A. The input resistance is equal to the input resistance of the first stage unless feedback is applied
B. Its output resistance is equal to the output resistance of the final stage unless feedback is applied
C. Its noise level is equal to the accumulated noise of the two stages, either by multiplying the noise voltage amplitudes together or by adding the noise decibel levels together
D. The output resistance is equal to the output resistance of the first stage unless feedback is applied.

132. What is the most costly coupling?
A. RC coupling
B. Direct
C. Transformer
D. Inductive

133. When the output of an amplifier is 10V and 100mV from the output is fed back to the input, feedback factor is
A. 10
B. 0.1
C. 0.01
D. 0.15

134. What is the piezoelectric effect in a crystal?
A. Voltage is developed because of mechanical stress
B. Change in resistance because of temperature
C. Change of frequency because of temperature
D. Current is developed due to force applied

135. The input resistance of a common emitter amplifier is affected by
A. R_e, r_e and β
B. R_c and r_e
C. β and r_e
D. α and r_e

136. What is the typical Q of a crystal?
A. 100
B. 50
C. 1000
D. More than 10,000

137. What is the axis that connects the corners of a crystal?
A. X
B. Mechanical
C. Y
D. Z

138. Determine the attenuation in dB for a T-pad for which R1=R2=40Ω and R3= 36 Ω. The pad connects a 50 Ω generator to a 50 Ω load.
A. 9.83 dB
B. 83.93 dB
C. 10.83 dB
D. 11.93 dB

139. What is usually employed at the output stage of an amplifier?
A. Class A power amplifier
B. Push-pull amplifier
C. Pre-amplifier
D. Differential amplifier

140. Why is it that the size of a power transistor is made considerably large?
A. To provide easy handling
B. To dissipate more heat
C. To simply construction
D. To facilitate connections

141. When crystal frequency increases with temperature, it has _____ temperature co- efficient.

A. Positive
B. Negative
C. Zero
D. Infinite

142. What is the purpose of the bypass capacitor in a common-emitter amplifier?

A. It increases voltage gain
B. It decreases voltage gain
C. It provides ac grounding
D. No effect in the circuit

143. An emitter follower is equivalent to

A. Common emitter amplifier
B. Common collector amplifier
C. Common base amplifier
D. Hybrid connection

144. The crystal oscillator frequency is very stable due to _____ of the crystal.

A. Rigidity
B. Ductility
C. High Q
D. Low Q

145. The bandwidth of an amplifier _____ when negative feedback is applied.

A. Decreases
B. Remains unchanged
C. Becomes infinite
D. Increases

146. The term 1+ A β in the expression for gain with negative feedback is known as

A. Gain factor
B. Sacrifice factor
C. Feedback factor
D. Quality factor

147. Emitter follower employs _____ negative feedback.

A. 50%
B. 25%
C. 75%
D. 100%

148. What application where one would most likely find a crystal oscillator?
A. Radio transmitter
B. AF generator
C. Radio receiver
D. Oscilloscope

149. What is the most important consideration in power amplifiers?
A. Collector efficiency
B. Biasing the circuit
C. To keep the transformer cool
D. Amplifier distortion

150. When the gain versus frequency curve of a transistor amplifier is not flat, _____ distortion is present.
A. Amplitude
B. Frequency
C. Intermodulation
D. Phase

151. In a Colpitt's oscillator, feedback is obtained
A. By magnetic induction
B. By a tickler coil
C. From the center of split capacitors
D. From the center of split inductors

152. When the collector resistor in a common emitter amplifier is increased in value the voltage gain
A. Increases
B. Decreases
C. Remain the same
D. Becomes erratic

153. The output signal of CE amplifier is always
A. Out of phase with the input signal
B. Equal to the input signal
C. In phase with the input signal
D. Larger than the input signal

154. What is the purpose of capacitors in a transistor amplifier?
A. To protect the transistor
B. To cool the transistor
C. To couple or bypass ac component
D. To provide biasing

155. What is the phase difference between voltage across collector load and signal voltage in a common emitter amplifier?

A. 0°
B. 270°
C. 180°
D. 90°

156. When CE configuration is used for an oscillator, the voltage fed back must

A. Be inverted by 180°
B. Be taken from a capacitor
C. Have a 0° phase shift
D. Taken from an inductor

157. Class B operation has a maximum possible frequency of _____ percent.

A. 100%
B. 78.5%
C. 75%
D. 2.2%

158. What is the most stable sine-wave oscillator which uses piezo-electric quartz crystal?

A. Crystal oscillator
B. Wien-bridge oscillator
C. DC restorer
D. Hartley and Colpitts oscillator

159. To sustain oscillations, the power gain of the amplifier may be

A. Between 0.1 and 0.5
B. Any value form 0.5 upward
C. Equal to or greater than 1
D. Infinite

160. In a phase shift oscillator, 180° phase-shift is obtained

A. A transformer
B. LC tank circuit
C. Three RC sections
D. Three LC sections

161. Feedback circuit usually employs _____ network

A. Resistive
B. Inductive
C. Capacitive
D. Active

162. Emitter follower is used for
A. Impedance matching
B. Voltage gain
C. Current gain
D. Power gain

163. One of the items below is a characteristic of cascaded amplifiers?
A. Doubles transconductance
B. Total gain is lessen
C. Increased overall gain
D. Increased overall amplification ratio

164. Logic analyzer is used to
A. Verify the logic operation of the gates in a circuit
B. To display the fall time
C. To sample and display systems signal
D. To analyze the logic operation of the system

165. Quartz crystal is most commonly used in crystal oscillators because
A. It is easily available
B. It has superior electrical properties
C. It is quite inexpensive
D. It is very rugged

166. The operating frequency of a Wien-bridge oscillator is given by
A. $1/(2\pi\sqrt{LC})$
B. $1/2\pi RC$
C. $1/(4\pi\, LC)$
D. $1/29RC$

167. Which operation gives the maximum distortion?
A. Class A
B. Class C
C. Class B
D. Class AB

168. Low efficiency of a power amplifier results in
A. Low forward bias
B. Less battery consumption
C. More battery consumption
D. Low power output

169. In an LC oscillator, the frequency of oscillations is given by

A. $1/(2\pi\sqrt{LC})$

B. $2\pi/\sqrt{LC}$

C. $\sqrt{LC}/2\pi$

D. $2\pi/\sqrt{LC}$

170. Class A operation has a maximum possible efficiency of _____ percent.

A. 100%

B. 50%

C. 75%

D. 25%

171. Which of the following amplifier below is a choice when higher power gain is a requirement?

A. Common base

B. Common emitter

C. Common collector

D. Hybrid connection

172. The signal generator generally used in laboratories is _____ oscillator

A. Crystal

B. Wien-bridge

C. Hartley

D. Phase-shift

173. A buffer amplifier is used for

A. Maximum loading and minimum mismatch

B. Minimum loading and minimum mismatch

C. Maximum loading and maximum mismatch

D. Minimum loading and maximum mismatch

174. Parasitic oscillations are caused by

A. Output negative feedback

B. Push-pull operation

C. Poor interstage coupling

D. Transistor interelectrode capacitance

175. Which is a fixed-frequency oscillator

A. Phase-shift oscillator

B. Colpitt's oscillator

C. Hartley oscillator

D. Crystal oscillator

176. The approximate operating frequency of a phase shift oscillator is given by
A. $1/(2\pi\sqrt{LC})$
B. $1/(2\pi RC\sqrt{6})$
C. $1/2\pi RC$
D. $1/29RC$

177. The frequency of the ripple voltage at the output of a full-wave rectifier at 60 cycles.
A. 120 cycles
B. 60 cycles
C. 240 cycles
D. 480 cycles

178. Cascaded amplifiers total decibel gain is equal to
A. The sum of the individual gains
B. The product of the individual gains
C. The difference of the individual gains
D. The quotient of the individual gains

179. In an LC oscillator, if the value of L is increased four times, then the frequency of oscillation is
A. Decreased 2 times
B. Decreased 4 times
C. Increased 2 times
D. Increased 4 times

180. A class A power amplifier is otherwise known as
A. Single ended amplifier
B. Darlington amplifier
C. Symmetrical amplifier
D. Differential amplifier

181. The power input to a power amplifier is _____ quantity.
A. ac
B. Pulsating dc
C. dc
D. sinusoidal

182. When shock-excited, a crystal will produce alternating emf longer than an LC circuit because
A. has greater mechanical strength
B. has fewer losses
C. is small-sized
D. is very rigid

183. The stability of a regulated power supply is equivalent to
A. change of output voltage over the change in supply voltage
B. change in supply voltage over the change of output voltage
C. product of the output voltage and supply voltage
D. the difference of an output voltage to its supply voltage

184. What oscillator circuit uses a tapped coil in the tuned circuit?
A. Hartley
B. Colpitts
C. Crystal
D. Pierce

185. If you move towards an oscillating circuit, its frequency changes because of
A. Hand capacitance
B. Movement of the body
C. Noise of foot
D. Stray capacitance

186. Which of the following is not a FET amplifier configuration?
A. Common base amplifier
B. Common drain amplifier
C. Common source amplifier
D. Common gate amplifier

187. The number of transistor in a single stage amplifier is
A. Two
B. Three
C. One
D. Four

188. Series current negative feedback occurs when the feedback voltage is proportional to the output
A. Voltage
B. Impedance
C. Current
D. Power

189. Which of the following is NOT an oscillator requirement?
A. Attenuator
B. Amplifier
C. Tank circuit
D. Feedback

190. An amplifier with efficiency of 85% is likely to be
A. Class A
B. Class B
C. Class AB
D. Class C

191. What is the phase difference between the output and the input voltage of a CE amplifier?
A. 180°
B. 270°
C. 0°
D. 90°

192. Class C operation is preferred in oscillators because it
A. Is more efficient
B. Gives larger outputs
C. Produces square waves
D. Increases stability

193. What type of oscillator which is composed of one or more amplifying devices with some frequency determining networks introducing positive feedback at a particular frequency so that oscillation is sustained at that frequency?
A. Sine wave oscillator
B. Square-wave generator
C. Relaxation oscillator
D. Limiter

194. What is the desired input impedance of a transistor?
A. Low
B. Very low
C. High
D. Very high

195. What is the maximum collector efficiency of class B?
A. 50%
B. 90%
C. 60.5%
D. 78.5%

196. When a transistor is cut off
A. Maximum current flows
B. Maximum voltage appears across load
C. Maximum voltage appears across transistor
D. Minimum current flows

197. In an LC circuit, when the capacitor energy is maximum, the inductor energy is
A. Maximum
B. Minimum
C. Half-way between maximum and minimum
D. Zero

198. What is the approximate gain of an amplifier with negative feedback?
A. The feedback factor
B. The reciprocal of feedback factor plus one
C. The reciprocal of feedback factor
D. The feedback factor plus one

199. The operating point in a transistor amplifier moves along _____ when an ac signal is applied
A. dc load line
B. ac load line
C. both dc and ac load lines
D. cut-off

200. An oscillator converts
A. ac power into dc power
B. dc power into ac power
C. mechanical power into ac power
D. electrical power into mechanical power

201. What is the device in a transistor oscillator?
A. LC tank circuit
B. Biasing circuit
C. Transistor
D. Feedback circuit

202. When the collector supply is 5V, then collector cut off voltage under dc condition is
A. 20V
B. 10V
C. 2.5V
D. 5V

203. The common base (CB) amplifier has a _____ compared to CE and CC amplifier.

A. Lower input resistance

B. Larger current gain

C. Larger voltage gain

D. Higher input resistance

204. When a FET with a lower transconductance is substituted into a FET amplifier circuit, what happens?

A. The current gain does not change

B. The voltage gain decreases

C. The circuit disamplifies

D. The input resistance decreases

205. At zero signal condition, a transistor sees_____ load.

A. dc

B. ac

C. both dc and ac

D. resistive

206. What is the gain of an amplifier with negative feedback if the feedback factor is 0.01?

A. 10

B. 1,000

C. 100

D. 500

207. The current gain of an emitter follower is

A. Equal to 1

B. Greater than 1

C. Less than 1

D. Zero

208. The current in any branch of a transistor amplifier that is operating is

A. ac only

B. the sum of ac and dc

C. the difference of ac and dc

D. dc only

209. An ideal differential amplifiers common mode rejection ratio is

A. Infinite

B. Zero

C. Unity

D. Undetermined

210. An open fuse circuit has a resistance equal to

A. Zero

B. Unity

C. At least 100Ω at standard

D. Infinity

211. What is the purpose of dc conditions in a transistor?

A. To reverse bias the emitter

B. To forward bias the emitter

C. To set up operating point

D. To turn on the transistor

212. The ac variations at the output side of power supply circuits are called _____.

A. Ripples

B. Pulses

C. Waves

D. Filters

213. What is the purpose of the emitter capacitor?

A. To forward bias the emitter

B. To reduce noise in the amplifier

C. To avoid drop in gain

D. To stabilize emitter voltage

214. A common emitter circuit is also called _____ circuit.

A. Grounded emitter

B. Grounded collector

C. Grounded base

D. Emitter follower

215. The output signal of a common-collector amplifier is always
A. Larger than the input signal
B. In phase with the input signal
C. Out of phase with the input signal
D. Exactly equal to the input signal

216. Calculate the ripples of the filter output if a dc and ac voltmeter is used and measures the output signal from a filter circuit of 25 VDC and 1.5 Vrms
A. 5%
B. 10%
C. 50%
D. 6%

217. What is the ideal maximum voltage gain of a common collector amplifier?
A. Unity
B. Infinite
C. Indeterminate
D. Zero

218. The output power of a transistor amplifier is more than the input power due to additional power supplied by
A. Transistor
B. Collector supply
C. Emitter supply
D. Base supply

219. When a transistor amplifier feeds a load of low resistance, its voltage gain will be
A. Low
B. Very high
C. High
D. Moderate

220. The capacitors are considered _____ in the ac equivalent circuit of a transistor amplifier.
A. Open
B. Partially open
C. Short
D. Partially short

221. For highest power gain, what configuration is used?
   A. CC
   B. CB
   C. CE
   D. CS

222. What is the most important characteristic of a common collector amplifier?
   A. High input voltage
   B. High input resistance
   C. High output resistance
   D. Its being an amplifier circuit

223. Which of the item below does not describe a common emitter amplifier?
   A. High voltage gain
   B. High current gain
   C. Very high power gain
   D. High input resistance

224. CC configuration is used for impedance matching because its
   A. Input impedance is very high
   B. Input impedance is very low
   C. Output impedance is very low
   D. Output impedance is zero

225. Which of the following is the other name of the output stage in an amplifier?
   A. Load stage
   B. Audio stage
   C. Power stage
   D. RF stage

226. When amplifiers are cascaded
   A. The gain of each amplifier is increased
   B. A lower supply voltage is required
   C. The overall gain is increased
   D. Each amplifier has to work less

227. Ina common emitter amplifier, the capacitor from emitter to ground is called the
A. Coupling capacitor
B. Bypass capacitor
C. Decoupling capacitor
D. Tuning capacitor

228. A class A power amplifier uses _____ transistor(s).
A. Two
B. One
C. Three
D. Four

229. What is the maximum collector efficiency of a resistance loaded class A power amplifier?
A. 50%
B. 78.5%
C. 25%
D. 30%

230. What is the maximum collector efficiency of a transformer coupled class A power amplifier?
A. 30%
B. 80%
C. 45%
D. 50%

231. Class C amplifiers are used as
A. AF amplifiers
B. Small signal amplifiers
C. RF amplifiers
D. IF amplifiers

232. Find the voltage drop developed across a D' Arsonval meter movement having an internal resistance of 1 kΩ and a full deflection current of 150uA.
A. 150μV
B. 150mV
C. 150V
D. 200mV

233. If the capacitor from emitter to ground in a common emitter amplifier is removed, the voltage gain
A. Increases
B. Decreases
C. Becomes erratic
D. Remains the same

234. Comparatively, power amplifier has _____ β.
A. Large
B. Very large
C. Small
D. Very small

235. The driver stage usually employs _____ amplifier.
A. Class A power
B. Class C
C. Push-pull
D. Class AB

236. The push-pull circuit must use _____ operation.
A. Class A
B. Class B
C. Class C
D. Class AB

237. A complementary-symmetry amplifier has
A. One PNP and one NPN transistor
B. Two PNP transistors
C. Two NPN transistors
D. Two PNP and two NPN transistors

238. Power amplifiers generally use transformer coupling because transformer coupling provides
A. Cooling of the circuit
B. Distortionless output
C. Impedance matching
D. Good frequency response

239. The output transformer used in a power amplifier is a/an _____ transformer
A. 1:1 ratio
B. Step-down
C. Step-up
D. Isolation

240. Transformer coupling can be used in _____ amplifiers
A. Only power
B. Only voltage
C. Either power or voltage
D. Neither power nor voltage

241. When negative current feedback is applied to an amplifier, its output impedance
A. increases
B. remains unchanged
C. decreases
D. becomes zero

242. The quiescent current of a FET amplifier is
A. IDS
B. id
C. ID
D. Id

243. The total decibel voltage gain of two cascaded voltage amplifier where individual voltage gains are 10 and 100 is
A. 20
B. 60
C. 800
D. 1000

244. The frequency response of the combined amplifier can be compared with
A. An OR gate
B. A negative feedback amplifier
C. A positive filter
D. An AND gate

245. Minimum interference with frequency response can be given by

A. Direct coupling

B. RC coupling

C. Transformer coupling

D. Instrumentation and control

246. The impedance of a load must match the impedance of the amplifier so that

A. Minimum power is transferred to the load

B. The efficiency can be maintained at low level

C. The signal-to-noise ratio is maximized

D. Maximum power is transferred to the load

247. The ratio output rms power in watts to the input dc power in watts in the different amplifier class is called _____.

A. Gain

B. Amplification factor

C. Efficiency

D. Phase power

248. Consider a zener diode with a slope resistance of 10 Ω in series with a 90 Ω resistor fed from a dc supply containing a ripple voltage of 20mV peak-to-peak. Compute for the ripple voltage in load

A. 1 mV p-p

B. 2 mV p-p

C. 1 V p-p

D. 6mV p-p

249. The _____ of a common collector configuration is unity

A. Voltage gain

B. Current gain

C. Power gain

D. Input impedance

250. Transmit time is the time taken by the electrons on holes to pass from

A. Emitter to collector

B. Collector to emitter

C. Base to emitter

D. Base to collector

CHAPTER 6: TEST AND MEASUREMENTS

1. What king of instrument an ammeter is?
   A. An indicating
   B. A recording
   C. An integrating
   D. A dc meter

2. As the deflection of the moving system increases, the controlling torque in an indicating instrument.
   A. Remains the same
   B. Increases
   C. Decreases
   D. Becomes zero

3. Which is the best type of meter movement?
   A. Iron-wave
   B. Dynamometer
   C. D' Arsonval
   D. Moving iron

4. Which dynamometer type has uniform scale?
   A. Wattmeter
   B. Voltmeter
   C. Ammeter
   D. Ohmmeter

5. When both deflecting and controlling torque act, the pointer of an indicating instrument comes to
   A. Rest
   B. Mid-position
   C. Maximum position
   D. Three-fourth position

6. The output voltage of a thermocouple
   A. Remains constant with temperature
   B. Decreases with applied voltage
   C. Increases with temperature
   D. Increases with applied voltage

7. An instrument in which the magnitude of the measured quantity is indicated by means of a pointer
   A. Analog instrument
   B. Digital instrument
   C. Ammeter
   D. Voltmeter

8. If the pointer of an indicating instrument is in motion, then what opposes deflecting torque?
   A. Controlling torque
   B. Damping torque
   C. Damping and controlling torques
   D. Frictional torque

9. How can electrical currents be inducted with a coil and a magnet?
   A. By placing the coil parallel to the magnetic field
   B. By placing the coil at right angles with the magnetic field
   C. By moving either the magnet or the coil
   D. By keeping the coil and the magnet perfectly stationary

10. When should a fuse be replaced with a higher rated unit?
    A. Never
    B. When the original value is not available
    C. If it blows
    D. When fuses of the original value are small in size

11. The pointer of an indicating instrument is generally made of
    A. Copper
    B. Silver
    C. Aluminum
    D. Gold

12. The time interval that a waveform is high (or low) is the _____ of the signal.
    A. Pulse width
    B. Pulse length
    C. Pulse position
    D. Duty cycle

13. A Wheatstone bridge is balanced if
    A. the ratio of resistors on one side of the bridge is one while the ratio of resistors on the other side is infinity
    B. the ratio of resistors on one side of the bridge is greater than the ratio of resistors on the other side
    C. the ratio of resistors on one side of the bridge equals the ratio of resistors on the other side
    D. the bridge uses identical resistors

14. The pointer of an indicating instrument is the final deflected position, the _____ is zero.
    A. Deflecting torque
    B. Controlling torque
    C. Damping torque
    D. Frictional

15. A moving system force in analog instruments which causes the moving system to deflect from its zero position.
    A. Deflecting force
    B. Damping force
    C. Return-to-zero force
    D. Controlling force

16. A moving force in analog instruments which ensures that the deflection of the pointer for a given value of measured quantity always has the same value.
    A. Damping force
    B. Controlling force
    C. NRZ force
    D. Deflecting force

17. All voltmeters except one of the following are operated by the passage of current.
    A. Moving-iron
    B. Dynamometer
    C. Electrostatic
    D. Permanent-magnet moving coil

18. Disc is made of what material in eddy current damping?
    A. Conductor and non-magnetic material
    B. Conductor and magnetic material
    C. Non-conductor and non-magnetic material
    D. Non-conductor and magnetic material

19. The time interval between pulses is called
    A. Pulse frequency
    B. Pulse delay
    C. Pulse duration
    D. Pulse period

20. An oscilloscope provides easy measurement of _____ values.
    A. instantaneous
    B. rms
    C. peak to peak
    D. average

21. An element in electrons which serves as a protection against overload?
    A. Resistor
    B. Transistor
    C. Semiconductor
    D. Fuse

22. What sensor provides a dc voltage approximately 1 V at 10 mW?
    A. Diode sensor
    B. Thermocouple sensor
    C. Thermal sensor
    D. Thermistor sensor

23. Hot-wire instrument has a/an _____ scale.
    A. uniform
    B. squared
    C. logarithmic
    D. exponential

24. For time measurements, _____ scale of the scope is used.
    A. horizontal
    B. diagonal
    C. vertical
    D. both vertical and horizontal

25. Fluid friction damping is employed in one of the following
    A. Dynamometer wattmeter
    B. Induction type energy meter
    C. Hot-wire ammeter
    D. Kelvin electrostatic voltmeter

26. Current range extension in moving coil instruments can be achieved by placing a _____ in shunt with the instrument.
    A. Low resistance resistor
    B. High resistance resistor
    C. High voltage transistor
    D. Capacitor

27. Permanent- magnet moving coil instrument can be used in
    A. ac work only
    B. both dc and ac work
    C. dc work only
    D. neither dc nor ac works

28. What CRT element provides for control of the number of electrons passing farther into the tube?
    A. Cathode
    B. Control grid
    C. Anode
    D. Phosphor screen

29. What refers to garaging two adjustments of an AC bridge together in such a way that changing one adjustment changes the other in a special way, but changing the second adjustment does not change the first?
    A. Logarithmic nulling
    B. Orthogonal nulling
    C. Exponential nulling
    D. Linear nulling

30. When the vertical input is 0V, the electron beam may be positioned at the _____ of the screen
    A. top center
    B. vertical center
    C. horizontal center
    D. bottom center

31. What is the reason why the scale of a permanent-magnet moving coil instrument is uniform?
    A. Because of effective eddy current damping
    B. Because external magnetic field has no effect
    C. Because it is spring controlled
    D. Because it has no hysteresis loss

32. A sensing element that provides a dc voltage less than 10 mV with typical power range of 0.1 to 100 mW.
    A. Thermal converters
    B. Thermal sensors
    C. Thermocouple sensors
    D. Diode sensors

33. Tank circuit frequency can be measured by _____.
    A. Voltmeter
    B. Signal generator
    C. Grid-dip meter
    D. Absorption meter

34. Shunts are generally made of what material?
    A. Constantan
    B. Silver
    C. Aluminum
    D. Manganin

35. What meter is the most sensitive?
    A. 10 ma
    B. 1 ma
    C. 1A
    D. 1 μA

36. A dynamometer instrument is mainly used as a /an
    A. dc ammeter
    B. wattmeter
    C. dc voltmeter
    D. ohmmeter

37. Which movement is the most expensive?
    A. D' Arsonal movement
    B. Dynamometer
    C. Moving-iron
    D. Iron-wave

38. Attraction and repulsion instruments are considered as
    A. Moving-cell instruments
    B. Moving-iron instruments
    C. Electrodynamic instruments
    D. Dynamometer

39. In Wheatstone bridge, bridge balance is considered where
    A. There is no current that flows through the load
    B. There is current that flows through the load
    C. There is potential difference between load terminal
    D. The galvanometer reading is maximum

40. The temperature coefficient of resistance of the shunt material is
    A. negligible
    B. negative
    C. positive
    D. infinite

41. In VTVMs, _____ is used to balance both halves of the difference amplifier or cathode-coupled amplifier.
    A. trigger adjust
    B. scale
    C. infinite adjust
    D. zero adjust

42. In an oscilloscope, _____ adjusts the brightness of the spot by changing the voltage on the control grid.
    A. intensity control
    B. focus control
    C. astigmatism control
    D. position control

43. What force in analog instrument quickly brings the moving system to rest in its final position?
    A. Damping force
    B. Controlling force
    C. Deflecting force
    D. Force at rest

44. The resistance of a moving-coil instrument is 10 Ω and gives full-scale deflection at 10 mA. Calculate the resistance of the shunt required to convert the instrument to give full-scale detection when the circuit current is 5 A.
    A. 0.**02004 Ω**
    B. 0.20004 Ω
    C. 1 Ω
    D. 2.04 Ω

45. A small swamping resistance is connected in series with operating coil of a moving coil ammeter in order to compensate for the effects of
    A. Temperature variation
    B. Hysteresis
    C. External magnetic fields
    D. Temperature inversion

46. The typical power range of diode sensor is
    A. 0.1μW to 10mW
    B. 0.1pW to 10mW
    C. 0.1mW to 100W
    D. 0.1nW to 10mW

47. A _____ operates on the magnetic attraction-repulsion principles
    A. Spectrum analyzer
    B. Oscilloscope
    C. Field strength meter
    D. Milliameter

48. What dc bridge is widely used for the accurate measurements of resistance?
    A. Owen bridge
    B. Hay bridge
    C. Potentiometer bridge
    D. Wheatstone bridge

49. Which of the following is a dc bridge that is very useful for making extremely accurate voltage measurements?
    A. Wheatstone bridge
    B. Potentiometer bridge
    C. Kelvin bridge
    D. Owen bridge

50. Majority of analog measuring instrument utilizes one of the following effects.
    A. Heating effect
    B. Electrostatic effect
    C. Magnetic field
    D. Chemical effect

51. Multimeter typically provides measurements of _____ values (for a sinusoidal waveform).
    A. peak
    B. rms
    C. average
    D. instantaneous

52. Dynamometer type instrument can be used for
    A. ac work only
    B. dc work only
    C. both dc and ac work
    D. neither dc nor ac works

53. What instrument which springs provide the controlling torque as well as serve to lead current into and out of the operating coil?
    A. Moving-iron
    B. Permanent-magnet
    C. Hot-wire
    D. Iron-wire

54. In VTVMs, _____ refers to the smallest signal that can be reliably measured.
    A. threshold signal
    B. minimum signal
    C. sensitivity
    D. input signal

55. The frequency of rotation in some rotating machinery can be measured by a
    A. VTVM
    B. Tachometer
    C. Spectral meter
    D. Stroboscope

56. Which of the items below describes an absorption meter's usage?
    A. Check the output frequency of a transmitter
    B. Monitors the output current of a receiver
    C. Monitors the frequency ratio of a device
    D. Frequency generator

57. What instrument is used for observing voltage and current waveforms?
    A. Multimeter
    B. DMM
    C. Oscilloscope
    D. Telescope

58. Which of the following forces does not act on the moving systems of analog instruments?
    A. A deflecting force
    B. A controlling force
    C. A damping force
    D. An electrostatic force

59. When current through the operating coil of a moving-iron instrument is tripled the operating force becomes
    A. six times
    B. one-half time
    C. nine times
    D. three times

60. What is the typical full-scale deflection current of a moving coil instrument?
    A. 50mA
    B. 50nA
    C. 50µA
    D. 50A

61. What instrument is used for measuring the amount of current flowing in a circuit?
    A. Voltmeter
    B. Ammeter
    C. Oscilloscope
    D. Meter amperage

62. What type of meter gives a precise reading on voltage, current or resistance where there is the generation of samples at the input and then feeds it to a digital read-out?
    A. VOM
    B. VTVM
    C. DMM
    D. DTMF

63. What is the typical full-scale voltage across a moving coil voltmeter?
    A. 50nV
    B. 50µV
    C. 50V
    D. 50mV

64. What is the period of a repetitive signal?
    A. One-fourth cycle of the waveform
    B. Two cycles of the waveform
    C. One cycle of the waveform
    D. One-half cycle of the waveform

65. What element of a CRT releases electrons when heated indirectly by a filament?
    A. Cathode
    B. Grid
    C. Anode
    D. Phosphor screen

66. Moving-iron instrument has what scale?
    A. Uniform
    B. Logarithmic
    C. Squared
    D. Exponential

67. A pattern displayed by oscilloscopes which has a steady characteristic is called
    A. Lissajous
    B. Nyquist pattern
    C. Barkhausen's criterian
    D. Fermat's pattern

68. A galvanometer with a 20 Ω coil resistance has a full-scale deflection of 10mA. A 0.02 Ω is placed across the meter to increase its rating capacity. What is the new full-scale current foe the meter?
    A. 1.01A
    B. 100.1A
    C. 10.10A
    D. 10.01A

69. Which of the following extends the range of a moving-iron ac ammeter?
    A. A shunt
    B. A multiplier
    C. Changing number of turns of operating coil
    D. A series

70. Which part of the following is not a basic part of a CRT?
    A. Electron gun
    B. Focusing and accelerating elements
    C. Horizontal and vertical deflecting plates
    D. Sawtooth generator

71. For amplitude measurements, what scale is calibrated in either volts per centimeter (V/cm), or milivolts per centimeter (mV/cm).
    A. Horizontal
    B. Diagonal
    C. Vertical
    D. Voltage

72. What ammeter is used to measure high-frequency currents?
    A. Hot-wire
    B. Moving-iron
    C. Dynamometer
    D. Thermocouple

73. Which of the voltmeter is used for measuring high direct voltage (say 10kV)?
    A. Permanent-magnet moving coil
    B. Hot-wire
    C. Electrostatic
    D. Moving iron

74. A common technique for measuring power at high frequency is to
    A. employ high power meter
    B. use microwave meters
    C. employ a sensing element that converts the RF power to a measurable dc or low-frequency signal
    D. use thermocouple

75. What provides visual display showing the form of the signal applied as a waveform on the front screen of a cathode ray oscilloscope?
    A. Television
    B. Computer
    C. Meter face
    D. CRT

76. Electrostatic instruments are exclusively used as
    A. voltmeters
    B. ohmmeters
    C. ammeters
    D. wattmeters

77. What is the typical power range of thermocouple sensors
    A. 0.1mW to 100W
    B. 0.1µW to 100mW
    C. 0.1nW to 100µW
    D. 0.1pW to 100nW

78. An electric pyrometer is an instrument used to measure
    A. phase
    B. high temperatures
    C. frequency
    D. power

79. Which instrument is the most sensitive?
    A. Moving-iron
    B. Dynamometer
    C. Hot-wire
    D. Permanent-magnet moving coil

80. Which is the most commonly used induction type instrument?
    A. Induction voltmeter
    B. Induction watt-hour meter
    C. Induction wattmeter
    D. Induction ammeter

81. What type of instrument is the watt-hour meter?
    A. An integrating
    B. A recording
    C. An indicating
    D. A power meter

82. A certain pulse measures 10ms and has a period of 50ms. The duty cycle is
    A. 20%
    B. 10%
    C. 5%
    D. 100%

83. Indicating instrument is assumed to be most accurate at what part of the scale?
    A. At beginning
    B. At half of full
    C. At ending
    D. Any part

84. On a simple ohmmeter, the 0 Ω mark is located _____ of the scale.
    A. at far left
    B. at half of full
    C. at ending
    D. any part

85. One of the basic functions of electronic circuit is
    A. the generation and manipulation of electronic waveshapes
    B. the creation of a signal
    C. the transmission of electrical signal
    D. the reception of electric signal

86. What provides a visual presentation of ant waveform applied to the input terminals?
    A. Cathode ray oscilloscope (CRO)
    B. Cathode ray tube (CRT)
    C. Spectrum analyzer
    D. VTVMs

87. The interval of a pulse from start to end is the _____ of the pulse
    A. period
    B. width
    C. position
    D. duty cycle

88. Considered as the "heart" of the cathode ray oscilloscope.
    A. Cathode ray tube (CRT)
    B. Sawtooth generator
    C. Horizontal amplifier
    D. Vertical amplifier

89. A material that glows when struck by the energetic electrons in a CRT.
    A. Aquadag
    B. Silicon
    C. Germanium
    D. Phosphor

90. What sensor provides a change of resistance with typical power range of 1μW to 10mW and with maximum frequency greater than 100GHz?
    A. Thermal converter
    B. Diode sensor
    C. Thermocouple sensor
    D. Thermistor sensor

91. An ammeter with an internal resistance of 50 Ω is used to measure a current through a load resistance RL= 1 k Ω. Determine the percentage error of the reading due to ammeter insertion.
    A. 67.4%
    B. 6.74%
    C. 4.76%
    D. 47.6%

92. Most AC voltmeters have an rms scale which is valid only if the input signal being measured is a _____ signal.
    A. square wave
    B. triangular
    C. sawtooth
    D. sinusoidal

93. Which of the following bridges measures dc resistance?
    A. Wheatstone
    B. Maxwell bridge
    C. Hay bridge
    D. Schering bridge

94. What bridge is used to measure high-Q inductors (Q>10)?
    A. Wheatstone bridge
    B. Wien bridge
    C. Hay bridge
    D. Maxwell bridge

95. Maxwell bridge measures an unknown inductance in terms of known
    A. resistance
    B. frequency
    C. inductance
    D. capacitance

96. What is used for measuring medium Q coils (1<Q<10)?
A. Maxwell bridge
B. Wheatstone bridge
C. Kelvin bridge
D. Hay bridge

97. What has a series RC combination in one arm and a parallel RC combination in the adjoining arm and used as a notch filter in harmonic distortion analyzer?
A. Wien bridge
B. Maxwell bridge
C. Kelvin bridge
D. Hay bridge

98. Sensitivity of a voltmeter is expressed in
A. Ω/ V
B. Ω/A
C. V/ Ω
D. V/A

99. What is the smallest change in applied stimulus that will indicate a detectable change in deflection in a indicating instrument called?
A. Sensitivity
B. Accuracy
C. Resolution
D. Precision

100. Insulation resistance is measured by which meter?
A. Ohmmeter
B. Insulation meter
C. Wien bridge
D. Megger

CHAPTER 7: MICROELECTRONICS

1. The integrated circuit was invented at Texas instrument in 1958 by
   A. Jonathan Kurtz
   B. James Faug
   C. Jack Kilby
   D. Harold Lanche

2. Which component cannot be fabricated into ICs?
   A. Diode
   B. Resistor
   C. Inductor
   D. Transistor

3. What is the purpose of a comparator in op-amps?
   A. To detect the occurrence of a changing input voltage
   B. To maintain a constant output when the dc input voltage changes
   C. To produce change in output when an input voltage equals a reference voltage
   D. To amplify an input voltage

4. The op-amp comparator circuit uses
   A. Negative feedback
   B. A resistor
   C. Positive feedback
   D. No feedback

5. What is a complete electronic circuit, containing transistors, diodes, resistors and capacitors processed on and contained entirely within a single chip of silicon?
   A. Integrated circuit (IC)
   B. Monolithic IC
   C. Linear IC
   D. Digital IC

6. What process is used to produce IC semiconductor elements?
   A. Alloy junction
   B. Mesa diffusion
   C. Grown diffusion
   D. Planar diffusion

7. Which integrated circuit is having more than 1000 gates?
    A. Small-scale integration (SSI)
    B. Medium-scale integration (MSI)
    C. Large-scale integration (LSI)
    D. Very large-scale integration (VLSI)

8. What characteristic does not apply to an op-amp?
    A. Low power
    B. High gain
    C. High input impedance
    D. Low output impedance

9. An integrator op-amp uses what element in the feedback path?
    A. Capacitor
    B. Resistor
    C. Inductor
    D. Transistor

10. Which integrated circuit is having more that 100 gates?
    A. Small-scale integration (SSI)
    B. Medium-scale integration (MSI)
    C. Large-scale integration (LSI)
    D. Very large-scale integration (VLSI)

11. Which of the choices below are sources of output offset voltage?
    A. The difference in V_{BE} values
    B. The difference in V_{CE} values
    C. The difference in transistor voltage
    D. All of the choices

12. The voltage gain of differential amplifier
    A. Equals the AC collector resistance divided by two times the AC resistance of the emitter diode
    B. Is the sum of two emitter currents
    C. Equals the difference between two base currents
    D. Is half of either collector current

13. Which integrated circuit is having 10 to 100 gates?
    A. Small-scale integration (SSI)
    B. Medium-scale integration (MSI)
    C. Large-scale integration (LSI)
    D. Very large-scale integration (VLSI)

14. Integrated circuits having up to 9 gates is called
    A. Small-scale integration (SSI)
    B. Medium-scale integration (MSI)
    C. Large-scale integration (LSI)
    D. Very large-scale integration (VLSI)

15. What is VCO
    A. Exhibits a frequency that can be varied with a dc control voltage
    B. A single pole low pass filter
    C. Is the terminal of the op-amp where input resistors are placed
    D. All of the choices

16. The reason why integrated circuits are divided into digital linear categories is because
    A. They either process analog or digital signals
    B. They are either used as input of output components
    C. Up to the present these are the only two known categories
    D. They are simply circuits that happen to be constructed integrally and like all circuits are either switching type or amplifying type

17. How is the output of a differentiator related to the input in an op-amp?
    A. The output of a differentiator is proportional to the rate of change of the input
    B. The output of a differentiator is inversely proportional to the rate of change of the input
    C. The two parameters are not related
    D. The two parameters are always equal to each other

18. ICs have advantages over discrete device circuits which is
    A. Lower cost
    B. High reliability
    C. Smaller size
    D. All of the above

19. Dual-in-line pick up (DIP) is the most popular IC package because
    A. It is low in cost
    B. It is one of the tiniest package known
    C. It ruggedly resist vibration due to its solid construction
    D. All of the above

20. What is the typical input resistance of the op-amp amplifier when measured under open loop?
    A. 2 MΩ
    B. 3 MΩ
    C. 1.5 MΩ
    D. 2.5 MΩ

21. After assembly, the ICs are tested and classified as either
    A. Military
    B. Industrial
    C. Military or industrial
    D. Military and industrial

22. For a constant input voltage to an integrator, why is the voltage across the capacitor linear?
    A. Capacitor diode does not dissipate heat
    B. Capacitor current is constantly changing
    C. Capacitor current is linear
    D. Capacitor current is constant

23. Upon what principle does a relaxation oscillator operate?
    A. Resistor in cascade
    B. The charging and discharging of capacitor
    C. The rectification process of a diode
    D. Switching transistors

24. ICs for military and space applications are tested in the temperature range of
    A. 0ºC to +70 ºC
    B. -55 ºC to +125 ºC
    C. -173 ºC to + 100 ºC
    D. -10 ºC to + 25 ºC

25. For most commercial and industrial operations, ICs are tested in the temperature range of
    A. 0ºC to +70 ºC
    B. -55 ºC to +125 ºC
    C. -173 ºC to + 100 ºC
    D. -10 ºC to + 25 ºC

26. An IC op-amp that combines FETs and bipolar transistors.
    A. BIFET
    B. MOSFET
    C. CMOS
    D. IGFET

27. A mass of metal attached to the case of a transistor to allow the heat to escape more easily.
    A. Flag
    B. Heat sink
    C. Op-amp
    D. Photodiode

28. Which of the following IC processes digital signals?
    A. Digital IC
    B. Discrete IC
    C. Linear IC
    D. Monolithic IC

29. Which of the following IC processes analog signals?
    A. Digital IC
    B. Discrete IC
    C. Linear IC
    D. Monolithic IC

30. A signal that is applied with equal strength to both inputs of a differential amplifier or an op-amp.
    A. Common-emitter circuit
    B. Common-ration signal
    C. CMRR
    D. Common mode signal

31. A base circuit that a designer can modify to get more advanced circuits
    A. Experimental
    B. Prototype
    C. Peak detector
    D. Loading

32. What is the most commonly used type of linear IC?
    A. 741
    B. 555 timer
    C. Operational amplifier
    D. LM 340

33. What has been considered as the industry standard of linear ICs?
    A. 555 timer
    B. 741 op amp
    C. LM 340
    D. LM 317

34. What type of response characterizes the single pole low pass filter?
    A. Flat from dc to the critical frequency
    B. Current downward up to the maximum frequency
    C. Curved upward to the maximum frequency
    D. No response characteristics

35. Which of the item below is an advantage of a shunt regulator over a series type?
    A. Has an inherent current limiting
    B. Efficient than series regulator because of its component used
    C. A non regulating device
    D. None of the choices

36. What is the most popular IC used in timing circuits?
    A. 555 timer
    B. 741
    C. LM 317
    D. LM 340

37. What is the typical total power dissipated by the operational amplifier?
    A. 5 mW
    B. 0.5 mW
    C. 50 mW
    D. 500 mW

38. In the standard letter-number identification code of operational amplifiers, the letter prefix which normally consists of two or three letters identifies the
    A. Manufacturer
    B. Type of packaging
    C. Type of op-amp
    D. Temperature range of operation

39. An op-amp circuit that has its output tied directly to the inverting input terminal is called a _____
    A. Current follower
    B. Inverting amplifier
    C. Non-inverting amplifier
    D. Voltage follower

40. Most op-amps circuit use
    A. Positive feedback
    B. Negative feedback
    C. Open-loop operation
    D. Closed-loop operation

41. The three most common package suffix codes are the following except one
    A. A
    B. D
    C. J
    D. N

42. What is the package suffix code for a plastic dual-in-line for surface mounting on PC board?
    A. D
    B. J
    C. N
    D. P

43. What is the approximate short circuit current output of 741 op amp?
    A. 15 mA
    B. 25 mA
    C. 30 mA
    D. 35 mA

44. A circuit whose components are soldered or otherwise connected mechanically
    A. Discrete circuit
    B. Non discrete circuit
    C. Biasing circuit
    D. Integrated circuit

45. MPP value in an op-amp is synonymous with
    A. Output voltage swing
    B. Equal to the difference of the two supply voltages
    C. The maximum unclipped peak-to-peak output of an amplifier
    D. All of the choices

46. What is the highest undistorted frequency out of an op-amp for a given slew rate and peak voltage?
    A. Power bandwidth
    B. Cut-off frequency
    C. Critical frequency
    D. 3-dB bandwidth

47. What is the summing point in op-amps?
    A. Simulates mathematical integration
    B. Acts as a scaling differentiator
    C. Determines the rate of change of the integrator output voltage
    D. A terminal of the op-amp where the input resistors are commonly connected

48. In terms of circuit components, what does the term pole refer to?
    A. A single RL circuit
    B. A single RC circuit
    C. A cascaded amplifier
    D. A summing amplifier

49. What is the slew rate of a 741 operational amplifier?
    A. 0.5 V/µs
    B. 1 V/µs
    C. 0.5 V/ms
    D. 1 V/ms

50. What specification of an operational amplifier which tells how fast the output voltage can change?
    A. Frequency response
    B. Common mode rejection ration
    C. Slew rate
    D. Open-loop voltage gain

51. What is the typical input bias current of a 741 operational amplifier?
    A. 70 nA
    B. 80 nA
    C. 90 nA
    D. 100 nA

52. The _____ of an op amp is its voltage gain when there is no negative feedback
    A. CMRR
    B. Unity gain
    C. Close-loop
    D. Open-loop

53. The term monolithic is derived tom a combination of the Greek words monos and lithos which means
    A. Single-element
    B. Single-water
    C. Single-stone
    D. Single-chip

54. A technique used to eliminate the need for inductive elements in monolithic integrated circuits.
    A. Projection printing
    B. Photolithographic
    C. LC synthesis
    D. RC synthesis

55. Most linear ICs are low-power devices with power dissipation ratings of

A. 5 W
B. 1 μW
C. Less than 1 W
D. More than 1 W but less than 2 W

56. An integrated circuit for both astable and monostable applications

A. 741 op-amp
B. Discrete ICs
C. Monolithic ICs
D. 555 timer

57. Astable multivibrator is

A. A square wave clock
B. Equivalent to a flip-flop
C. A one-shot multivibrator
D. Monostable in nature

58. In a 5 V level detector circuit

A. The noninverting input is connected to +5V
B. The input signal is connected to +5V
C. The inverting input is connected to +5V
D. The input signal must be riding on a +5V dc level

59. To convert a summing amplifier of an averaging amplifier

A. All inputs must be of the same value
B. The ratio of Rf/R must equal to the reciprocal of the number of inputs
C. All input resistors must be of different value
D. The ratio of Rf/R must equal to the number of inputs

60. An oscillator is described by

A. Regenerative feedback
B. No feedback
C. An integrator or differentiator
D. Unity gain and zero phase shift around the feedback loop

61. To use a comparator for zero-level detection, the inverting input is connected to

A. Ground

B. A positive reference voltage

C. The dc supply voltage

D. A negative reference voltage

62. In most modern IC op-amps, the 741 requires _____ power supplies

A. 1

B. 2

C. 3

D. 4

63. In an op-amp integrator, the feedback path consist of

A. A capacitor

B. An inductor

C. A resistor and a capacitor in series

D. A resistor and a capacitor in parallel

64. Microwave ICs cover the frequency range from

A. 0.5 to 15 GHz

B. 15 to 30 GHz

C. 30 to 45 GHz

D. 45 to 100 GHz

65. Considered as the fundamental form of IC

A. Hybrid

B. MSI

C. VLSI

D. Monolithic

66. Plastic dual-in-line for insertion into sockets has a package suffix code of

A. N

B. P

C. Both a and b

D. J

67. What is the specific application of µA741C op-amp
    A. For commercial
    B. For industrial
    C. For military
    D. For experimental

68. What is the most common method used for growth of single crystals for IC fabrication?
    A. Epitaxial growth
    B. Czochralsky pulling technique
    C. Film deposition
    D. Photolithography

69. The charge-coupled device (CCD) is a unique and versatile semiconductor structure invented in 1969 by
    A. W.S Boyle and G.E Smith
    B. W.F Davis and R.C Huntington
    C. D. Cave and W. Blood Jr.
    D. H.H Strellrecht and C.S. Meyer

70. The value of the input voltage that switches the output of a comparator or Schmitt trigger
    A. Trip point
    B. Firing voltage
    C. Threshold voltage
    D. All of the choices

71. A type of ground that appears at the inverting input of an op-amp that uses negative feedback.
    A. Earth ground
    B. Equipment ground
    C. True ground
    D. Virtual ground

72. The intel i486 32-bit microprocessor incorporates _____ transistors on a single chip.
    A. 1 million
    B. 100 thousand
    C. 2 million
    D. 200 thousand

73. In IC op-amps, the input bias current is defined as the

A. Average of the two base currents

B. Total of the base currents

C. Inverse of the base currents

D. Difference of the base currents

74. CMRR means

A. Common-mode rejection ratio

B. The ratio of the differential voltage gain to common-mode voltage gain

C. Both a and b

D. The difference between the two base voltages

75. The typical dimension of a MOSFET in a single IC ship is

A. 4 mils x 6.5 mils

B. 2 mils x 12 mils

C. 3 mils x 4.5 mils

D. 1.5 mils x 3 mils

76. The maximum rate that an output voltage of an op-amp can change

A. Slew rate

B. CMRR

C. Input offset voltage

D. Tail current

77. The unwanted capacitance between connecting wires and ground.

A. Summer capacitor

B. Stray wiring capacitance

C. Biasing capacitance

D. Feedback capacitance

78. The typical dimension of a BJT in a single IC chip is

A. 4 mils x 6.5 mils

B. 2 mils x 12 mils

C. 3 mils x 4.5 mils

D. 1.5 mils x 3 mils

79. The typical dimension of a diode in a single IC chip is
    A. 4 mils x 6.5 mils
    B. 2 mils x 12 mils
    C. 3 mils x 4.5 mils
    D. 1.5 mils x 3 mils

80. Which of the items below is equivalent to a relaxation oscillator?
    A. Astable multivibrator
    B. Flip-flop
    C. Monostable multivibrator
    D. Bistable multivibrator

81. The unity gain frequency of an op-amp
    A. Is the frequency where the voltage gain of an op-amp is 1
    B. Indicates the highest usable frequency
    C. It equals the gain bandwidth product
    D. All of the above

82. If the base 10 is called decimal number system, then the base 12 is called
    A. Bidecimal number system
    B. Dodecimal number system
    C. Duodecimal number system
    D. All of the above

83. What is the principal method used in the fabrication of semiconductor devices for hybrid and monolithic ICs?
    A. Epitaxial growth
    B. Photolithographic process
    C. Isolation diffusion
    D. Planar technology

84. The gain reduction in operational amplifier is known as
    A. Roll-off
    B. Back-off
    C. Gain-off
    D. Attenuation

85. The rate of gain reduction in operational amplifers

A. 5 db per decade (-5db/decade)
B. 6 db per decade (-6db/decade)
C. 10 db per decade (-10db/decade)
D. 20 db per decade (-20db/decade)

86. A capacitor inside an op-amp that prevents oscillations

A. Compensating capacitor
B. Limiting capacitor
C. Biasing capacitor
D. Coupling capacitor

87. A device that contains its own transistors, resistors and diodes

A. Integrated circuit
B. CMOS
C. Logic gates
D. All of the above

88. What provides a parameter specifying the maximum rate of change of the output when driven by a large step-input signal?

A. Step rate
B. Slew rate
C. Step rate
D. Dynamic rate

89. The absolute maximum rating for op-amps interval power dissipation is

A. 500 mW
B. 300 mW
C. 200 mW
D. 100 mW

90. What is the absolute maximum rating for an op-amps differential input voltage?

A. ±10 V
B. ±20 V
C. ±30 V
D. ±50 V

91. The amplifier CMRR of µA 741 op-amplifier is

A. 60 dB
B. 70 dB
C. 80 dB
D. 90 dB

92. The letter prefix LM identifies which of the following manufacturers?

A. National semiconductor corporation
B. Texas instrument
C. Motorola
D. Signetics

93. What is the letter prefix used by the Fairchild Semiconductor on their op-amp product?

A. µA
B. FS
C. SG
D. NE

94. Which of the following is not part of the three temperature range codes of op amps for commercial, industrial and military applications?

A. -30 to 200ºC
B. 0 to 70 ºC
C. -25 to 85 ºC
D. -55 to 125 ºC

95. What identifies the package style that houses the op amp chip?

A. Letter suffix
B. Letter prefix
C. Circuit designator
D. Military specification code

96. The package suffix code for ceramic dual-in-line is

A. J
B. D
C. N
D. P

97. The summing amplifier has two or more inputs, and its output voltage is proportional to the _____ of the algebraic sum of its input voltages.

A. Positive
B. Negative
C. Reciprocal
D. Inverse

98. When higher power ICs are needed, we can use

A. Monolithic ICs
B. Thin film ICs
C. Thick film ICs
D. Both b and c

99. In IC op-amps, one of the most important input characteristics is the _____ which is defined as the difference between the base currents.

A. Input bias current
B. Input offset current
C. Total base current
D. All of the choices

100. Monolithic ICs are

A. Forms of discrete circuits
B. Combination of thin-film and thick-film circuits
C. Also called hybrid ICs
D. Used for high power application

CHAPTER 8: INDUSTRIAL ELECTRONICS: PRINCIPLES AND APPLICATIONS

1. What is a nucleonic sensing method employing usually one or more radioisotope sources and radiation detectors?
   A. Radiation sensing
   B. Sonic level sensing
   C. Conductivity level sensing
   D. Dielectric variation sensing

2. What is concerned with the measurement of electric signals on the scalp with arise from the underlying neural activity in the brain (including synaptic sources)?
   A. ECG
   B. EEG
   C. Ultrasound
   D. EKG

3. In therapeutic radiology and in nuclear medicine, the energies of interest range from about
   A. 10 to 100 KeV
   B. 100 to 10000 KeV
   C. 10000 to 10000 KeV
   D. 1 to 10 KeV

4. Which of the following is a four-layer diode with an anode gate and a cathode gate?
   A. SCS
   B. SCR
   C. SBS
   D. SUS

5. What is basically a two-terminal parallel-inverse combination of semiconductor layers that permits triggering in either direction?
   A. Diac
   B. Triac
   C. Quadrac
   D. Shockley Diode

6. What is the typical value of the interbase resistance of UJTs?
   A. 20 KΩ
   B. Between 4 to 4 KΩ
   C. 4 KΩ
   D. Between 4 to 10 KΩ

7. PUT stands for
   A. Programmable Unijunction Transistor
   B. Programmable Universal Transistor
   C. Pulse Unijunction Transistor
   D. Pulse Universal Transistor

8. Which transistor conducts current in both directions when turned on?
   A. Diac
   B. SCR
   C. Quadrac
   D. SCS

9. What is a three terminal device used to control large current to a load?
   A. SCR
   B. SCS
   C. GTO
   D. Thyristor

10. What is the other term for thermoelectric effect?
    A. Seebeck effect
    B. Hall effect
    C. Photoelectric effect
    D. Thermal effect

11. What are the regions corresponding to open-circuit condition for the controlled rectifier which block the flow of charge from anode to cathode?
    A. Forward blocking regions
    B. Reverse blocking regions
    C. Breakdown regions
    D. Both A and B above

12. The V-I characteristics for a triac in the first and third quadrants are essentially identical to those of _____ in the quotation.
    A. SCR
    B. UJT
    C. Transistor
    D. SCS

13. When the temperature increases, the inter-base resistance of a UJT
    A. Remains unchanged
    B. Increases
    C. Decreases
    D. is zero

14. The three terminals of a triac are
    A. drain, source, gate
    B. two main terminals and a gate terminal
    C. cathode, anode and gate
    D. anode, source, gate

15. A triac is equivalent to two SCRs
    A. in parallel
    B. in inverse-parallel
    C. in series
    D. in inverse-series

16. In diagnostic radiology and for superficial therapy purposes, the energy spectrum of radiation varies from about
    A. 1 to 10 KeV
    B. 10 to 100 KeV
    C. 100 to 10000 KeV
    D. 10000 to 100000 KeV

17. The x-ray region of the electromagnetic spectrum has a corresponding range of wavelengths from
    A. 0.1 to 0.0001 nm
    B. 0.1 to 0.0001 pm
    C. 0.1 to 0.0001 μm
    D. 0.1 to 0.0001 mm

18. The three terminals of an SCR are the
    A. anode, cathode, and grid
    B. cathode, anode, gate
    C. anode, cathode, drain
    D. drain, source, gate

19. If a body is considered as a conducting sphere of 0.5m radius its capacitance to infinity is
    A. 55 pF
    B. 55 nF
    C. 55 μF
    D. 55 F

20. How many semiconductor layers does an SCR have?
    A. Four
    B. Two
    C. Three
    D. Five

21. A triac is a _____ switch.
    A. unidirectional
    B. mechanical
    C. bidirectional
    D. omnidirectional

22. Which of the following is the normal way to turn on an SCR?
    A. By breakover voltage
    B. By appropriate anode current
    C. By appropriate cathode current
    D. By appropriate gate current

23. A triac can pass a portion of _____ half cycle through the load
    A. only positive
    B. only negative
    C. both positive and negative
    D. neither positive nor negative

24. A diac has how many terminals?
    A. Two
    B. Three
    C. Four
    D. Five

25. An SCR combines the feature of
    A. a rectifier and resistance
    B. a rectifier and capacitor
    C. a rectifier and transistor
    D. a rectifier and inductor

26. Which is the control element in an SCR?
    A. Anode
    B. Cathode
    C. Gate
    D. Cathode supply

27. How many semiconductor layers does a triac have?
    A. Two
    B. Four
    C. Three
    D. One

28. A diac has how many semiconductor layers?
    A. Three
    B. Four
    C. Two
    D. Five

29. The p-type emitter of a UJT is _____ doped.
    A. lightly
    B. moderately
    C. heavily
    D. not

30. A diac has
    A. one pn junction
    B. three pn junctions
    C. two pn junctions
    D. four pn junctions

31. A UJT is sometimes called a ____ diode.
    A. double-based
    B. single-based
    C. a rectifier
    D. a switching diode

32. A diac is _____ switch.
    A. an AC
    B. a mechanical
    C. a dc
    D. both ac and dc

33. An SCR is made of silicon and not germanium because silicon.
    A. is inexpensive
    B. has low leakage current
    C. is mechanically strong
    D. is tetravalent

34. What is the control element in an SCR?
    A. Gate
    B. Anode
    C. Grid
    D. Cathode

35. An effect that reduces the possibility of accidental triggering of the SCS.
    A. Miller effect
    B. Rate effect
    C. End effect
    D. Flywheel effect

36. Which of the following is a common application of UJT?
    A. Amplifier
    B. Rectifier
    C. Mulitivibrator
    D. Sawtooth generator

37. Which device does not have a gate terminal?
    A. Triac
    B. SCR
    C. FET
    D. Diac

38. An SCR is a _____ triggered device.
    A. current
    B. power
    C. voltage
    D. noise

39. When UJTs is turned on, the resistance between emitter terminal and lower base terminal
    A. remains unchanged
    B. increases
    C. decreases
    D. becomes zero

40. The UJT has
    A. two pn junctions
    B. three pn junctions
    C. one pn junction
    D. four on junction

41. The UJT may be used as
    A. an amplifier
    B. a rectifier
    C. a sawtooth generator
    D. a multivibrator

42. Which of the following is the normal way to turn on a diac?
A. By breakover voltage
B. By gate voltage
C. By gate current
D. By anode current

43. Power electronics deals with the control of ac power at what frequencies essentially?
A. 20 KHz
B. 1000 KHz
C. Frequencies less than 10 Hz
D. 60 Hz frequency

44. When the emitter terminal of a UJT is open, the resistance between the base-terminals is generally
A. low
B. extremely low
C. high
D. extremely high

45. AC power in a load can be controlled by connecting
A. two SCRs in series
B. two SCRs in parallel
C. two SCRs in parallel opposition
D. two SCRs in series opposition

46. Which equation defines the intrinsic stand off ratio (η) of UJTs?
A. $R_{B1} / (R_{B1} + R_{B2})$
B. $(R_{B1} + R_{B2}) / R_{B1}$
C. $(R_{B1} + R_{B2}) / R_{B2}$
D. $R_{B1} + R_{B2}$

47. To turn off the SCR, which of the following is done?
A. Reduce gate voltage to zero
B. Reverse bias the gate
C. Reduce anode voltage to zero
D. Reduce cathode voltage to zero

48. Control system that maintains a speed voltage, or other variable within specified limits of a preset level.
    A. Controller
    B. Regulator
    C. Sensor
    D. Computer

49. To turn on the UJT, the forward bias on emitter diode should be _____ the peak point voltage.
    A. more than
    B. less than
    C. equal to
    D. twice

50. When the temperature increases, the intrinsic stand off ratio
    A. increases
    B. decreases
    C. essentially constant
    D. becomes zero

51. What is dimensionless parameter of the second-order characteristic equation?
    A. Damping ratio
    B. Accuracy
    C. Efficiency ratio
    D. Transfer function ratio

52. What is the ratio of two exponential functions of time called?
    A. Transfer function
    B. Damping ratio
    C. Efficiency
    D. Gain

53. A diac is turned on by
    A. breakover voltage
    B. gate current
    C. gate voltage
    D. anode current

54. An SCR whose state is controlled by the light falling upon a silicon semiconductor layer of the device.
    A. SCS
    B. GTO
    C. Thyristor
    D. LASCR

55. A diac is simply
    A. a single junction
    B. a three junction device
    C. a triac without a gate terminal
    D. the SCR

56. What region lies between the peak point and valley point of UJT emitter characteristic?
    A. Saturation
    B. Cut off
    C. Negative resistance
    D. Positive resistance

57. What refers to the application of electronic theory, technology, instrumentation, and computing system to biological research and medical problems?
    A. Medical electronics
    B. Genetics electronics
    C. Biomedical engineering
    D. Biomedical electronics

58. Which device exhibits negative resistance region?
    A. Diac
    B. Triac
    C. Transistor
    D. UJT

59. The UJT operates in what region after peak point?
    A. Cut off
    B. Negative resistance
    C. Saturation
    D. Positive resistance

60. SCR is a rectifier constructed of silicon material. Silicon is chosen because
    A. it is the most abundant material
    B. of its strength and ruggedness
    C. it is much cheaper than any other material
    D. of its high temperature and power capabilities

61. A transduction principle used primarily in optical sensors.
    A. Photoconductive transduction
    B. Photovoltaic transduction
    C. Electromagnetic transduction
    D. Piezoelectric transduction

62. What is a solid state equivalent of a gas filled triode?
    A. Triac
    B. Thyristor
    C. SCR
    D. SCS

63. The supply voltage is generally _____ that of breakover voltage in an SCR.
    A. equal to
    B. less than
    C. greater than
    D. twice

64. The triac is fundamentally a/an _____ with a gate terminal for controlling the turn-on conditions of the bilateral device in either direction.
    A. SCR
    B. Quadric
    C. Shockley diode
    D. Diac

65. When the supply voltage exceeds the breakover voltage of an SCR, it
    A. starts conducting
    B. stops conducting
    C. conducts leakage current
    D. conducts terminal current

66. The step response of a first order systems is given by
    A. $y(t) = A_0$
    B. $y(t) = A_0 + A_1e^{s1t} + A_2e^{s2t} + A_3e^{s3t}$
    C. $y(t) = A_0 + A_1e^{s1t} + A_2e^{s2t}$
    D. $y(t) = A_0 + A_1e^{s1t}$

67. A feedback control system in which the controlled variable is mechanical position.
    A. Closed-loop feedback control system
    B. Open-loop feedback control system
    C. Servomechanism
    D. Mechanical servomechanism

68. What is that voltage above when the SCR enters the conduction region?
    A. Reverse breakover voltage
    B. Forward breakover voltage
    C. Holding voltage
    D. Trigger voltage

69. A locus or path of the roots traced out on the s-plane as a parameter is changed.
    A. Root locus
    B. Hyperbola
    C. Parabola
    D. Circle

70. A control system in which the output is related to the input by device parameters only.
    A. Open-loop control system
    B. Closed-loop control system
    C. Servomechanism
    D. Feedback control system

71. What is that value of current below which the SCR switches from the conduction state to the forward blocking region under stated conditions?
    A. Holding current
    B. Forward current
    C. Reverse current
    D. Trigger current

72. Which is equivalent to a zener or avalanche region of the fundamental two-layer semiconductor diode?
A. Reverse breakdown voltage
B. Forward breakdown voltage
C. Breakdown voltage
D. Breakover voltage

73. What is the required gate triggering current of GTO?
A. 20 mA
B. 10 mA
C. 30 mA
D. 40 mA

74. What is an automatic speed control device using the centrifugal force on rotating flyweights as the feedback element?
A. Regulator
B. Flywheel governor
C. Field control
D. Throttle valve

75. What is the sensing element of acceleration transducer?
A. Damper
B. Spring
C. Seismic mass
D. Crystal

76. What are some areas where GTO is applicable?
A. Counters
B. Pulse generators
C. Multivibrators
D. All of the above

77. What Greek word which means “switch”?
A. Ristor
B. Trans
C. Thy
D. Thyristor

78. What is the typical turn-on time of an SCR?
A. 1 µs
B. 5 µs
C. 10 µs
D. 3 µs

79. An SCR is a solid state equivalent of which tube?
A. Triode
B. Gas-filled triode
C. Pentode
D. Tetrode

80. The gate of an SCR is _____ with respect to its cathode.
A. positive
B. at zero potential
C. negative
D. at infinite potential

81. A normally operated SCR has an anode which is _____ with respect to cathode.
A. negative
B. positive
C. at zero potential
D. at infinite potential

82. What device measures humidity directly with a single sensing element?
A. Hygrometer
B. Tachometer
C. Venturi meter
D. Hydrometer

83. What is one of the most widely used sensing elements particularly for pressure ranges higher than 2 MPa?
A. Bellows
B. Bourdon tube
C. Capsule
D. Straight tube

84. Which of the following can change the angle of conduction in SCR?
    A. Changing anode voltage
    B. Changing gate voltage
    C. Reverse biasing the gate
    D. Changing cathode voltage

85. An SCR is a member of what family?
    A. Thyrector
    B. Thyratron
    C. Thyristor
    D. Transistor

86. How many pn junction does SCRs have?
    A. Two
    B. Four
    C. Three
    D. Five

87. Which of the following is NOT a method primarily used for density sensing?
    A. Sonic
    B. Radiations
    C. Vibrating element
    D. Differential

88. When SCR starts conducting, then _____ losses all control.
    A. gate
    B. anode
    C. cathode
    D. anode supply

89. An SCR when turned on has a typical voltage across of
    A. zero
    B. 0.1 V
    C. infinite
    D. 1 V

90. The typical turn-off time of an SCR is about
    A. 20 to 40 µs
    B. 5 to 40 µs
    C. 1 to 5 µs
    D. 15 to 25 µs

91. An SCR is made of what material?
    A. Silicon
    B. Carbon
    C. Germanium
    D. Gallium-arsenide

92. ECG stands for electrocardiography while EEG stands for?
    A. electroextracellugraphy
    B. electroemyography
    C. electroencephalography
    D. electrovectorcardiography

93. Acceleration transducers are also called
    A. gyros
    B. force transducers
    C. tachometers
    D. accelerometers

94. When an SCR is combined to a switch, it is considered as a _____ switch.
    A. bidirectional
    B. mechanical
    C. unidirectional
    D. omnidirectional

95. When the firing angle of SCR is increased, its output
    A. decreases
    B. increases
    C. remains unchanged
    D. doubles

96. When the SCR is OFF, the current in the circuit is
    A. exactly zero
    B. large leakage current
    C. small leakage current
    D. thermal current

97. The SCR can exercise control over _____ of ac supply.
    A. positive or negative half-cycle
    B. both positive and negative half-cycles
    C. only positive half-cycle
    D. only negative half-cycle

98. What is the most widely used altitude and altitude-rate transducers?
    A. Flowmeter
    B. Psychometer
    C. Gyro
    D. Gygrometer

99. What sensing element is typically made from a thin-walled tube formed into deep convolutions and sealed at one end, whose displacement can then be made to act on a transduction element?
    A. Diaphragm
    B. Bellow
    C. Capsule
    D. Bourdon tube

100. The voltage across an SCR when it is turned on is about
    A.0.5 V
    B. 0.1 V
    C. 1 V
    D. 5 V

CHAPTER 9: COMPUTER FUNDAMENTALS

1. Which of the following involves digital quantities?
   A. Ten position switch
   B. Current meter
   C. Temperature
   D. Radio volume control

2. Which of the following choices is NOT a characteristic of analog quantity?
   A. Variable amplitude
   B. One quantity is represented by another which is proportional to the first
   C. Is considered discrete
   D. They can vary over a continuous range of values

3. The decimal system is composed of _____ numerals or symbols.
   A. 2
   B. 10
   C. 8
   D. 16

4. Change in state is
   A. same state
   B. reset
   C. set
   D. toggle

5. What is the decimal equivalent of $(1101011)_2$?
   A. 107
   B. 108
   C. 96
   D. 100

6. What is the next binary number following $(10111)_2$ in the counting sequence?
   A. 11100
   B. 11001
   C. 10110
   D. 11000

7. What is the largest decimal value that can be represented using 12 bits?
   A. 144
   B. 2048
   C. 4095
   D. 4096

8. What is the largest number that can be represented using 8 bits?
   A. 11111111
   B. 10111011
   C. 10111111
   D. 11011111

9. A digital circuit is also referred to as a/an _____ circuit.
   A. arithmetic
   B. logic
   C. electrical
   D. sequential

10. CMOS means
    A. Complementary Main-Oxide Semiconductor
    B. Complementary Metal-Oxide Semiconductor
    C. Complements Main-Oxidation Semiconductor
    D. Correlation in Metal Oxidized Semiconductor

11. What is the smallest type of computer in terms of their physical size?
    A. Minicomputer
    B. Mainframe
    C. Maxicomputer
    D. Microcomputer

12. Equivalent of decimal value of 178 in straight binary code is _____ and in BCD is _____.
    A. 11000, 11111111
    B. 10111101, 100000
    C. 10110010, 101111000
    D. 111111, 1100000

13. If each digit of a decimal number is represented by its binary equivalent, the result is a code called
    A. Morse code
    B. Binary system
    C. Binary-coded decimal
    D. Straight binary coding

14. Convert $(614)_8$ to decimal.
    A. 400
    B. 384
    C. 392
    D. 396

15. BCD code has always _____ bits per number.
    A. 2
    B. 4
    C. 8
    D. 16

16. Convert $(B2F)_{16}$ to octal.
    A. 5547
    B. 5457
    C. 7547
    D. 11010

17. Convert 1000 1001 0111 (BCD) to its decimal equivalent.
    A. 798
    B. 457
    C. 897
    D. 101

18. Which of the following items below is NOT one of the three basic operations of Boolean algebra?
    A. Logical addition
    B. Logical complementation
    C. Logical subtraction
    D. Logical multiplication

19. How many bits are required to represent an eight digit decimal number in BCD?
    A. 256
    B. 4
    C. 255
    D. 32

20. The _____ belongs to a class of codes called the minimum-change codes, in which only one bit in the code group changes when going from one step to the next.
    A. Morse code
    B. BCD code
    C. Excess-3 code
    D. Gray code

21. The most widely used 7-bit alphanumeric code is the
    A. ASCII
    B. EBCDIC
    C. Straight binary code
    D. Gray code

22. What is the hex equivalent of an ASCII code which means "HELP"?
    A. 48 45 4C 50
    B. 4C 50 51 52
    C. 58 57 58 48
    D. 48 45 50 50

23. A _____ takes the complete decimal number and represents it in binary.
    A. BCD
    B. Gray code
    C. Excess-3 code
    D. Straight binary code

24. The number of input combinations will equal _____ for an N-input truth table.
    A. 2^N-1
    B. N
    C. 2^N
    D. N-1

25. The _____ operation result will be 1 if any one or more variables is a 1.
    A. NOT
    B. AND
    C. OR
    D. NOR

26. A circuit that operates in such a way that its output is high when all its inputs are high.
    A. OR
    B. NAND
    C. NOR
    D. AND

27. What is the only input combination that will produce a high at the output of a five-input AND gate?
    A. At least one low input
    B. At least one high input
    C. All inputs should be low
    D. All inputs should be high

28. The output of an inverter is connected to the input of a second inverter. Determine the output level of the second inverter.
    A. Output level is the complement of the input level
    B. Output level is the same as the input level
    C. High output is observed
    D. Undetermined state

29. Given: **x = A'BC (A+D)'**. Determine the output of the circuit x if A = 0, B = 1, C = 1 and D = 0.
    A. 0
    B. 1
    C. 2
    D. 10

30. With OR operation, 1 + 1 = _____
    A. 1
    B. 0
    C. 10
    D. 2

31. Use the expression for **x = D + [(A+B)C]' · E** to determine the output of the circuit for the conditions A = B = E = 1, C = D = 0.

A. 0

B. 1

C. 2

D. 10

32. The Boolean expression for a six-input OR gate

A. A + B + C

B. A · B · C · D · E · F

C. A + B + C + D + E + F

D. U + V + W + X + Y + Z

33. What type of gate is equivalent to a NAND gate followed by an inverter?

A. OR

B. AND

C. XOR

D. NOR

34. Simplify the expression **y = AB'D + AB'D'.**

A. AB

B. D'

C. BCD

D. AB'

35. How many different ways can we implement the inversion operation in a logic circuit?

A. One

B. Two

C. Three

D. Four

36. In Boolean algebra, **B · B'** =

A. B

B. B'

C. 0

D. 1

37. In Boolean algebra, **G + GF** =
    A. GF
    B. G
    C. F
    D. 1

38. In Boolean algebra, **X + 1** =
    A. X + 1
    B. X
    C. 0
    D. 1

39. A circuit with no memory characteristic and whose output depends only on the current value of its inputs.
    A. SLC
    B. Boolean circuits
    C. CLC
    D. Multiplexers

40. Determine the sum-of-product expression for a circuit with four inputs and an output that is HIGH only when A is low at the same time that exactly two inputs are low.
    A. A'B'C'D + A'B'CD' + A'BC'D'
    B. A'B'C' + C'D'
    C. A'B'C' + A'C'D' + A'B'D'
    D. 10

41. What graphical device is used to convert a truth table to its corresponding logic circuit in a simple and orderly process?
    A. Karnaugh map
    B. State table
    C. Truth table
    D. State diagram

42. What is the output of an EX – OR gate when a logic signal and its exact inverse are connected to its input?
    A. X'
    B. X
    C. 1
    D. 0

43. One of the standard levels of complexity of integrated circuits which contains 100,000 and more number of gates.
    A. SSI
    B. MSI
    C. VLSI
    D. ULSI

44. What is the most common type of digital IC package?
    A. DIP
    B. Metal type
    C. CMOS
    D. TTL

45. An acceptable voltage range of a logic 0 for TTL.
    A. 2 to 5 V
    B. 0 to 0.8 V
    C. 0 to 1.5 V
    D. 3.5 to 5 V

46. An acceptable voltage range of a logic 1 for TTL.
    A. 2 to 5 V
    B. 0 to 0.8 V
    C. 0 to 1.5 V
    D. 3.5 to 5 V

47. An acceptable voltage range of a logic 0 for CMOS operating at VDD = 5 V.
    A. 2 to 5 V
    B. 0 to 0.8 V
    C. 0 to 1.5 V
    D. 3.5 to 5 V

48. An acceptable voltage range of a logic 1 for CMOS operating at VDD = 5 V.
    A. 2 to 5 V
    B. 0 to 0.8 V
    C. 0 to 1.5 V
    D. 3.5 to 5 V

49. What happens when the input to a digital IC is left unconnected for TTL ICs?
    A. It acts like logic 1
    B. It becomes overheated
    C. It acts just like logic 0
    D. It eventually destroys itself.

50. An unconnected input is termed as _____.
    A. open
    B. close
    C. disconnected
    D. floating

51. How does a CMOS integrated circuit respond to a floating input?
    A. Unpredictable, may overheat and be destroyed
    B. Open
    C. Shorted
    D. Acts just like a logic 1

52. Which of the following is NOT an internal digital IC fault?
    A. Open signal lines
    B. Shorted signal lines
    C. Faulty power supply
    D. Poor solder connections

53. What will be the state of Q and Q' after a flip-flop has been reset?
    A. Q = 0, Q' = 1
    B. Q = 1, Q' = 0
    C. Q = 0, Q' = 0
    D. Q = 1, Q' = 1

54. This type of fault has the same effect as an internal short between IC pins.
    A. Open signal lines
    B. Shorted signal lines
    C. Broken wire
    D. Poor solder connections

55. Which of the following does not describe a flip-flop circuit?
    A. Latch
    B. Memory
    C. Bistable multivibrator
    D. ROM

56. What is the normal resting state of the SET and CLEAR inputs in a NAND gate latch?
    A. SET = CLEAR = 1
    B. SET = 0, CLEAR = 1
    C. SET = 1, CLEAR = 0
    D. SET = CLEAR = 0

57. Add the hex numbers 58 and 24.
    A. 7C
    B. 7D
    C. C7
    D. 2C

58. Add 3AF to 23C
    A. BE5
    B. 5EB
    C. A3B
    D. 101A

59. All arithmetic operations take place in the _____ of a computer
    A. CPU
    B. ALU
    C. Microprocessor
    D. ROM

60. How many inputs does a full adder have?
    A. 2
    B. 4
    C. 8
    D. 3

61. How many outputs does a full adder have?
    A. 1
    B. 2
    C. 4
    D. 8

62. How many inputs does a half adder have?
    A. 1
    B. 2
    C. 3
    D. 4

63. What are the three basic parts of a BCD adder circuit?
    A. Two 4-bit adders and connection logic
    B. Two connection logic and one 4-bit adder
    C. Two full adders and one AND gate
    D. One connection logic and 4 full adders

64. What is the principal register of an arithmetic logic unit?
    A. Controller
    B. Buffer
    C. Actuator
    D. Accumulator

65. A computer programming language in which groups of 1s and 0s are used to represent instructions. It is also the only language a computer actually understood.
    A. Application software
    B. Machine language
    C. High – level language
    D. Programming language

66. A digital circuit that produces an output code depending on which of its inputs is activated.
    A. Decoder
    B. Encoder
    C. Multiplexer
    D. Demultiplexer

67. An IC that contains a large number of interconnected logic functions wherein the user can program the IC for a specific function by selectively breaking the appropriate interconnections.
    A. RAM
    B. ROM
    C. PLD
    D. PLC

68. Class of programmable logic devices wherein its AND array is programmable while its OR array is hard-wired.
    A. PAL
    B. PLA
    C. PLD
    D. PROM

69. Class of programmable logic devices wherein both its AND and its OR arrays are programmable.
    A. Field Programmable Logic Array
    B. Programmable Logic Controller
    C. Programmable Logic Circuit
    D. Programmable Array Logic

70. A result which is obtained when one is added to the least significant bit position of a binary number in the 1's complement.
    A. Spike
    B. 2's complement form
    C. Complement
    D. Signed binary numbers

71. A digital circuit that oscillates between two unstable output states.
    A. Monostable multivibrator
    B. Astable multivibrator
    C. Bistable multivibrator
    D. Flip-flop

72. An electrical connection common to all segments of an LCD.
    A. Dual slope
    B. Bootstrap
    C. Backplane
    D. Cascade

73. A binary counter that counts from 0000 to 1001 before it recycles.
    A. Buffer
    B. BCD counter
    C. Ring counter
    D. Ripple counter

74. A shift register in which the output of the last flip-flop is connected to the input of the first flip-flop.
    A. Ring counter
    B. Ripple counter
    C. Parallel counter
    D. BCD counter

75. A term synonymous with CLEAR in computer systems.
    A. Reset
    B. Set
    C. Toggle
    D. Load

76. That part of a computer instruction that defines what type of operation the computer is to execute on specified data.
    A. Machine language
    B. Mnemonic
    C. Assembly language
    D. Op code

77. An abbreviation that represents the op code of a computer instruction.
    A. ASCII
    B. Mnemonic
    C. Octets
    D. Instruction

78. A property whereby the output of a digital-to-analog converter either increases or stays the same as the input is increased.
    A. Volatility
    B. Immunity
    C. Monotonicity
    D. Parity

79. Class of mass memory devices that use a laser beam to write and read onto a specified coated disk.
    A. Mass storage
    B. RAM
    C. Optical disk memory
    D. Non-volatile memory

80. A term used to describe the logic function created when open-collector outputs are tied together.
    A. Wired-OR
    B. Wired-AND
    C. Totem-pole
    D. Tristate

81. A technique often used to eliminate decoding spikes.
    A. Wired-AND
    B. Strobing
    C. Tristate
    D. Wired-NAND

82. A momentary, narrow, spurious and sharply defined change in volume.
    A. Glitch
    B. Strobe
    C. Toggle
    D. Clock

83. A single bit comparator is usually implemented using
    A. Exclusive OR
    B. NOR gate
    C. Exclusive NOR
    D. Wired-AND

84. An equivalent Boolean equation for an exclusive NOR is
    A. xy + x'y'
    B. xy + xy'
    C. x'y + xy'
    D. xy'+ x'y'

85. Data storage in a memory is termed as

A. writing

B. memorizing

C. loading

D. reading

86. Data retrieval from a memory is called

A. getting

B. accessing

C. reading

D. fetching

87. In BCD, the code 1111 is

A. letter F

B. A

C. 11

D. Invalid

88. A decoder with four inputs can have a maximum of how many outputs?

A. 4

B. 8

C. 16

D. 32

89. Another name for a digital multiplexer is

A. data selector

B. compressor

C. encoder

D. decoder

90. An astable multivibrator has

A. one stable state

B. two stable states

C. no stable state

D. tristate

91. A bistable multivibrator has
    A. one stable state
    B. two stable states
    C. no stable state
    D. tristate

92. A monostable multivibrator has
    A. one stable state
    B. two stable states
    C. no stable state
    D. tristate

93. A type of multivibrator circuit which generates a square wave of its own is the
    A. astable
    B. monostable
    C. bistable
    D. flip-flop

94. A situation when a circuit's output level for a given set of input conditions can be assigned as either a 1 or a 0.
    A. Don't care
    B. Totem Pole
    C. Low level
    D. High level

95. Circuits made up of combinations of logic gates, with no feedback from outputs to inputs.
    A. Latch
    B. Sequential logic circuit
    C. Combinational logic circuit
    D. Memory

96. A digital circuit that takes a 4-bit BCD input and activates the required outputs to display the equivalent decimal digit on a 7-segment display.
    A. BCD-to-decimal decoder
    B. BCD-to-7-segment driver
    C. Decimal to BCD driver
    D. 7-segment display

97. Asynchronous flip-flop input used to clear Q immediately to 0.
    A. DC set
    B. DC clear
    C. DC reset
    D. DC toggle

98. A counter that counts from a maximum count downward to zero
    A. Synchronous counter
    B. Down counter
    C. Up counter
    D. Up/down counter

99. Small circles on the input or output lines of logic circuit symbols which represent inversion of a particular signal.
    A. Bootstrap
    B. Bubble
    C. Strobe
    D. Clode

100. A multiplexer is described by its size through _____, where n = number of bits.
    A. $n \times 2^n$
    B. 1×2^n
    C. $2^n \times 1$
    D. $2^n \times m$

101. Which of the following is NOT an advantage of state tables in sequential logic circuit design?
    A. They are the systematic approach to a design problem
    B. The number of variables is limited
    C. They minimize the gating required
    D. They result in synchronous circuit

102. A situation in a system where it can never leave or progress to another state.
    A. Rest
    B. Hang-up state
    C. No change in state
    D. Toggle

103. A diagram consisting of a set of circles, where each circle contains a number of states within it.
A. State table
B. Transition diagram
C. Karnaugh map
D. Bubble diagram

104. A counter that counts sequentially but does not step through all possible states, it returns to zero after a particular state.
A. Ripple counter
B. Decade counter
C. Truncated counter
D. Binary counter

105. A circuit that produces an output pulse for a fixed period of time in response to a trigger and then returns to its quiescent state.
A. Monostable circuit
B. Astable circuit
C. Bistable circuit
D. Discriminator

106. A small change made in resistance or capacitance to time a circuit precisely.
A. Trigger
B. Tweaking
C. Bounce
D. Squeaking

107. A square wave oscillator or clock generator
A. Astable circuit
B. Monostable circuit
C. Bistable circuit
D. Debounding circuit

108. A circuit designed to produce a clean output in response to a switch closure.
A. Monostable circuit
B. Filter circuit
C. Attenuator
D. Debouncing circuit

109. Duty cycle for repetitive waveform is defined as the
A. Ratio of the ON time to the total time
B. Sum of the ON time and the OFF time
C. Ratio of the OFF time to the ON time
D. Ratio of the total time to the ON time

110. The state of a flip-flop when Q = 0 and Q' = 1
A. Reset
B. Set
C. Trigger state
D. Tristate

111. The state of a flip=flop when Q = 1 and Q' = 0.
A. Reset
B. Latch
C. Set
D. Glitch

112. A state causing the flip-flop to change or reverse its state.
A. Reset
B. Set
C. Toggle
D. Non-toggle

113. How many flip-flops should be used to realize 32-count capacity?
A. 2
B. 4
C. 5
D. 6

114. The time difference which results when a clock may not arrive at all flip-flops at precisely the same time.
A. Glitch
B. Spike
C. Hold
D. Clock skew

115. A _____ condition that exists if a circuit output depends on which of two nearly simultaneous inputs arrive at a point in the circuit first.
A. glitch
B. skew
C. clear
D. race

116. A one-input JK flip-flop is the _____ flip-flop.
A. D
B. T
C. S-R
D. C

117. A JK flip-flop can be made to function like a T flip-flop by simply
A. connecting the J and K inputs together as one input
B. connecting J = 0 and K = 0
C. resetting all inputs of the JK
D. connecting earth ground the JK inputs

118. The one-input RS flip-flop is the _____ flip-flop.
A. T
B. D
C. R
D. Latch

119. Which of the following does not describe a flip-flop?
A. It is a one-bit memory device.
B. Its interval circuitry are usually symmetrical
C. It is a bistable device
D. It is equivalent to a one-shot circuit

120. In clock circuits, SWG means
A. square wave glitches
B. standard wire gauge
C. square wave generators
D. standard wave ground

121. An input signal that can activate or disable a gate.
A. Strobe
B. Glitch
C. Tristate
D. Wired-AND

122. A ring counter where the output is inverted and tied back to the input
A. Shift counter
B. Decade counter
C. BCD counter
D. Johnson counter

123. A circuit that goes through 2^n-1 states in a random fashion.
A. Random generator
B. Pseudo-random sequence generator
C. Counting shift
D. Register

124. An input that disables multiplexers or demultiplexers when it is HIGH.
A. Strobe
B. Keyboard
C. Decoder
D. Binary input

125. Application of excessive current to a fuse in order to open it.
A. Shorting
B. Blowing
C. Breaking
D. Disconnecting

126. An outstanding advantage of LCDs from LEDs.
A. LCDs are organized as a 7-segment display for numerical read out
B. LCDs can be multiplexed
C. LCDs essentially act as a capacitor and consume almost no power
D. LCDs generates light

127. A computer language that enables Programmable Array Logic (PAL) users to generate a file that can be used to blow a PAL.
A. JEDEC
B. PALASM
C. TURBO C++
D. Visual C

128. A type of computer bus which is bidirectional.
A. Data bus
B. Address
C. Control bus
D. Calling bus

129. A table used by a PLD language such as PALASM, to calculate the expected outputs for a set of inputs.
A. Excitation table
B. State table
C. Simulation table
D. Truth table

130. A programmable block of logic within a gate array, that contains a flip-flop for storage and also allows the user to specify logic functions on its inputs.
A. Programmed block
B. PLD
C. Configurable logic block
D. Block diagram

131. This type of bus carries the memory address from the computer to the memory.
A. Data bus
B. Address bus
C. Control bus
D. Parallel bus

132. This bus carries lines that control the operation of the memory from the microprocessor to the memory.
A. Data bus
B. Address bus
C. Control bus
D. Bus lines

133. A register which holds the address of the word currently being accessed.
A. Hold register
B. Memory address register
C. Memory data register
D. Access register

134. A register which holds the data being written into or read out of the addressed memory location.
A. Hold register
B. Memory data register
C. Memory address register
D. Glitch register

135. A preproduction model of a system built for testing and debugging,
A. Wire list
B. Maybe (colloquial)
C. Prototype
D. Sample

136. Correcting the faults in a circuit or a system.
A. Buzz-out
B. Debugging
C. Trap
D. Fault corrector

137. There are _____ flip-flops for a 3-bit binary counter.
A. 2
B. 3
C. 4
D. 5

138. A sequential logic circuit where the storage elements commonly used are time-delay devices (usually gates).
A. Synchronous SLC
B. Asynchronous SLC
C. Counter
D. Register

139. A block added to the combinational logic circuit to form a sequential logic circuit is the
A. ROM
B. counter
C. clock
D. memory

140. The state of the flip-flop before the occurrence of a clock pulse is called as its
A. present state
B. next state
C. current input
D. present output

141. The state of the flip-flop after the occurrence of a clock pulse is called as its
A. current state
B. present state
C. next state
D. current input

142. It is said to be a universal gate because any digital system can be implemented with it.
A. NAND
B. AND
C. OR
D. Exclusive OR

143. A flip-flop which follows its input in the next state.
A. T
B. D
C. JK
D. RS

144. An n-bit binary parallel adder requires _____ in its least design.
A. n half adders
B. n half subtractor
C. n full adders
D. n half subtractor and n full adder

145. A magnitude comparator has 2^{2n} entries in the truth table where n =
A. number of inputs
B. number of comparator bits
C. number of outputs
D. number of inputs and outputs

146. An included input terminals in a magnitude comparator IC which is significant when both inputs compared are equal is called as its
A. setting
B. cascading inputs
C. input terminals
D. address

147. In designing a 16 x 1 multiplexer, how many selection lines are needed?
A. 2
B. 4
C. 16
D. 32

148. If **F = xy + x'y'** Boolean expression is to be implemented using decoders and OR gates, the connection involves
A. 2 to 4 line decoder with 3 OR gates
B. 3 to 8 line decoder with 2 OR gates
C. 2 to 4 line decoder with 1 OR gate
D. 3 to 8 line decoder with 4 OR gates

149. How many AND gates and 4-bit binary adders are needed to implement a 2-bit to 3-bit binary multiplier?
A. 15 AND gates and three 4-bit binary adders
B. 2 AND gates and one 4-bit binary adder
C. 9 AND gates only
D. 6 AND gates and one 4-bit binary adder

150. From a 3-bit binary counter design using T flip-flops, determine the number of T flip-flops needed in its circuit implementation.
A. 1
B. 2
C. 3
D. 4

151. A system of coordinating I/O between the transmitting and receiving devices.
A. Charging
B. Handshaking
C. Interfacing
D. Polling

152. An area of memory that holds the ASCII characters that are being displayed on a monitor.
A. Space
B. Start bit
C. Terminal
D. Screen image

153. An IC that transforms parallel data to serial in the asynchronous format and vice versa.
A. UART
B. USART
C. MODEM
D. RS232C

154. An instruction that alters the normal course of a program by causing it to jump to another instruction.
A. Rotate instruction
B. Skip instruction
C. Jump
D. ACC

155. An instruction that causes data to be brought from memory into an accumulator register.
A. LOAD
B. LOOP
C. FETCH
D. JUMP

156. The portion of an instruction cycle where the instruction is sent from memory to the instruction register
A. LOAD
B. ACCUMULATE
C. FETCH
D. EXECUTE

157. An instruction that causes data in the accumulator to be moved to the memory or a peripheral register.
A. FETCH
B. STORE
C. LOOP
D. LOAD

158. This occurs when the result of an arithmetic operation is a more negative number than the output register can accommodate.
A. Error
B. Overflow
C. Underflow
D. Don't care

159. This occurs when the result of an arithmetic operation is a larger number than the output register can accommodate.
A. Overflow
B. Inflow
C. Underflow
D. Lock-ahead carry

160. A representation of numbers when negative numbers are obtained by complementing their positive equivalent and adding 1.
A. 2's complement
B. Inversion
C. Signed numbers
D. Indeterminate

161. Which of the following is the language used in making an internet web page?
A. Highertext mark-up language
B. Hypertext mark-up language
C. Hightech mark-up language
D. Hypertext make-up language

162. A program which can be executed on several different computers to compare their speed and performance.
A. Compiler
B. Assembler
C. Diagnostic program
D. Benchmark

163. A single word memory location used to temporarily hold data during program execution.
A. Accumulator
B. Register
C. Buffer
D. Stack

164. Refer to the debugging method in which the program is executed one instruction at a time and the register contents can be examined after each step?
A. Text editing
B. Syntax analyzing
C. Trace
D. Semantic tracing

165. In a computer system, it is a unit of hardware where the control keys are located.
A. CPU
B. Keyboard
C. I/O section
D. Console

166. If a certain circuit acts as AND gate when used with positive logic (H = 1, L = 0), what function will it perform when used with negative logic (H = 0, L = 1).
A. OR
B. AND
C. NAND
D. NOR

167. TTL, DTL and ECL which are frequently used to refer to certain "families" of digital integrated circuits, are actually names of
A. alternatives to positive and negative logic
B. varieties of positive and negative logic
C. companies that originated the families
D. general varieties of electronic circuits used as logic gates, from which, in essence, the building blocks in each series are constructed.

168. In the data sheet of a digital building block, operating speed is typically expressed in terms of
A. capacitance C
B. transition frequency
C. propagation delay times for both possible output transitions
D. miles per hour or centimeters per second

169. The fan out capability of a digital building block depends on the current capability of its output and the current requirement of each input driven by that output, and maybe defined as the

A. number of inputs that one output can transmit to

B. number of other inputs that can transmit to one input

C. maximum power dissipation that the unit can stand

D. amount of cooling required

170. Noise margin, which is one indication of how likely it is that information communicated between digital building blocks will be incorrect due to noise, depends on

A. output current capabilities and input current requirements

B. output power and required input power for the two logic states

C. the "safety margin" between the output voltage produced by the transmitting block and input voltage required by the receiving block for each of the two logic state.

D. the "safety margin" between the noise level and the noise figure.

171. Typical propagation delay range for modern digital integrated circuits is

A. 1 to 100 milliseconds

B. 1 to 100 microseconds

C. 1 to 100 nanoseconds

D. 1 to 100 picoseconds

172. The most commonly used IC package for digital integrated circuits is the

A. CMOS pack

B. DIP ceramic

C. DIP plastic

D. Flat pack

173. A multiwire connection between digital circuits is usually called a

A. ribbon

B. bus

C. wire wrap

D. multiplexed line

174. Which of the following is a form of De Morgan's theorem?

A. **A + B = (AB)'**

B. **AB = (A + B)'**

C. (A + B)' = A' · B'

D. **A·B = A' · B'**

175. “Limbo” state of a flip-flop occurs when
A. both outputs are low
B. both outputs are high
C. both output are the same
D. the outputs are inverse

176. A logic circuit that is triggered by a clock signal is
A. sequential
B. synchronous
C. synchronous
D. pulsed

177. Another name for a decade counter
A. frequency divider
B. ripple shift counter
C. BCD counter
D. Binary counter

178. Which of the items below can perform parallel-to-serial data conversion?
A. Shift register
B. Binary counter
C. Multiplexer
D. Decoder

179. Which of the following does not form DACs?
A. Counter
B. Resistor network
C. Current switches
D. Reference

180. What digits are used in the binary number system?
A. 0 and 1
B. high and low
C. true and false
D. all of the choices

181. How many bits are in a byte?

A. 8

B. 4

C. 2

D. 16

182. What binary number follows 1110?

A. 1010

B. 0111

C. 1111

D. 1000

183. What capital letter corresponds to 1000101 in the ASCII code?

A. A

B. C

C. D

D. E

184. What is the binary ASCII code for a question mark?

A. 0111110

B. 0111111

C. 0111000

D. 0100011

185. In the 7400 Family of TTL Devices, Quad 2-input NAND gates has a device number equivalent to

A. 7400

B. 7402

C. 7432

D. 7486

186. Quad 2-input XOR gates in the 7400 Family of TTL devices has a device number equivalent to

A. 7402

B. 7486

C. 7408

D. 7404

187. A JK flip-flop will operate in the toggle mode when
A. J = 0, K = 0
B. J = 1, K = 0
C. J = 1, K = 1
D. J = 0, K = 1

188. A digital circuit test equipment which is a troubleshooting tool that generates a short-duration pulse when activated manually, usually by pressing the button is the _____.
A. logic probe
B. VOM
C. logic clip
D. logic pulser

189. An RS flip-flop will not change in state when
A. R = 0, S = 0
B. R = 1, S = 0
C. R = 0, S = 1
D. R =1, S = 1

190. A T flip-flop can be derived by
A. connecting the two inputs of the JK flip-flop together
B. by inverting the inputs of a JK flip-flop
C. connecting the RS flip-flop's input to ground
D. securing an integrated circuit with three inputs

191. The number of digits used by a number system.
A. Base
B. Radix
C. 2^n
D. n

192. What is the condition of the flip-flop when Q = 0 and Q = 1?
A. Reset
B. Set
C. Undetermined
D. Preset

193. How many logic gates are in an SSI chip?
A. Less than 12 gates
B. Between 12 to 99 gates
C. Anywhere from 100 to 9999 gates
D. 10,000 or more

194. How many logic gates are in an MSI chip?
A. Less than 12 gates
B. Between 12 to 99 gates
C. Anywhere from 100 to 9999 gates
D. 10,000 or more

195. How many logic gates are in a VLSI chip?
A. Less than 12 gates
B. Between 12 to 99 gates
C. Anywhere from 100 to 9999 gates
D. 10,000 or more

196. Which of the following items below is not a part of the hardware organization in a computer?
A. Architecture
B. Implementation
C. Hardware realization
D. Assembler

197. It consists of the instructions and data that the computer hardware manipulates to perform useful work.
A. Software
B. Program
C. File
D. Data

198. The data manipulated by a program is called _____ depending on its nature and extent.
A. data base
B. file
C. input
D. all of the choices

199. The most primitive instructions that can be given to a computer are those interpreted directly by the hardware in _____ form.
A. assembly language
B. machine language
C. high-level language
D. simulator

200. It represents machine instructions by mnemonic names and allows memory addresses and other constants to be represented by symbols rather than bit strings.
A. Assembler
B. Machine language
C. Assembly language
D. Interpreter

201. It is needed to translate a high-level program into a sequence of machine instructions that performs the desired task.
A. Assembler
B. Interpreter
C. Compiler
D. Debugger

202. Text editors and formatters belong to the area of computing known as _____.
A. software
B. word processing
C. compilers
D. assemblers

203. The processor or central processing unit is
A. the heart of the computer
B. employed RISC
C. communicates with the user
D. supports floating point numbers

204. Processors with more than two registers for arithmetic and logical operations are classified as
A. specific registered processors
B. general register processors
C. accumulator based
D. serial register processor

205. Which of the following is a non-volatile device?

A. ROM

B. RAM

C. PLA

D. PLD

206. With a _____, a processor can store data at ay address and read back the stored information at any time.

A. RWM

B. ROM

C. PLA

D. PROM

207. The system program used to translate directly an assembly language to machine language is called

A. assembler

B. compiler

C. text editor

D. debugger

208. A command to an ADC to start conversion

A. SOC

B. EOC

C. PAC

D. EAR

209. Speeds of modems are generally classified by the number of _____ they can transmit.

A. cycles per second

B. bits per second

C. frequency per second

D. all of the choices

210. High speed modems transmit between

A. 300 and 2400 bps.

B. 2400 and 9600 bps

C. between 2400 and 9600 bps

D. between 300 and 2400 bps

211. Low speed modems method of modulation is usually
A. phase-shift modulation
B. dibit modulation
C. frequency shift keying
D. amplitude modulation

212. Low speed modems generally handle data rates between
A. 3000 and 9000 bps
B. 300 and 2400 bps
C. 2400 and 9600 bps
D. 100 and 2400 bps

213. The most important memory element which is made of an assembly of logic gates is called
A. latch
B. bistable multivibrator
C. flip-flop
D.all of the choices

214. What is the normal resting state of the SET and CLEAR inputs in a flip-flop
A. Low, high
B. High, low
C. High, high
D. Low, low

215. What will be the states of Q and Q' after a flip-flop has been cleared?
A. Q = 1, Q' = 0
B. Q = 0, Q' = 1
C. Q = 0, Q' = 0
D. Q = 1. Q' = 1

216. When power is first applied to any flip-flop circuit, it is impossible to predict the initial state of Q and Q'. What could be done to ensure that NAND latch always started off in the Q = 1 state?
A. apply a momentary HIGH to PRESET input
B. apply a momentary LOW to SET input
C. apply a momentary LOW to CLEAR input
D. apply a momentary HIGH to CLEAR input

217. When a flip-flop is set, what are the states of Q and Q'?

A. Q = 1, Q' = 0

B. Q = 0, Q' = 1

C. Q = 0, Q' = 0

D. Q = 1, Q' = 1

218. What two types of inputs that a clocked flip-flop has?

A. synchronous control inputs and clock input

B. Asynchronous control inputs and clock input

C. Pulsed control inputs and clock input

D. all of the choices

219. The flip-flop can change only when the appropriate clock transition occurs. It is a condition called

A. edge triggered

B. latching

C. clocking

D. pulsing

220. It is the required interval immediately following the active edge of the clock signal during which the control inputs must be held stable.

A. Hold time

B. Pulsing time

C. Set up time

D. All the time

221. It is the required interval immediately following the active edge held of clocks during which the control inputs must be held.

A. Set up time

B. Hold time

C. Pulsing time

D. Propagation time

222. What JK input condition will always set Q upon the occurrence of the active clock transition?

A. J = 0, K = 0

B. J = 1, K = 0

C. J = 0, K = 1

D. J = 1, K = 1

223. How does the operation of asynchronous input differ from that of a synchronous input?

A. it works independently of the clock input

B. it is very dependent on the clock transition

C. it is mutually the same in function

D. Not determined by ordinary operation

224. The triangle inside the rectangle which is part of the IEEE/ANSI symbol at clock input

A. indicates the function of those inputs that are common to more than one circuit in the chip

B. indicates triggering on a NGT

C. indicates edge-triggered operation

D. all of the choices

225. Which type of flip-flop is best suited for synchronous transfer because it requires the fewest interconnections from one flip-flop to the other?

A. JK

B. T

C. RS

D. D

226. The fastest method for transferring data from one register to another is the

A. serial transfer

B. parallel transfer

C. hybrid transfer

D. FIFO

227. What is the major advantage of serial transfer over parallel transfer?

A. large interconnections between gates

B. one at a time transmission

C. fewer interconnections between registers

D. speed

228. A 20 KHz clock signal is applied to a JK flip-flop when J = 1, K = 1. What is the frequency of the flip-flop output waveform?

A. 20 KHz

B. 10 KHz

C. 40 KHz

D. 5 KHz

229. How many flip-flops are required for a counter that will count 0 to 255?
A. 2
B. 4
C. 16
D. 8

230. It converts a non-electrical physical quantity to an electrical quantity.
A. Converter
B. Inverter
C. Transducer
D. Compiler

231. What does a computer do with the data it receives from an ADC?
A. Stores the data
B. Performs calculation
C. Processes the data
D. All of the choices

232. An actuator in the DAC
A. performs conversion of digital data to its analog representation
B. controls a physical variable according to an electrical input signal
C. converts a non-electrical physical quantity to an electrical quantity
D. performs calculation

233. The maximum deviation of DAC output from its ideal value, expressed as percentage of full scale.
A. Full scale error
B. Deviation ratio
C. Percentage error
D. None of the choices

234. The time it takes for the DAC output to settle to within ½ step size of its full scale value when the digital input changes from zero to full scale.
A. Settling time
B. Set-up time
C. Hold time
D. Full scale time

235. Why are voltage DAC's generally slower than current DAC's?

A. Because of the response time of the op-amp current-to-voltage converter

B. Because of its internal construction

C. Because voltage DAC's have many heat losses

D. None of the choices

236. What is the function of the comparator in the ADC?

A. Tells control logic when the DAC output exceeds the analog input

B. Compares two parameters only

C. Addition and multiplication

D. Arithmetic operation

237. Meaning of checksum in ROM's

A. It is a code placed in the last one or two ROM locations that represents the sum of the expected ROM data from all other locations.

B. Used as a means to test for leakage in one or more ROM locations

C. prevents decoding glitches

D. regulates ROM

238. What is meant by interfacing in a computer system?

A. Synchronization of data information operation in a computer

B. Synchronization of digital information transmission between computer and external I/O devices

C. Connection of computers

D. Finding the fault in a network

239. Which of the items below is not one of the three major sections of an MPU?

A. Timing and control

B. ALU

C. Register

D. Inversion

240. What is an operand address?

A. The binary code that represents the operation to be performed by the CPU

B. The address of the data to be operated as the CPU executes the instruction called for by the opcode

C. A short abbreviation for the operation

D. All of the choices

241. What device puts data on the data bus during a write operation?
A. ALU
B. CPU
C. Keyboard
D. Accumulator

242. Instruction mnemonic means
A. a short abbreviation for the operation
B. a binary code that represents the operation to be performed by the CPU
C. technical term sometimes added to an IC's description
D. representation of a quantity that varies in discrete steps

243. Arrival of a clock signal at the clock inputs of different flip-flops at different times as a result of propagation delays.
A. Clock transition
B. Buffer address
C. Clock skew
D. None of the choices

244. A circuit made up of combinations of logic gates, with no feedback from output to input.
A. Sequential logic circuit
B. Combinational logic circuit
C. Clocked circuits
D. Asynchronous circuit

245. A logic circuit that depends on the status of its selected inputs will channel its data input to one of several data outputs.
A. MUX
B. DMUX
C. RAM
D. ROM

246. Add $(74)_8$ with $(1.1)_2$
A. $(700)_{10}$
B. $(70.5)_8$
C. $(10101.01)._2$
D. $(75.4)_8$

247. An analog memory output circuit used to eliminate aperture error is called a
A. MUX
B. DMUX
C. Track/store amplifier
D. Flip-flop

248. Which of the following is not a dynamic test instrument?
A. Logic probe
B. Oscilloscope
C. Logic analyzer
D. Logic monitor

249. A translated program in machine language is called
A. a source program
B. an object program
C. machine program
D. users program

250. Perform binary subtraction to 6 ¼ and 4 ½ would result to
A. 1001. 01
B. 1.11
C. 10. 11
D. 1.00

CHAPTER 10: VACUUM TUBES

1. What are the two principal electrodes in every tube?
   A. Plate and control grid
   B. Cathode and screen grid
   C. Plate and cathode
   D. Screen grid and control grid

2. For a given plate voltage, if negative potential on the control grid of triode is increased, the plate current
   A. decreases
   B. remains the same
   C. increases
   D. becomes zero

3. A vacuum diode can be used as
   A. an amplifier
   B. an oscillator
   C. a rectifier
   D. a regulator

4. Which generates the least noise in operation?
   A. Triode valve
   B. Tetrode valve
   C. Pentode valve
   D. Octode valve

5. A vacuum tube will conduct only if its plate is _____ with respect to the cathode.
   A. positive
   B. negative
   C. at zero potential
   D. at infinite potential

6. Saturation in a tube is a condition where an increase in plate voltage will produce
   A. a rise in electron emission
   B. a decrease in electron emission
   C. no appreciable change in plate current
   D. an appreciable change in plate current

7. A vacuum diode can be used as
    A. an amplifier
    B. an oscillator
    C. a rectifier
    D. a regulator

8. Which tube generates the greatest noise?
    A. Triode
    B. Tetrode
    C. Pentode
    D. Diode

9. Before ionisation, a gas- filled tube has a _____ resistance.
    A. very high
    B. very small
    C. small
    D. zero

10. The negative resistance characteristics of the tetrode is due to
    A. secondary emission
    B. plate being positive with respect to cathode
    C. control grid being negative with respect to cathode
    D. screen grid being negative with respect to cathode

11. What emitter is used in X-ray tubes?
    A. Thoriated tungsten
    B. Oxide-coated
    C. Tungsten
    D. Nickel

12. When the temperature of an emitter is increased two times, the electron emission
    A. increases two times
    B. increases four times
    C. increases several million times
    D. decreases two times

13. What is the typical life span of an oxide coated emitter?

A. 500 hours
B. 200 hours
C. 1000 hours
D. 10000 hours

14. The cathode heating time of thermionic glass diode is _____ that of a vacuum diode.

A. the same as
B. much less than
C. much more than
D. not related to

15. What is the solid state equivalent of thyratron?

A. FET
B. SCR
C. BJT
D. UJT

16. The grid to palate capacitance is least in _____ valve

A. triode
B. tetrode
C. pentode
D. diode

17. The peak inverse voltage of a diode is defined as the maximum allowable

A. negative voltage across the load resistor
B. negative voltage applied to plate with respect to cathode
C. positive voltage to plate with respect to cathode
D. positive voltage applied across the load resistor

18. The equation that defines the dc plate resistance of a vacuum tube.

A. E_b/I_b
B. $I_b^2 \times E_b$
C. $I_b \times E_b$
D. I_b/E_b

19. The voltage on the suppressor grid of a pentode is generally
    A. positive with respect to cathode
    B. positive with respect to cathode
    C. zero with respect to cathode
    D. at zero potential

20. Which of the following defines the amplification factor of a vacuum tube?
    A. $\Delta E_b/\Delta E_c$
    B. $\Delta I_b/\Delta E_b$
    C. $\Delta E_c/\Delta E_b$
    D. $\Delta E_b/\Delta I_c$

21. Which is the best tube for high frequency amplification?
    A. Triode valve
    B. Tetrode valve
    C. Pentode valve
    D. Diode valve

22. A triode is normally operated with control grid at _____ potential with respect to cathode.
    A. positive
    B. high positive
    C. zero
    D. negative

23. Once a thyratron is fired, its control grid _____ over palate current.
    A. loses all control
    B. exercises rough control
    C. exercises fine control
    D. becomes helpless

24. The _____ voltage should be reduced to zero to stop conduction in a thyratron.
    A. grid
    B. filament
    C. plate
    D. heater

25. What is the typical value of ac plate resistance for a triode?

A. 1000 Ω

B. 100 kΩ

C. 1000 kΩ

D. 10 Ω

26. Direct coupling is used for _____ amplification.

A. very low frequency

B. radio-frequency

C. audio-frequency

D. ultra high frequency

27. A vacuum diode acts as a rectifier because of its _____ conduction.

A. unidirectional

B. bidirectional

C. isotropic

D. omnidirectional

28. Directly heated cathode require _____ amount of heating

A. very small

B. large

C. small

D. very large

29. A hard tube is defined as a tube with

A. a tungsten filament

B. a gas in the envelope

C. a metal envelope

D. no gas in the envelope

30. What operation results in severest distortion?

A. Class C

B. Class B

C. Class A

D. Class AB

31. What is the typical plate efficiency of Class A amplifier?
    A. 50 %
    B. 75 %
    C. 30 %
    D. 10 %

32. For the sample plate dissipation, the output power of a Class B push-pull circuit is nearly _____ that of Class A operation.
    A. 2 times
    B. 4 times
    C. 3 times
    D. 5 times

33. The screen grid potential is kept ___ plate potential
    A. somewhat lower than
    B. same as
    C. somewhere higher than
    D. at zero potential with respect to

34. The output stage of a practical amplifier always employs what coupling?
    A. RC coupling
    B. Transformer coupling
    C. Direct coupling
    D. Impedance coupling

35. The plate resistance of a tube is mainly due to
    A. space charge
    B. electrodes of the tube
    C. vacuum in the tube
    D. gas in the tube

36. A vacuum tube is a ____ device.
    A. linear
    B. exponential
    C. non-linear
    D. bilateral

37. What is the unit of transconductance?
    A. Ohm
    B. Siemen/m
    C. Volt
    D. Siemen

38. Which provides the best frequency response?
    A. Transformer coupling
    B. RC coupling
    C. Direct coupling
    D. Impedance coupling

39. Voltage amplifiers are operated as _____ amplifiers.
    A. Class A
    B. Class B
    C. Class C
    D. Class AB

40. The PIV of hot cathode gas diode is _____ the equivalent vacuum diode.
    A. the same as that of
    B. less than
    C. more than
    D. independent that of

41. The anode-cathode potential of a gas-filled tube at which gas de-ionizes and stops conduction is called _____ potential.
    A. extinction
    B. ionizing
    C. striking
    D. reverse

42. For the same plate voltage, a gas diode can conduct _____ the equivalent vacuum diode.
    A. less current than
    B. same current as
    C. more current than
    D. one-half the current than

43. A thyratron can be used as
    A. an oscillator
    B. a controlled switch
    C. an amplifier
    D. an attenuator

44. A pentode is a _____ device.
    A. constant current
    B. linear
    C. constant voltage
    D. bilateral

45. The actual voltage gain of a triode amplifier is less than μ due to
    A. grid being negative with respect to cathode
    B. voltage drop in ac resistance of the tube
    C. plate being positive with respect to cathode
    D. voltage drop in dc resistance of the tube

46. For faithful amplification, the control grid should be _____ with respect to cathode.
    A. positive
    B. negative
    C. at zero potential
    D. at infinite potential

47. Which valve has the lowest amplification factor?
    A. Triode
    B. Pentode
    C. Tetrode
    D. Diode

48. Which of the following would have the most effect on decreasing the life of a vacuum tube?
    A. Too much of a grid excitation
    B. An excessive filament voltage
    C. A grid current that is too low
    D. A plate resistance value that is too high

49. Valves in a radio receiver generally employ _____ heated cathodes.
    A. directly
    B. indirectly
    C. oxide
    D. nickel

50. A vacuum diode acts as a _____ switch.
    A. bidirectional
    B. unidirectional
    C. controlled
    D. omnidirectional

51. Which can be used for proper high frequency amplification?
    A. Triode
    B. Tetrode
    C. Pentode
    D. Diode

52. The indirectly heated cathode of the diode is coated with
    A. thoriated tungsten
    B. nickel
    C. carbon
    D. strontium or barium oxide

53. What started the conduction in a cold cathode tube?
    A. Thermionic emission
    B. Natural sources
    C. Secondary emission
    D. Thermal sources

54. Which emitter is most commonly used in the tubes of a radio receiver?
    A. Tungsten
    B. Oxide coated
    C. Thoriated tungsten
    D. Constantan

55. What is the real measure of valve's amplification capability?
    A. Plate resistance
    B. Transconductance
    C. Amplification factor
    D. Gain

56. Field emission is utilized in the mechanism of
    A. vacuum tubes
    B. gas-filled tubes
    C. mercury pool devices
    D. TV picture tubes

57. A vacuum tube is normally operated in the temperature saturation region.
    A. To protect against filament aging
    B. To keep the tube envelope hot
    C. To disperse the space charge
    D. Keep the tube envelope cold

58. Plate saturation results when
    A. filament voltage is too high
    B. space-charge region is depleted
    C. plate temperature is too low
    D. space-charge region is saturated

59. When the control grid of a triode is operated with positive potential with respect to cathode
    A. the grid resistance decreases
    B. the grid may overheat
    C. the plate current decreases sharply
    D. the grid resistance increases

60. What is the solid state equivalent of cold cathode diode?
    A. Zener diode
    B. LED
    C. Varactor
    D. Photodiode

61. The nose in a gas-filled tube is ____ that of a vacuum tube.
    A. the same as
    B. less than
    C. more than
    D. very much smaller than

62. What is the phase difference of the output and input voltage of a grounded-cathode amplifier?
    A. 90°
    B. 360°
    C. 270°
    D. 180°

63. A grid controlled vacuum tube acts as
    A. an amplifier
    B. a controlled switch
    C. a rectifier
    D. an oscillator

64. The filament voltage is a direct measure of
    A. filament temperature
    B. amplification
    C. plate temperature
    D. filament resistance

65. The equation that defines the ac plate resistance of a vacuum tube?
    A. $\Delta E_b/\Delta E_c$
    B. $\Delta I_b/\Delta E_c$
    C. $\Delta E_b/\Delta E_b$
    D. $\Delta E_c/\Delta I_b$

66. The transconductance of a pentode is _____ a triode.
    A. more than that of
    B. about the same as for
    C. less than that of
    D. not comparable to that of

67. The electrons emitted by a thermionic emitter are called
    A. free electrons
    B. thermionic electrons
    C. loose electrons
    D. bound electrons

68. The unit of work function of metals.
    A. Joules
    B. Watt-hour
    C. Electron-volt
    D. Watt

69. What is the typical operating temperature of an oxide coated cathode?
    A. 750°
    B. 500°
    C. 1200°
    D. 1000°

70. What is the amount of additional energy required to emit an electron from the surface of a metal?
    A. Surface barrier
    B. Threshold level
    C. Work function
    D. Potential

71. Oxide coated emitters have electron emission of _____ per watt of heated power.
    A. 5-10 A
    B. 50-100 A
    C. 50-150 mA
    D. 150-1000 mA

72. What is the pentagrid converter?
    A. A tube with a total of five electrodes
    B. A tube with a total of five grids
    C. A tube that can be used for frequency conversion
    D. A tube that requires twice as such plate voltage as a single triode

73. Which emission is most widely used in practice?

A. Field
B. Secondary
C. Thermionic
D. Photo

74. What is the work function of an oxide coated cathode?

A. 4.0 electron-volts
B. 2.63 electron-volts
C. 4.52 electron-volts
D. electron-volts

75. A directly heated cathode has ____ warm-up time

A. zero
B. large
C. small
D. very large

76. Which thermionic emitter has the highest opening temperature?

A. Oxide coated
B. Tungsten
C. Thoriated-tungsten
D. Eureka

77. The internal resistance after ionization of a gas-filled tube is

A. low
B. very high
C. high
D. zero

78. One advantage of a mercury vapor diode over the high rectifier is

A. its higher peak inverse voltage rating
B. its reduced RF interference effect
C. its lower voltage drop when the plate current is flowing
D. the elimination of the need for a warm up period

79. The screen grid is used to

A. increase the capacitance between the second grid and the plate

B. decrease the capacitance between the control grid and the plate

C. reduce the secondary emission effect

D. lower the tube's plate resistance

80. A tube tester is used to check a triode's transconductance, which is the ratio of

A. a small change in cathode current to the corresponding small change in grid current

B. a small change in plate current to the corresponding small change in grid current

C. a small change in plate voltage to the corresponding small change in plate current

D. a small change in plate voltage to the corresponding small change in plate current

81. Which emitter is used in high voltage (>10 kV) applications?

A. Tungsten

B. Oxide coated

C. Thoriated-tungsten

D. Constantan

82. Which of the following is a desirable characteristic of an emitter?

A. Large work function

B. Small work function

C. Very large work function

D. Very small work function

83. When a thyratron tube has fired one thing that will cause it to stop conducting is

A. a more positive on the plate

B. a more negative voltage on the control electrode

C. a more positive voltage on the control electrode

D. a negative voltage on the plate

84. Secondary emission effects are undesirable in

A. vacuum tubes

B. gas-filled tubes

C. ICs

D. transistors

85. What would cause the plate current to increase in a pentode tube?

A. A short circuit between the plate and the screen grid

B. An open circuit in the lead that is connected to the

C. A short circuit between the suppressor grid and the cathode

D. A short circuit between the control grid and the cathode

86. In directly heated cathode, filament and cathode are

A. separated components

B. same components

C. made of metals

D. made of alloys

87. What is provided by transformer coupling?

A. Impedance matching

B. Step-up in voltage

C. Good frequency response

D. Stability of gain

88. What is one advantage of a pentode tube over a triode?

A. Lower input impedance

B. Lower output impedance

C. Less noise internally generated

D. Less control grid to plate capacitance

89. The load resistance R in a triode amplifier should be nearly _____ for good amplification.

A. ½ r_p

B. 3 r_p

C. r_p

D. 2 r_p

90. A voltage amplifier is designed to have

A. high μ and R_L

B. low μ and high R_L

C. high r_p and low R_L

D. high μ and low R_L

91. What transformer secondary voltage is utilized in a center-tap circuit?

A. One-half
B. One-third
C. full
D. One-eighth

92. Class C amplifiers are used as ____ amplifiers.

A. audio-frequency voltage
B. radio-frequency
C. audio-frequency power
D. audio-frequency current

93. The typical application of a cold cathode tube is as a

A. diode
B. tetrode
C. triode
D. pentode

94. Vacuum tube rectifiers are ____ affected by the changes in temperatures.

A. not
B. highly
C. greatly
D. severely

95. The internal resistance of a gas-filled tube is _____ that of a vacuum tube.

A. the same as
B. less than
C. more than
D. dependent

96. The ionization potential in a gas diode depends upon

A. plate current
B. size of the tube
C. cathode construction
D. type and pressure of gas

97. When the gas pressure in a gas-filled diode is increased, its PIV rating
    A. remains unchanged
    B. decreases
    C. increases
    D. becomes infinite

98. Ionization of cold cathode diode takes place at _____ plate potential compared to hot cathode gas diode.
    A. the same
    B. much lower
    C. much higher
    D. zero

99. A cold cathode diode is used as _____ tube.
    A. a rectifier
    B. a regulating
    C. a power-controlled
    D. an amplifying

100. For a conventional vacuum tube used in the UHF band
    A. The electron transit time becomes critical
    B. The distance between the control grid and the plate must be increased
    C. The physical size of the tube must be increased
    D. Only a pentode can be used because of noise effects

101. Ionization current which is a positive-ion current produced by collision between electrons and residual gas molecules in an electron tube is also called
    A. gas current
    B. gas discharge
    C. plasma current
    D. plasma discharge

PART 2:

TEST YOURSELF SECTION

TEST YOURSELF –EXAM 1

1. **ECE Board Exam November 1995**
   What is an electronic measuring equipment used in navigation operating in 1GHz band which provides bearing and distance indication?
   A. TACAN
   B. ODR
   C. ILS
   D. DME

2. **ECE Board Exam November 1995**
   Find the output of four (4) lead acid cells.
   A. 3.2 V
   B. 8.4 V
   C. 5.8 V
   D. 1.6 V

3. **ECE Board Exam November 1995**
   The reciprocal of capacitance is called
   A. elastance
   B. permittivity
   C. conductance
   D. permeability

4. **ECE Board Exam November 1995**
   An advantage of full-wave rectifier over half-wave rectifier.
   A. Each diode can cool-off during half of each input cycle.
   B. The ripple frequency is lower.
   C. The tube will conduct during both halves of the cycle.
   D. Output voltage is lower with more ripples.

5. **ECE Board Exam November 1995**
   What composes all matter whether a liquid, solid or gas?
   A. Atoms
   B. Electrons
   C. Protons
   D. Neutrons

6. **ECE Board Exam November 1995**
   What is the majority carrier in an N material?
   A. Holes
   B. Neutrons
   C. Electrons
   D. Protons

7. **ECE Board Exam November 1995**
   A very high resistance connected in parallel with smoothing capacitors in a high voltage DC system is called a
   A. dropping resistor
   B. shunt
   C. divider
   D. bleeder

8. **ECE Board Exam November 1995**
   What is the smallest part of a computer language?
   A. Binary
   B. Byte
   C. Bit
   D. Word

9. **ECE Board Exam November 1995**
   A user-program that has the ability to move a robot axis to any position within its range
   A. Point-to-point
   B. Continuous path
   C. Positive stop
   D. Pick-and-place

10. **ECE Board Exam November 1995**
    What level is used to represent logic-1 in a negative logic circuit?
    A. Negative transition level
    B. Low level
    C. Positive transmission level
    D. High level

11. ECE Board Exam November 1995

What law in electronics where an induced current will be in such a direction that its own magnetic field will oppose the magnetic field that produces the same?

A. Electromagnetic law
B. Nortons law
C. Lenz law
D. Maxwells law

12. ECE Board Exam November 1995

What is the reason why robot actuators have lesser capabilities than electric or hydraulic robot actuators?

A. It has quick response
B. It always has oil leaks
C. It always has all or nothing motion
D. It has high initial cost

13. ECE Board Exam November 1995

_____ has the unit of electron volt.

A. Charge
B. Potential difference
C. Energy
D. Current

14. ECE Board Exam November 1995

What is the unit of magnetic flux in SI system?

A. Weber
B. Maxwell
C. Tesla
D. Gauss

15. ECE Board Exam November 1995

What element possesses four valence electrons?

A. Insulator
B. Semi-insulator
C. Semiconductor
D. Conductor

16. ECE Board Exam November 1995

What level is used to represent logic-0 in a negative logic circuit?

A. High level

B. Low level

C. Negative transition level

D. Positive transition level

17. ECE Board Exam November 1995

In an Amplitude-Modulated (AM) radio transmitter, the modulator is _____.

A. How amplification can be thought of as a decision making process

B. How semiconductor replace vacuum

C. A digital decision

D. How to adapt a radio transmitter to make it useful as multiplier circuit.

18. ECE Board Exam November 1995

Which of the following is the probable output if all inputs of a TTL gate are binary 1?

A. Determinable

B. Binary 0

C. Binary 1

D. Indeterminate

19. ECE Board Exam November 1995

Term used to describe sudden reverse conduction of an electronic component caused by excess reverse voltage across the device.

A. Cut-off

B. Saturation

C. Avalanche

D. Revertion

20. ECE Board Exam November 1995

Given the two voltages:

$S(t)=10\cos(\omega t+30 \text{ degrees})\text{volts}$

$Q(t)=15\cos(\omega t+45 \text{ degrees})\text{volts}$

Find $V(t)=S(t) + Q(t)$

A. $V(t)=5.9\cos(\omega t+71\text{degrees})\text{volts}$

B. $V(t)=24.8\cos(\omega t+39\text{degrees})\text{volts}$

C. $V(t)=25\cos(\omega t+75 \text{ degrees})\text{volts}$

D. $V(t)=13.6\cos(\omega t+75\text{degrees})\text{volts}$

21. ECE Board Exam November 1995

What type of materials formed when trivalent material is doped with silicon or germanium?

A. N type
B. N and P type
C. PN type
D. P type

22. ECE Board Exam November 1995

What is the degree of exactness of measurement when compared to the expected value of the variable being measured?

A. Accuracy
B. Error
C. Deviation
D. Precision

23. ECE Board Exam November 1995

The overall gain of an amplifier in cascade is

A. the sum
B. the average of each
C. the product
D. 100 % the sum

24. ECE Board Exam November 1995

_____ is a byte of data stored in a memory location.

A. 8 bits
B. Character
C. 4 bits
D. Memory word

25. ECE Board Exam November 1995

An instrument used to measure one location in terms of coordinates.

A. Global Positioning System
B. Hydrometer
C. Altimeter
D. Increductometer

26. ECE Board Exam November 1995

How do you measure the current in a circuit without an ammeter?

A. By computing the values of resistance
B. Measure voltage drop across tube
C. Measure voltage drop across known resistor
D. Divide total circuit resistance by the total circuit load

27. ECE Board Exam November 1995

_____ is retrieving data from memory.

A. Accessing
B. Getting
C. Encoding
D. Reading

28. ECE Board Exam November 1995

Materials with permeabilities slightly less than that of free space are referred to as

A. diamagnetic
B. ferromagnetic
C. non-magnetic
D. paramagnetic

29. ECE Board Exam November 1995

_____ can erase EPROMS.

A. Applying a 21-volt pulse
B. Applying ultraviolet rays
C. Turning off the power
D. Blowing fuse

30. ECE Board Exam November 1995

What materials possess permeabilities slightly less than that of free space?

A. Non-magnetic
B. Diamagnetic
C. Paramagnetic
D. Ferromagnetic

31. ECE Board Exam November 1995

An LC circuit resonates at 2000 kHz and has a Q of 100. Find the lower and upper cut-off frequencies.

A. 1950 kHz, 2050 kHz
B. 1900 kHz, 2100 kHz
C. 1990 kHz, 2010 kHz
D. 1980 kHz, 2020 kHz

32. ECE Board Exam November 1995

Find the ripple factor (Kr) of a sinusoidal signal with peak ripple of 4 volts and an average of 30.

A. 0.094
B. 0.013
C. 0.130
D. 0.94

33. ECE Board Exam November 1995

The term "Fully Saturated" for a transistor refers to:

A. the collector current at its maximum value
B. the collector current at its minimum value
C. the transistor's beta at its maximum value
D. the transistor's alpha at its maximum value

34. ECE Board Exam November 1995

The _____ grid in an electron tube is where the input signal is usually applied.

A. screen
B. control
C. bias
D. supression

35. ECE Board Exam November 1995

If three amplifiers with a gain of 8 each are in cascade, how much is the overall gain?

A. 72
B. 24
C. 512
D. 8

36. ECE Board Exam November 1995

_____ is a pn junction semiconductor device that emits noncoherent optical radiation when biased in the forward direction, as a result of a recombination effect.

A. LASER
B. JUGFET
C. LED
D. Optical cavity

37. ECE Board Exam November 1995

What do you call the force which sets up or tends to set up magnetic flux in a magnetic circuit?

A. Electromotive force
B. Potential difference
C. Magnetomotive force
D. Dynamic force

38. ECE Board Exam November 1995

Silicon diodes are used in a two-diode full-wave rectifier circuit to supply a load of 12 volts DC. Assuming ideal diodes and the load resistance is 12 ohms, compute the efficiency of the rectifier in percentage.

A. 5.8
B. 75
C. 95.7
D. 81.2

39. ECE Board Exam November 1995

In order to match the load to the generator means making load resistance _____.

A. increased to more of generator's internal resistance
B. equal to generator's internal resistance
C. decreased
D. lowered than generator's internal resistance

40. ECE Board Exam November 1995

The purpose of installing thyrectors across the incoming power lines to speed the control system is to _____.

A. cause the motor to caution
B. protect drive circuits from high voltage transient surges
C. increase counter-emf
D. allow the field winding current to continue flowing

41. ECE Board Exam November 1995

The base SI unit of luminous intensity is

A. lux

B. lumen

C. candela

D. lambert

42. ECE Board Exam November 1995

The portion of the weld interval during which welding current is flowing

A. Heat subinterval

B. Release interval

C. Cool interval

D. Squeeze interval

43. ECE Board Exam November 1995

The difference in energy between the valence and conduction bands of a semiconductor is called

A. band gap

B. extrinsic photoeffect

C. conductivity

D. energy-density

44. ECE Board Exam November 1995

_____ is a segment register which normally accesses variables in the program.

A. Extra

B. Stack

C. Data

D. Code

45. ECE Board Exam November 1995

What is the range of audio frequency?

A. 10 to 10,000 Hz

B. 16 to 20,000 Hz

C. 3 to 2,000 kHz

D. 10 to 2,000 Hz

46. ECE Board Exam November 1995

A _____ is a storage device used to accommodate a difference in rate of flow of data or time of occurrence of events when transmitting from one device to another.

A. Accumulator

B. Buffer

C. Modem

D. Register

47. ECE Board Exam November 1995

Solve the collector current if base current is 200 mA and the current gain is 20.

A. 10 A

B. 4 A

C. 1 A

D. 40 A

48. ECE Board Exam November 1995

_____ is the specific gravity reading for a good lead-acid cell.

A. 1170

B. 1270

C. 1070

D. 1370

49. ECE Board Exam November 1995

_____ refers to BCD counter

A. Decade counter

B. Shift relay

C. Frequency divider

D. Binary counter

50. ECE Board Exam November 1995

The typical number of bits per dynamic memory location is

A. 1

B. 8

C. 2

D. 16

51. ECE Board Exam November 1995

Find voltage regulation of a generator when full-load voltage is 110 V and no-load voltage is 120.

A. 1 %

B. 9.09 %

C. 90.0 %

D. 10 %

52. ECE Board Exam November 1995

In a system with MOS devices, the main bus loading factor is likely to be

A. resistive

B. current

C. capacitive

D. static charge

53. ECE Board Exam November 1995

The first recipient in E-mail communication.

A. Host

B. Mail box

C. Computer`

D. Disk

54. ECE Board Exam November 1995

When a power supply is constructed to operate from either 240V or 120V ac lines such that it will have same secondary output, its primary when connected from 240V must be

A. split into halves and connected in parallel

B. connected in series

C. connected in parallel

D. split into halves and connected in series

55. ECE Board Exam November 1995

Which has the largest diameter of the following dry cells?

A. Type C

B. Type AA

C. Type AAA

D. Type D

56. ECE Board Exam November 1995

_____ is an output applied to Read Only Memory (ROM).

A. Multiplexer

B. Address

C. Input code

D. Data

57. ECE Board Exam November 1995

_____ is a kind of memory where only manufacturer can store program and has a group of memory locations each permanently storing a word.

A. ROM

B. SOS memory

C. RAM

D. Hard Memory

58. ECE Board Exam November 1995

_____ is an excess property of P-type semiconductor.

A. Neutron

B. Proton

C. Electron

D. Hole

59. ECE Board Exam November 1995

The best way to control speed of an AC induction motor is by varying the _____

A. supply frequency

B. both supply voltage and frequency simultaneously

C. supply voltage

D. series resistance of the field

60. ECE Board Exam November 1995

There are _____ identical cells in parallel needed to double the current reading of each cells.

A. 3

B. 4

C. 2

D. 1

61. ECE Board Exam November 1995

Two heaters A and B are in parallel across supply voltage V. Heater A produces 500 kcal in 20 minutes and B produces 1000 kcal in 10 minutes. The resistance of A is 10 ohms. What is the resistance of B, if the same heaters are connected in series voltage V?

A. 0.14 ohms
B. 4.5 ohms
C. 2.5 ohms
D. 4.5 ohms

62. ECE Board Exam November 1995

_____is a low frequency oscillation which sometimes occurs under fault condition in electron tube circuits.

A. Ping pong
B. Jitter
C. Glitch
D. Motor boating

63. ECE Board Exam November 1995

The longer the diameter of a wire, the _____ is its resistance.

A. unstable
B. higher
C. stable
D. lesser

64. ECE Board Exam November 1995

When an atom gains an additional _____, it results to a negative ion.

A. neutron
B. proton
C. electron
D. atom

65. ECE Board Exam November 1995

_____ refers to circuits with 10 to 100 integrated circuits.

A. IC
B. Monolithic
C. MSI
D. SSI

66. **ECE Board Exam November 1995**

What is the most stable type of biasing?

A. Current feedback
B. Fixed bias
C. Voltage divider
D. Voltage feedback

67. ECE Board Exam November 1995

If the gain of an amplifier without feedback is 10 and with negative feedback is 8, then the feedback fraction is

A. 0.025
B. 0.9
C. 0.8
D. 0.225

68. ECE Board Exam November 1995

The _____ is an analog component that has two inputs, one inverting and the other non-inverting, and a single output terminal.

A. counter
B. op amp
C. register
D. flip-flop

69. ECE Board Exam November 1995

What do you call the duration within it takes to read the content of a memory location after it has been addressed

A. Execution time
B. Data rate
C. Cycle time
D. Access time

70. ECE Board Exam November 1995

What term in electronics is used to express how fast energy is consumed?

A. Load
B. Power
C. Conductance
D. Volt

71. ECE Board Exam November 1995

If a sine wave voltage varies from 0-200 V, how much is its instant voltage at 90%?

A. 200 V

B. Half of its maximum voltage

C. 100 V

D. Minimum voltage

72. ECE Board Exam November 1995

Device that increases power content from an input signal.

A. Attenuator

B. Amplifier

C. Oscillator

D. Transformer

73. ECE Board Exam November 1995

What is the lagging effect between the magnetizing force applied and the flux density?

A. Hysteresis

B. Permeance

C. Reluctance

D. Eddy Currents

74. ECE Board Exam November 1995

A solid-state device which only gives a "1" output if all its inputs are also "1" is called

A. an AND gate

B. a NAND gate

C. a NOR gate

D. an OR gate

75. ECE Board Exam November 1995

How much is the resistance of Germanium slag 10 cm long and cross sectional area of 1 squared cm?

A. 5.5 k ohm

B. 550 k ohm

C. 55 k ohm

D. 550 ohm

76. ECE Board Exam November 1995

A _____ is a device which can test all pins of an IC at the same time.

A. logic probe
B. current tracer
C. logic clip
D. pulser

77. ECE Board Exam November 1995

Current carried by each of two long parallel conductors is doubled if their separation is also doubled, the force between them would

A. increase four-fold
B. become half
C. increase two-fold
D. remain the same

78. ECE Board Exam November 1995

What is the first stage in electronic troubleshooting?

A. Statistical analysis
B. Symptom analysis
C. Diagnostics
D. Initiate plate testing

79. ECE Board Exam November 1995

Circuit that transforms dc from one voltage level to another or from one frequency to another

A. Coupler
B. Clipper
C. Comparator
D. Converter

80. ECE Board Exam November 1995

_____ is an orderly pattern of combined silicon atoms.

A. Covalent bond
B. Valence orbit
C. Semiconductor
D. Crystal

81. ECE Board Exam November 1995

A crystal with its major flat surfaces cut so that they are perpendicular to a mechanical axis of the original quartz crystal is called

A. a Y-cut crystal

B. a Z-cut crystal

C. an XY-cut crystal

D. an X-cut crystal

82. ECE Board Exam November 1995

A good material conductor should have _____ valence electrons.

A. 21

B. 1

C. 3.5

D. 10

83. ECE Board Exam November 1995

The objective of a capacitor is to

A. block AC and passes DC current

B. block DC and passes AC current

C. stores AC current

D. blocks AC current

84. ECE Board Exam November 1995

_____ is the characteristic of an oscillator that enables it to sustain oscillation after removal of the control stimulus.

A. Momentum

B. Fly-wheel effect

C. Damping

D. Forced oscillations

85. ECE Board Exam November 1995

_____ is the term used to express the amount of electrical energy in an electrostatic field.

A. Coulombs

B. Watts

C. Volts

D. Joules

86. ECE Board Exam November 1995

_____ is a device that stays on once triggered and stores one of two conditions as a digital circuit.

A. Gate

B. Latch

C. Integrator

D. Oscillator

87. ECE Board Exam November 1995

When the cells are in series, voltages add, while current capacity is _____.

A. the same as one cell

B. zero

C. infinite

D. the sum of each cell

88. ECE Board Exam November 1995

In shift registers made up of several flip-flops, the clock signal indicates _____.

A. a bit of information stored in the flip-flop

B. information of time

C. what time is it

D. when to shift a bit of data from input of the flip-flop to the output

89. ECE Board Exam November 1995

A dc voltage supply is measured at 50 V and drops to 25 V when the load is connected. What is the value of "voltage regulation"?

A. 5 %

B. 50 %

C. 8.33 %

D. 11.11 %

90. ECE Board Exam November 1995

Which of the following statements is correct?

A. Transistor has two terminals

B. Open resistor has small resistance

C. Typical power rating of a carbon-composition resistor ranged from 0.125 W to 2W

D. Potentiometer has two terminals

91. ECE Board Exam November 1995

_____ is the major characteristics of an IC

A. Complication

B. Size

C. Power consumption

D. Speed

92. ECE Board Exam November 1995

Find the sum of binary number 1010 and 0011.

a) 1021

b) 1101

c) 1011

d) 1111

93. ECE Board Exam November 1995

The loss of electrical energy in counter balancing the residual magnetism in each cycle is called

A. Eddy current loss

B. Hysteresis loss

C. Copper loss

D. Leakage loss

94. ECE Board Exam November 1995

In order to simplify a circuit, in analysis and computation the diode is normally assumed as _____

A. zero

B. ideal

C. imaginary

D. infinite

95. ECE Board Exam November 1995

Files in an E-mail communication are send thru _____

A. disk

B. mailbox

C. wires

D. attachment

96. ECE Board Exam November 1995

An audible tone generated by combining two different frequencies in a non-linear circuit or as sound waves in air is called

A. side tone

B. beat tone

C. heterodyne

D. deadbeat

97. ECE Board Exam November 1995

_____ are electrons at the outer shell.

A. Inside shell electrons

B. Conductor electrons

C. Outside shell electrons

D. Valence electrons

98. ECE Board Exam November 1995

Solve for flux density (in gauss) from a magnetic flux of 5,000 Mx through a perpendicular are of 2 cm x 5 cm.

A. 5000 G

B. 500 G

C. 10,000 G

D. 50 G

99. ECE Board Exam November 1995

Refers to the increased used of data conversion circuits as a result of increased application.

A. OP AMPS

B. Linear circuits

C. Computers

D. Digital equipment

100. ECE Board Exam November 1995

The decibel gain of cascaded amplifiers equals the

A. sum of voltage and current gains

B. product of individual gains

C. difference of individual gains

D. sum of individual gains

TEST YOURSELF – EXAM 2

1. **ECE Board Exam March 1996**
   What is a group of circuits that provides timing and signals to all operation in the computer?
   A. Output unit
   B. Memory unit
   C. Control unit
   D. Input unit

2. **ECE Board Exam March 1996**
   Where does voltage generated in a DC generator depend?
   A. Field resistance and flux
   B. Field and armature currents
   C. Flux and speed
   D. Speed and field resistance

3. **ECE Board Exam March 1996**
   _____ is the most influential factor in the switching speed of saturated bipolar transistor
   A. Charge stored
   B. Collector current
   C. HFE
   D. Base current

4. **ECE Board Exam March 1996**
   What is a pi-network?
   A. A Power Incidence Network
   B. A network consisting of one inductor and two capacitors or two inductors and one capacitor
   C. A network consisting entirely of four inductors or four capacitors
   D. An antenna matching network that is isolated form ground

5. **ECE Board Exam March 1996**
   _____ is the property of a material which opposes creation of magnetic flux?
   A. Resistance
   B. Permeance
   C. Reluctance
   D. Conductance

6. **ECE Board Exam March 1996**
The purpose of cells connected in parallel is to
   A. increase internal resistance
   B. increase voltage output
   C. decrease current capacity
   D. increase current capacity

7. **ECE Board Exam March 1996**
What does SI magnetic flux refer?
   A. Weber
   B. Flux
   C. Maxwell
   D. Lines

8. **ECE Board Exam March 1996**
_____ is a type of linear regulator used in applications requiring efficient utilization of the primary power source.
   A. A series regulator
   B. A shunt regulator
   C. A constant current source
   D. A shunt current source

9. **ECE Board Exam March 1996**
When a switch is closed, it has a total resistance of
   A. 1000 ohms at room temperature
   B. unstable
   C. infinity
   D. zero

10. **ECE Board Exam March 1996**
How many turns are needed to produce a magnetizing force of 5000 A.t. for a coil of 50 amperes?
   A. 1,000 turns
   B. 5,000 turns
   C. 100 turns
   D. 500 turns

11. ECE Board Exam March 1996

When an SCR is triggered or on condition, its electrical characteristics are similar to what other solid-state device (as measured between its cathode and anode)?

A. The junction diode
B. The varactor diode
C. The tunnel diode
D. The hot-carrier diode

12. ECE Board Exam March 1996

What special type of diode is capable of both amplification and oscillation?

A. Point contact diode
B. Junction diode
C. Zener diode
D. Tunnel diode

13. ECE Board Exam March 1996

A static memory generally contains

A. electrons
B. positive ions
C. row decoders
D. holes

14. ECE Board Exam March 1996

Which is the majority carrier in an N-type semiconductor?

A. Electrons
B. Positive ions
C. Negative ions
D. Holes

15. ECE Board Exam March 1996

Steel is hard to magnetize because of its _____.

A. high retentivity
B. low permeability
C. high permeability
D. high density

16. ECE Board Exam March 1996

When you increase the resistance in a circuit, the flows of electrons will _____

A. flow faster
B. be constant
C. be decreased
D. be stopped

17. ECE Board Exam March 1996

Current in a chemical cell refers to the movement of _____

A. negative ions only
B. negative and positive ions
C. positive ions only
D. negative hole charge

18. ECE Board Exam March 1996

What is the effect of light in a photodiode?

A. Reverse current
B. Limits flow of current
C. Forwards current
D. Renders unstable current

19. ECE Board Exam March 1996

What is the effect in terms of bandwidth when the Q of a single-tune stage is doubled?

A. Doubled
B. The same
C. Halved
D. Four times

20. ECE Board Exam March 1996

_____ is the dc motor control senses.

A. Resistance
B. Counter emf
C. Field voltage
D. Armature current

21. ECE Board Exam March 1996

What is the range of voltage rating available in zener diodes?

A. 2.4 volts to 200 volts

B. 1.2 volts to 7 volts

C. 3 volts to 2000 volts

D. 1.2 volts to 5.6 volts

22. ECE Board Exam March 1996

Find which type of network provides the greatest harmonic suppression.

A. Pi-network

B. Pi-L-network

C. Inverse-Pi-network

D. L-network

23. ECE Board Exam March 1996

What type of transformer that is used to protect technicians and operators from deadly electrical shock?

A. Absorber transformer

B. Step-down transformer

C. Step-up transformer

D. Isolation transformer

24. ECE Board Exam March 1996

What is residual magnetism?

A. The external magnetic field when the current is flowing through the exciting coil.

B. The flux density, which exist in the iron core when the magnetic field intensity is reduced to zero.

C. The flux density, which exist in the iron core when the magnetic field intensity is at its maximum value.

D. The flux density when the magnetic core is saturated.

25. ECE Board Exam March 1996

When batteries have cells connected in series the effect is

A. reduced output voltage

B. increased current supply

C. increased voltage supply

D. reduced internal resistance

26. ECE Board Exam March 1996

How many OP-AMPS does window comparator require?

A. 2

B. 4

C. 3

D. 1

27. ECE Board Exam March 1996

What is the memory element used in clocked sequential logic circuit?

A. Gates

B. Flip-flop

C. Static-RAM

D. Read-only memory

28. ECE Board Exam March 1996

Semiconductors which are considered to be “low power” or “small signal” usually have power dissipation ratings of

A. 1 watt or less

B. 5 watts or less

C. exactly 1 watt

D. 10 watt or less

29. ECE Board Exam March 1996

_____ for a transistor to be cut-off

A. Maximum current flows from emitter to collector

B. The transistor is at its operating point

C. No current flows from emitter to collector

D. There is no base current

30. ECE Board Exam March 1996

A _____ is an instruction in a source language that is to be replaced by a defined sequence of instructions in the same source language

A. statement

B. source code

C. mnemonic

D. macro-instruction

31. ECE Board Exam March 1996

Common-base (CB) amplifier has _____ compared to common-emitter and common collector amplifiers.

A. a higher input resistance
B. a larger current gain
C. a lower input resistance
D. a larger voltage gain

32. ECE Board Exam March 1996

_____ currents are wasteful currents which flow in cores of transformers and produces heat.

A. Residual
B. Eddy
C. Sneak
D. Magnetizing

33. ECE Board Exam March 1996

Which of the following photocell is most sensitive to?

A. Radio waves
B. Sound waves
C. Light waves
D. Heat waves

34. ECE Board Exam March 1996

What is the resonant frequency of a circuit when L of 1 microhenry and C of 10 picofarads are in series?

A. 15.9 MHz
B. 50.3 MHz
C. 15.9 MHz
D. 50.3 kHz

35. ECE Board Exam March 1996

What is the law that determines polarity of an induced voltage?

A. Norton's Law
B. Thevenin's Law
C. Lenz Law
D. Faraday's Law

36. ECE Board Exam March 1996

The science of physical phenomena at very low temperatures, approaching absolute zero is called _____

A. Crytanalysis
B. Cybernetics
C. Temperature inversion
D. Cryogenics

37. ECE Board Exam March 1996

If a dry cell has an internal resistance of 0.50 ohm and an emf of 2 volts, find power delivered in a one ohm resistor?

A. 1.33 watts
B. 1.66 watts
C. 3.66 watts
D. 1.77 watts

38. ECE Board Exam March 1996

What happens in the resistance of copper wired when its temperature is raised?

A. Decreased
B. Steady
C. Increase
D. Zero

39. ECE Board Exam March 1996

Refers to the part of computer that performs mathematical operations

A. CPU
B. Flip-flop
C. Assembly Language
D. ALU

40. ECE Board Exam March 1996

_____ is called a memory device which holds fixed set of data in a circuit.

A. RAM
B. Register
C. Logic
D. ROM

41. ECE Board Exam March 1996

When a voltage of 100 V at 50 Hz is applied to a choking coil A, the current taken is 8A and the power is 120 W, when applied to a coil B, the current is 10 A and the power is 120 W. What power will be taken when 100 V is applied to the two coils connected in series?

A. 4737 W
B. 140 W
C. 70 W
D. 1454 W

42. ECE Board Exam March 1996

The current needed to operate a soldering iron which has a rating of 600 watts at 110 volts is

A. 5.455 A
B. 66,000 A
C. 18,200 A
D. 182 A

43. ECE Board Exam March 1996

An interval required to address and read out memory word

A. Propagation delay
B. Pulse duration
C. Settling time
D. Access time

44. ECE Board Exam March 1996

When a logic circuit rejects an unwanted signal, this is termed as _____

A. logic levels
B. noise margin
C. power consumption
D. propagation delay

45. ECE Board Exam March 1996

What is responsible for the phenomenon when voltages across reactances in series can often be larger than the voltage applied to them?

A. Capacitance
B. Resistance
C. Conductance
D. Resonance

46. ECE Board Exam March 1996

How many symbols do hexadecimal digital number system used?

A. 16

B. 4

C. 8

D. 32

47. ECE Board Exam March 1996

What is the equivalent of decimal 47 in binary?

A. 111011

B. 111101

C. 110111

D. 101111

48. ECE Board Exam March 1996

What is the logic circuit having two or more inputs but only one output with high output if any or all inputs are high, with low output only when all inputs are low?

A. AND gate

B. OR gate

C. NOR gate

D. NAND gate

49. ECE Board Exam March 1996

Determine which is not a dynamic test instrument

A. Oscilloscope

B. Logic monitor

C. Logic

D. Logic

50. ECE Board Exam March 1996

How much voltage regulation does commercial power supply have?

A. 10% and above

B. Within 1%

C. 15% and above

D. 10%

51. ECE Board Exam March 1996

_____ is called an electronic transfer from one stage to the next.

A. Coupling

B. Swamping

C. Doping

D. Mixing

52. ECE Board Exam March 1996

_____ capability is analogous to permeance.

A. Admittance

B. Conductance

C. Reluctance

D. Resistance

53. ECE Board Exam March 1996

Which is a common use for point-contact diode?

A. As a constant current source

B. As a constant voltage source

C. As an RF detector

D. As a high voltage rectifier

54. ECE Board Exam March 1996

Which of the following is not a secondary type cell?

A. Lithium

B. Lead-acid

C. Silver cadmium

D. Silver-zinc

55. ECE Board Exam March 1996

What do you call the piece of equipment in an oscilloscope used to indicate pulse condition in a digital logic circuit?

A. Logic probe

B. Probe

C. Electroscope

D. Galvanometer

56. ECE Board Exam March 1996

How many bits, binary pattern represent the decimal numbers 0 to 9 in binary coded decimal?

A. 4

B. 1

C. 2

D. 8

57. ECE Board Exam March 1996

Which is the principal characteristic of a varactor diode?

A. It has a very high PIV

B. It has a negative resistance region

C. Its internal capacitance varies with the applied voltage

D. It has a constant voltage under conditions of varying current

58. ECE Board Exam March 1996

What is the law whereby the attraction or repulsion between two magnetic poles is directly proportional to their strength?

A. Coulomb's law

B. Newton's law

C. Coulomb's first law

D. Norton's law

59. ECE Board Exam March 1996

Efficient oscillators are those that are class _____.

A. AB

B. B

C. C

D. A

60. ECE Board Exam March 1996

_____ refers to a circuit that stores pulses and produces an output pulse when specified number of pulses is stored.

A. Counter

B. Register

C. Flip-flop

D. Buffer

61. ECE Board Exam March 1996

How many lithium cells in series are needed for a 12 V battery?

A. 12 cells
B. 4 cells
C. 8 cells
D. 10 cells

62. ECE Board Exam March 1996

_____ is a linear electronic voltage regulator

A. A regulator that has a ramp voltage at its output
B. A regulator in which the control device is switched on or off, with the duty cycle proportional to the line or load conditions
C. A regulator in which the pass transistor switches from the "off" state to the "on" state
D. A regulator in which the conduction of a control element is varied in direct proportion to the voltage or load current.

63. ECE Board Exam March 1996

The particles that make up the lattice in ionic crystal

A. Molecules
B. Ions
C. Electrons
D. Neutron

64. ECE Board Exam March 1996

Parallel cells have the same voltage as one cell but have _____.

A. unstable resistance
B. less current capacity
C. fluctuating power output
D. more current capacity

65. ECE Board Exam March 1996

A digital word consisting of only four bits is called a

A. dibit
B. quad
C. pixel
D. nibble

66. ECE Board Exam March 1996

The reason for the thin layer of varnish over the copper coil pattern is to prevent

A. oxidizing

B. flux

C. corrosion

D. dioxide

67. ECE Board Exam March 1996

_____ is the output voltage of a carbon-zinc cell.

A. 3.5 V

B. 2.5 V

C. 1.5 V

D. 0.5 V

68. ECE Board Exam March 1996

Speed of a logic circuit is normally expressed as _____

A. logic levels

B. speed immunity

C. propagation delay

D. power consumption

69. ECE Board Exam March 1996

_____ is the term used to express the ratio of the change in the dc collector current to a change in base current in a bipolar transistor.

A. Gamma

B. Beta

C. Alpha

D. Delta

70. ECE Board Exam March 1996

_____ refers to a program that translates and then immediately executes statements in a high level language.

A. Interpreter

B. Synchronous

C. Interface

D. Operating system

71. **ECE Board Exam March 1996**

_____ is the property of magnetic materials which retain magnetism after magnetizing force is withdrawn.

A. Reluctivity
B. Resistivity
C. Retentivity
D. Conductivity

72. ECE Board Exam March 1996

A _____ is a junction field effect transistor with a Schottky barrier instead of a normal semiconductor junction.

A. biFET
B. MOSFET
C. MESFET
D. JUGFET

73. **ECE Board Exam March 1996**

Term used for response in an electrical circuit.

A. The frequency at which power factor is at a minimum
B. The highest frequency that will pass current
C. The frequency at which capacitive reactance equals inductive reactance
D. The lowest frequency that will pass current

74. **ECE Board Exam March 1996**

_____ is the progressive decay with time in the amplitude of the free oscillation in a circuit.

A. Decrement
B. Pulse decay time
C. Damping
D. Dancing

75. **ECE Board Exam March 1996**

What do you call a circuit that changes pure binary code into ASCII?

A. Decoder
B. Encoder
C. Demultiplexer
D. Code converter

76. **ECE Board Exam March 1996**

Which of the following statement is incorrect?

A. Open transistor has three (3) terminals
B. Transistors have three (3) terminals
C. Potentiometer has three (3) terminals
D. Typical power rating of carbon-composition resistors ranged from 0.001 W to 0.1 W

77. **ECE Board Exam March 1996**

Which statement is not true?

A. The internal resistance of a cell limits the amount of output current
B. Two electrodes of the same metal provide the highest voltage output
C. Secondary cell can be recharged
D. The negative terminal of a chemical cell has a charge of excess electrons

78. **ECE Board Exam March 1996**

What type of circuit whose parameters are constant which do not change with voltage of current?

A. Lumped circuit
B. Tuned circuit
C. Reactive circuit
D. Linear circuit

79. **ECE Board Exam March 1996**

_____ is gaseous tube which uses a pool of liquid mercury as its cathode.

A. Thyratron
B. Phanotron
C. Klystron
D. Ignition

80. **ECE Board Exam March 1996**

What do you call an electromagnet with its core in a form of magnetic ring?

A. Polarization
B. Irradiation
C. Toroid
D. Doping

81. **ECE Board Exam March 1996**

_____ is the procedure by which an atom is given a net charge by adding or taking away of electron.

A. Polarization
B. Irradiation
C. Ionization
D. Doping

82. **ECE Board Exam March 1996**

What do you call an electronic component that is a non-linear resistor and its resistance is function of the voltage across it?

A. Triac
B. IC
C. Varistor
D. Thyristor

83. **ECE Board Exam March 1996**

Find the half-power bandwidth of a resonant circuit which has a resonant frequency of 1.8 MHz and a Q of 95.

A. 189 Hz
B. 1.89 kHz
C. 58.7 kHz
D. 18.9 kHz

84. **ECE Board Exam March 1996**

A dynamic memory will store information

A. as long as power is applied to the memory
B. as long as power is applied and the memory is refreshed periodically
C. even when power is not applied to the memory
D. when power is applied at regular intervals

85. **ECE Board Exam March 1996**

The energy of an oscillator can be source by _____

A. coupling a small coil close to the tube
B. capacitance of inductive coupling from tuned circuit
C. inserting resistor in the grid circuit
D. connecting capacitor across the supply

86. **ECE Board Exam March 1996**

Refers to that part of computer that interprets and executes instructions

A. ACC
B. ALU
C. CPU
D. Compiler

87. **ECE Board Exam March 1996**

What is the gain of a vacuum tube having the following parameter amplification factor is 80, external plate-load resistance of 30,000 ohms and the tubes internal plate resistance is 10,000 ohms?

A. 60
B. 20
C. 30
D. 40

88. **ECE Board Exam March 1996**

_____is the region in a transistor that is heavily doped

A. Collector
B. Ground
C. Base
D. Emitter

89. **ECE Board Exam March 1996**

Which class of amplifier has the highest linearity and least distortion

A. Class A
B. Class AB
C. Class C
D. Class B

90. **ECE Board Exam March 1996**

_____ is the unit of reluctance.

A. Gauss
B. Weber
C. Maxwells
D. At/Wb

91. ECE Board Exam March 1996

Find the value of voltage regulation having a dc voltage of 67 V without load and with full load current drawn the output voltage drops to 42 V.

A. 59.5 %

B. 15.9 %

C. 62.6 %

D. 32.5 %

92. **ECE Board Exam March 1996**

What is the reason why more cells can be stored in a given area with dynamic cells?

A. They consume less power

B. They are smaller

C. They are larger

D. They travel faster

93. **ECE Board Exam March 1996**

Which of the following is a characteristic of cascaded amplifier?

A. Double each amplifier's gain

B. Each amplifiers gain is increased

C. Increased overall gain

D. Total gain is decreased

94. **ECE Board Exam March 1996**

How do you determine if diode is defective?

A. Diode resistance is either very low or very high on either direction

B. High current

C. Very low current

D. High voltage

95. **ECE Board Exam March 1996**

Avalanche breakdown is primarily dependent on the phenomenon of

A. doping

B. collision

C. recombination

D. ionization

96. **ECE Board Exam March 1996**

What network facility is used to interconnect distinct networks physically?

A. Relays
B. Routers
C. Repeaters
D. Bridges

97. **ECE Board Exam March 1996**

Diagram showing procedures which are followed and actions taken is called

A. functional block diagram
B. circuit diagram
C. flow chart
D. schematic diagram

98. **ECE Board Exam March 1996**

Find the dielectric constant of air

A. Approximately 1
B. Approximately 0
C. Approximately 2
D. Approximately 4

99. **ECE Board Exam March 1996**

_____ refers to the term remote sensing with regard to a linear voltage regulator.

A. The feedback connection to the error amplifier is made directly to the load
B. The load connection is made outside the feedback loop
C. The error amplifier compares the input voltage to the reference voltage
D. Sensing is accomplished by wireless inductive loops

100. **ECE Board Exam March 1996**

Transition region refers to _____ with regard to transistor.

A. the area of maximum N-type charge
B. the area maximum P-type
C. the point where wire leads are connected to the P or N type material
D. an area of low charge density around P-N junction

TEST YOURSELF – EXAM 3

1. **ECE Board Exam November 1996**
   What is a medium of communication with a computer where programs are written in mnemonics?
   A. Assembly Language
   B. High level Language
   C. Machine Language
   D. Low level Language

2. **ECE Board Exam November 1996**
   The arrow in the symbol of a transistor indicates the direction of
   A. Electron current in the collector
   B. Donor ion current
   C. Electron current in the emitter
   D. Hole current in the emitter

3. **ECE Board Exam November 1996**
   Digital ICs are mostly
   A. hybrid
   B. thick film
   C. thin film
   D. monolithic

4. **ECE Board Exam November 1996**
   A _____ is a program which converts instruction written in a source language into machine code which can be read and acted upon by the computer.
   A. source code
   B. assembler
   C. application software
   D. compiler

5. **ECE Board Exam November 1996**
   What is the total resistance of a two equal valued resistor in series?
   A. Twice as one
   B. The sum of their reciprocal
   C. The difference of both
   D. The product of both

6. **ECE Board Exam November 1996**
   What two elements widely used in semiconductor devices exhibit both metallic and non-metallic characteristics?
   A. Galena and Germanium
   B. Silicon and Gold
   C. Galena and Bismuth
   D. Silicon and Germanium

7. **ECE Board Exam November 1996**
   What do you expect when you use the two 20 k-ohms, 1 watt resistor in parallel instead of one 10 k-ohms, 1 watt?
   A. Provide more power
   B. Provide lighter current
   C. Provide less power
   D. Provide wider tolerance

8. **ECE Board Exam November 1996**
   Find the required battery capacity needed to operate an equipment of 30 Amperes at 5 hours.
   A. 6
   B. 30
   C. 3
   D. 150

9. **ECE Board Exam November 1996**
   What does ALU which carries arithmetic and logic operations process?
   A. Binary coded decimal numbers
   B. Hexadecimal numbers
   C. Octal numbers
   D. Binary numbers

10. **ECE Board Exam November 1996**
    A static memory will store information
    A. as long as power is applied to the memory
    B. even when power is not applied to the memory
    C. as long as power is applied and the memory is refreshed periodically
    D. when power is applied at regular intervals

11. ECE Board Exam November 1996

The conductance of a circuit having three (3) 10 ohms resistors in parallel is

A. 3.33 S

B. 0.30 S

C. 0.333 S

D. 30 S

12. ECE Board Exam November 1996

Protons are about _____ heavier than electrons.

A. 1,800 times

B. less than thrice

C. less

D. twice

13. ECE Board Exam November 1996

In half-wave rectifier, if a resistance equal to load resistance is connected in parallel with the diode then

A. circuit will stop rectifying

B. output voltage would be halved

C. output voltage would be doubled

D. output voltage will remain unchanged

14. ECE Board Exam November 1996

_____ refers to a function of a decade counter digital IC.

A. Producing one output pulse for every 10 input pulses

B. Adding two decimal numbers

C. Producing 10 output pulses for every input pulse

D. Decoding a decimal number for display on seven segment

15. ECE Board Exam November 1996

What is the time interval to undertake a refresh operation in a typical dynamic RAM?

A. 2 ms

B. 200 ns

C. 50 µs

D. 22 µs

16. ECE Board Exam November 1996

Electric energy refers to _____.

A. Joules divided by time

B. Volt-coulomb

C. Volt-ampere

D. Watt

17. ECE Board Exam November 1996

What is the process by which AC is converted to pulsating DC?

A. Charging

B. Rectification

C. Filtering

D. Clipping

18. ECE Board Exam November 1996

_____ frequency is reached when the capacitive and inductive reactance in a tuned circuit are equal.

A. Infinite

B. Resonant

C. Pulsating

D. Zero

19. ECE Board Exam November 1996

A _____ is composed of voltage-controlled oscillator, a phase comparator and a low pass filter, where the oscillator generates the output frequency in response to an error voltage produced by the comparator.

A. JK flip-flop

B. error detection

C. voltage-to-frequency converter

D. phase-locked loop

20. ECE Board Exam November 1996

How are the networks able to transform one impedance to another?

A. Resistance in the networks substitute for resistances in the load

B. The matching network can cancel the reactive part of an impedance and change the value of the resistive part of an impedance

C. The matching network introduces negative resistance to cancel the resistive part of an impedance

D. The matching network introduces transconductance to cancel the reactive part of an impedance

21. ECE Board Exam November 1996

Which of the following demodulates an RF modulated wave?

A. RF amp
B. IF amp
C. Mixer
D. Detector

22. ECE Board Exam November 1996

The ideal internal resistance of an ammeter should be

A. equal to the circuit's resistance
B. zero
C. infinity
D. higher than the circuit's resistance

23. ECE Board Exam November 1996

What type of bias is required for an LED to produce luminescence?

A. Reverse bias
B. Zero bias
C. Forward bias
D. Inductive bias

24. ECE Board Exam November 1996

What is the resonant frequency of a circuit when L of 2 microhenrys and C of 30 picofarads are in series?

A. 20.5 kHz
B. 20.5 MHz
C. 2.65 kHz
D. 2.65 MHz

25. ECE Board Exam November 1996

_____ is a layer of insulating medium that separates the plates of a capacitor.

A. Insulator
B. Core
C. Dielectric
D. Space

26. ECE Board Exam November 1996

What is the oscillator of a radar receiver?

A. Detector
B. Product detector
C. Hartley oscillator
D. Klystron oscillator

27. ECE Board Exam November 1996

What is the equivalent of decimal number 11 in binary

A. 1101
B. 1110
C. 1111
D. 1011

28. ECE Board Exam November 1996

Which of the following ammeters is the most sensitive?

A. 0-100 micro Ammeter
B. 0-5 milli Ammeter
C. micro Ammeter
D. 0-50 milli Ammeter

29. ECE Board Exam November 1996

In the concept of induction heating in industrial electronics, the eddy current penetrates to greater depths at

A. high frequencies
B. increasing induction
C. decreasing induction
D. low frequencies

30. ECE Board Exam November 1996

Refers to the lowest voltage across any insulator that can cause current flow

A. Conduction voltage
B. Breakdown voltage
C. Voltage flow
D. Voltage drop

31. ECE Board Exam November 1996

Type of power-line frequency meter composed of vibrating iron reeds placed in alternating magnetic field

A. Induction type
B. Resonant type
C. Vibrating reed type
D. Electrodynamic type

32. ECE Board Exam November 1996

A separately packaged circuit element with its own external connections is called a _____ component.

A. integrated
B. discrete
C. active
D. passive

33. ECE Board Exam November 1996

The area of a conductor whose diameter is 0.001 inch is equal to

A. one angstrom
B. one circular mill
C. one micron
D. one steradian

34. ECE Board Exam November 1996

_____ is called the time sharing of one line with multiplex signals.

A. Simultaneous transmission
B. Bidirectional
C. Relay
D. Multiplexing

35. ECE Board Exam November 1996

A process of constant loses of free electrons and then regaining them is called _____.

A. induction
B. ionization
C. polarization
D. electron gaining

36. ECE Board Exam November 1996

Term used for an out-of-phase, non-productive power associated with inductors and capacitors.

A. Reactive power

B. Effective power

C. Peak envelope power

D. True power

37. ECE Board Exam November 1996

What do you call the devices that allow computers to communicate with other computers through telephone lines or radio frequency?

A. Modems

B. Disks

C. Mouse

D. Super computers

38. ECE Board Exam November 1996

As general rule in the process of industrial electronic heating, the frequency with the thickness of the metal to be heated

A. is not related

B. is directly proportional

C. varies inversely

D. varies

39. ECE Board Exam November 1996

A _____ network is a two-port circuit made up of a repeated L, T, pi or H networks.

A. lattice

B. hierarchy

C. hybrid

D. ladder

40. ECE Board Exam November 1996

The octal equivalent of binary number 10101100 is

A. 367

B. AC16

C. 254

D. 172

41. ECE Board Exam November 1996

Which type of network offers the greater transformation ratio?

A. L-network

B. Pi-network

C. Constant-K

D. Constant-M

42. ECE Board Exam November 1996

Refers to the system that has no feedback and is not self-correcting

A. Close-loop system

B. Coal slurry system

C. Feed forward control system

D. Open-loop system

43. ECE Board Exam November 1996

Find the equivalent of 10 Oersted (O_e)

A. 100 Gb/cm

B. 1 Gb/cm

C. 10 Gb/cm

D. 1 Gb/m

44. ECE Board Exam November 1996

The density of data recorded on magnetic tape is measured in

A. bit stuffing rate

B. bit error rate

C. bits per inch

D. bits per second

45. ECE Board Exam November 1996

_____ is called back EMF.

A. A voltage that opposes the applied EMF

B. A current that opposes the applied EMF

C. An opposing EMF equal to R multiplied by C (RC) percent of the applied EMF

D. A current equal to the applied EMF

46. ECE Board Exam November 1996

What is the purpose of the rheostat in ohmmeter?

A. Balancing resistance
B. Counter resistance of measured circuit
C. Coil resistance
D. Compensate aging battery of the meter

47. ECE Board Exam November 1996

Find the charge in coulombs of dielectric that has a positive charge of 14.5 x 10 to the 18^{th} power protons.

A. 29 x 10 to the 16^{th} coulombs
B. 14.5 x 10 to the 16^{th} coulombs
C. 14.5 x 10 to the 18^{th} coulombs
D. 29 x 10 to the 18^{th} coulombs
E. None of the above

48. ECE Board Exam November 1996

_____ is the transmitter receiver triggered by interrogator used mainly in secondary surveillance radar and distance measuring equipment.

A. Transponder
B. ILS
C. Interrogator
D. VOR

49. ECE Board Exam November 1996

In electricity, positive electric charge refers to _____.

A. protons
B. neutrons
C. electrons
D. atoms

50. ECE Board Exam November 1996

What is the lagging effect between the magnetizing force applied and the flux density?

A. Hysteresis
B. Permeance
C. Eddy current
D. Reluctance

51. ECE Board Exam November 1996

Find the Thevenins impedance equivalent across R_2 of a linear close circuit having 10 volt supply in series with two resistors (R_1= 50 ohms and R_2= 200 ohms).

A. 400 ohms

B. 40 ohms

C. 4 ohms

D. 4 k-ohms

52. ECE Board Exam November 1996

What is the process of converting multiple analog input signals sequentially to digital output?

A. Time division multiplexing

B. Analog to digital conversion

C. Space division multiplexing

D. Pulse code multiplexing

53. ECE Board Exam November 1996

What is the equivalent of decimal 15 in octal?

A. 15

B. 18

C. 17

D. 16

54. ECE Board Exam November 1996

_____ is the transistor which fabricated as two complementary SCRs in parallel with common gate terminal.

A. Triac

B. Field effect transistor

C. Bilateral SCR

D. Unijunction transistor

55. ECE Board Exam November 1996

How many diodes will you use to have a basic half-wave rectifier?

A. Three

B. Four

C. Two

D. One

56. ECE Board Exam November 1996

Electric charge of neutron is the same as

A. proton
B. electron
C. current
D. atom

57. ECE Board Exam November 1996

The current of an electric circuit is analogous to _____ parameter of a magnetic circuit.

A. flux density
B. reluctivity
C. mmf
D. flux

58. ECE Board Exam November 1996

Find the filter capacitor that will provide 2.5 % ripple filtered voltage having a load of 120 mA, full wave rectified voltage of 36 V dc and 60 Hz supply.

A. 3117 microfarads
B. 3207 microfarads
C. 311.7 microfarads
D. 320.7 microfarads

59. ECE Board Exam November 1996

Which of the following solid state devices work on the phenomenon avalanche breakdown?

A. Triac
B. Unijunction
C. All of the above
D. Light activated SCR

60. ECE Board Exam November 1996

_____ is unipolar semiconductor device which the current is carried by the majority carriers only.

A. Field-effect transistor
B. Point-contact transistor
C. Zener diode
D. Junction transistor

61. ECE Board Exam November 1996

_____ is a gate which has 2 or more low input signals to get low output.

A. AND
B. Inverter
C. OR
D. NAND

62. ECE Board Exam November 1996

The main reason for the variation of amplifier gain with frequency is

A. due to interstage transformer
B. the presence of capacitance both external and internal
C. the logarithmic increases in its output
D. the Miller effect

63. ECE Board Exam November 1996

Component of solar battery which uses light energy to produce electromagnetic force

A. Alkaline cells
B. Polymer cells
C. Lithium cells
D. Selenium cells

64. ECE Board Exam November 1996

What is the term called magnetic field?

A. The force between the plates of a charged capacitor
B. A force set up when current flows through a conductor
C. Current flow through space around a permanent magnet
D. The force that drives current through a resistor

65. ECE Board Exam November 1996

Find the voltage drop developed across D'Arsonval meter movement having an internal resistance of 1 k-ohm and full deflection current of 150 micro amp.

A. 150 kV
B. 150 mV
C. 150 V
D. 150 micro V

66. ECE Board Exam November 1996

Kind of AC-motor, light load high speed or high load low speed

A. Synchronous motor
B. Squirrel cage motor
C. Split phase motor
D. Universal motor

67. ECE Board Exam November 1996

One of the following can program bipolar PROMs.

A. Biasing bipolar transistor
B. Blowing fuse
C. Enfusing input
D. Charging a gate

68. ECE Board Exam November 1996

In order to maintain same secondary output voltage, a power supply which operate from either 120 V or 240 V ac lines must have primary winding:

A. split exactly 1/3 from one end
B. split exactly 1/4 from one end
C. completely no split
D. split exactly 1/2 from one end

69. ECE Board Exam November 1996

What is the counter that follows the binary sequence?

A. Binary counter
B. Simplex counter
C. Shift counter
D. Decimal counter

70. ECE Board Exam November 1996

_____ are non-semiconductor devices still used in digital memories.

A. Gates
B. Flip-flops
C. Relay
D. Magnetic cores

71. ECE Board Exam November 1996

What is the reference cycle time use in radar, when the signal is transmitted and back to receiver?

A. 10.1 microsec
B. 100.0 microsec
C. 12.4 microsec
D. 24.8 microsec

72. ECE Board Exam November 1996

Process in industrial electronics where electrons are emitted from the surface of certain metals when expose to the light is called

A. photonics
B. photosensitive
C. phoovoltaic
D. photoemission

73. ECE Board Exam November 1996

A FET can act as an excellent buffer amplifier because

A. it has a low input impedance and high output impedance
B. it has a very high voltage gain and low noise level
C. it has a high input impedance and low output impedance
D. smaller size, longer life and lower efficiency
E. Eddy Currents

74. ECE Board Exam November 1996

What is the smallest element of a matter?

A. Neutron
B. Proton
C. Atom
D. Electron

75. ECE Board Exam November 1996

Refers to a pulse transmitter-receiver used in radio navigation and secondary surveillance radar to either a reply from transponder is called

A. ILS
B. Interrogator
C. Outer maker
D. Inner maker

76. ECE Board Exam November 1996

A triac behaves like two

A. diodes in series

B. resistors and one diode

C. four-layer diodes in parallel

D. inverse parallel connected SCRs with common gate

77. ECE Board Exam November 1996

_____is called the flux density produced within, due to its own induced magnetism.

A. Electromagnetic field intensity

B. Magnetic field intensity

C. Intensity of magnetization

D. Electric field intensity

78. ECE Board Exam November 1996

The resonant circuit of a tuned-collector transistor oscillator has a resonant frequency of 5 MHz. If the value of capacitance is increased by 50%, calculate the new resonant frequency.

A. 3.33 MHz

B. 11.25 MHz

C. 2.6 MHz

D. 4.08 MHz

79. ECE Board Exam November 1996

The ability of a material to conduct magnetic flux through it refers to

A. permittivity

B. permeability

C. reluctivity

D. conductivity

80. ECE Board Exam November 1996

_____ is one factor that does not affect resistance.

A. Cross sectional area

B. Resistivity

C. Mass

D. Length

81. ECE Board Exam November 1996

Type of power line frequency meter device utilizing a principle of balancing an indicator needle at center at a scale using magnetic fields (resistive and inductive) opposing each other

A. Magnetic type

B. Resonant type

C. Resistive type

D. Electrodynamic type

82. ECE Board Exam November 1996

A measuring device or a meter made, so the pointer rests at the center of its scale zero current.

A. Linear meter

B. Galvanometer

C. Digital meter

D. Non-linear meter

83. ECE Board Exam November 1996

Part of the oscilloscope which produces bright spot through collection of electrons

A. Focus control

B. Heater cathode

C. Aquadag coating

D. Grid

84. ECE Board Exam November 1996

For a processor that uses 4-bit words, the largest number that can be represented using double precision is

A. 255

B. 15 (decimal)

C. 65,535

D. 127

85. ECE Board Exam November 1996

_____ refers to the class of logic circuit containing flip-flops.

A. Combinational

B. Sequential

C. Linear

D. Feedback

86. ECE Board Exam November 1996

How does junction diodes rated?

A. Maximum reverse current and PIV

B. Maximum forward current and PIV

C. Maximum forward current and capacitance

D. Maximum reverse current and capacitance

87. ECE Board Exam November 1996

What logic circuit is analogous to a single pole mechanical selector switch?

A. Decoder

B. Encoder

C. Multiplexer

D. Exclusive OR

88. ECE Board Exam November 1996

What do you call an electronic measuring equipment used in navigation which provides runway direction, distance and height guidance to permit blind landing?

A. DME

B. ODR

C. TACAN

D. ILS

89. ECE Board Exam November 1996

An encoder is an MSI (medium-scale-integration) circuit that

A. provides an output code that corresponds to which a set of input line is true

B. provides a storage of a certain number of binary bits

C. selects a given output based on binary input code

D. provides for delivering one of two or more inputs to an output

90. ECE Board Exam November 1996

In a high-fidelity system, the pair of filter which separate audio frequency band signals into two separate groups, one of which is fed to the tweeter and the other to the woofer is called

A. matching transformer

B. crossover network

C. equalizer

D. bridge network

91. ECE Board Exam November 1996

How long in nautical miles does the radar travel to and from at 12.4 microseconds?

A. 2 miles

B. 1 miles

C. 3 miles

D. 4 miles

92. ECE Board Exam November 1996

The _____ the Q of a circuit, the narrower is its bandwidth.

A. lower

B. higher

C. broader

D. selective

93. ECE Board Exam November 1996

Data selector is also called

A. encoder

B. decoder

C. multiplexer

D. demultiplexer

94. ECE Board Exam November 1996

The code 1011 in BCD is

A. 24

B. letter A

C. 11

D. invalid

95. ECE Board Exam November 1996

What is the equivalent of hexadecimal 1A in decimal?

A. 27

B. 26

C. 42

D. 40

96. ECE Board Exam November 1996

_____ is the voltage applied in direct current circuit having a power of 36 watts and total resistance of 4 ohms.

A. 6V
B. 9V
C. 24V
D. 12V

97. ECE Board Exam November 1996

A two-pole, one phase motor has ____ field poles.

A. 8
B. 2
C. 6
D. 4

98. ECE Board Exam November 1996

_____ is a device used to store electrical energy in an electrostatic field?

A. Inductor
B. Battery
C. Transformer
D. Capacitor

99. ECE Board Exam November 1996

A memory circuit that has address inputs has how many storage locations?

A. 1024
B. 256
C. 512
D. not determined by sets of input

100. ECE Board Exam November 1996

High sensitive DC voltmeter provides accurate reading when measuring _____ circuits.

A. zero resistance
B. low resistance
C. at any resistance
D. high resistance

TEST YOURSELF – EXAM 5

1. How much current does an electrostatic voltmeter require through it to operate?
   A. Zero current
   B. Below one ampere
   C. One ampere
   D. Very high current

2. Determine the equivalent work of 166 watt – second
   A. 166 Joules
   B. 100 Joules
   C. 16.6 Joules
   D. 10 Joules

3. Characteristics of the current flow in a series R-L-C circuit at resonance
   A. it is dc
   B. it is at a minimum
   C. it is zero
   D. it is at a maximum

4. What is the value of a resistor with colours from left. Orange, blue, gold and silver?
   A. 34 ohms +/- 10%
   B. 3.6ohms +/- 10%
   C. 3.4ohms +/- 10%
   D. 36 ohms +/- 10%

5. Which of the following characterizes inductance?
   A. tends to oppose dc
   B. tends to oppose changes in voltage
   C. tends to oppose changes in current
   D. oppose all frequencies equally

6. One of the following does not refer to the internal component of a klystron oscillator
   A. a collector plate
   B. a pair of plates
   C. a pair of catcher grids
   D. a pair of buncher grids

7. How can electrical current be inducted with a coil and a magnet?
   A. holding the coil and the magnet perfectly stationary
   B. moving either the magnet or the coil
   C. placing the coil parallel to the magnetic field
   D. placing the coil at right angles with the magnetic field

8. Which of the following integrated circuit contains the most gates?
   A. LSI
   B. MSI
   C. VLSI
   D. SSI

9. Which of the following is not primary type cell?
   A. Zinc chloride
   B. Silver zinc
   C. Silver oxide
   D. Carbon zinc

10. A Transformer consist of the following
   A. an inductance and resistance
   B. a parallel resonant circuit
   C. a capacitor and inductor
   D. two coils wound on a common core

11. What type of tube is used to display a signal on an oscilloscope?
   A. Filament tube
   B. Cathode ray tube
   C. Tetrode
   D. Pentode

12. Meaning of the term transition region with regard to a transistor.
   A. the point where wire leads are connected to the P or N type material
   B. an area of low charge density around the P-N junction
   C. The area of maximum P-type charge
   D. The area of maximum N-type charge

13. What is the resonant frequency of a circuit when L of 25 micro henrys and C of 10 picofarads are in parallel?
    A. 63.7 MHz
    B. 10.1 MHz
    C. 63.7 KHz
    D. 10.1 KHz

14. When should a fuse be replaced with a higher rated unit?
    A. Never
    B. When the original value is not available
    C. If it blows
    D. When the fuse of the original value is small in size

15. What is the resonant frequency of a circuit when L of 3 micro henrys and C of 40 picofarads are in series?
    A. 1.33 MHz
    B. 14.5 kHz
    C. 1.33 kHz
    D. 14.5 MHz

16. Find the two stable operating conditions of SCR
    A. conducting and non-conducting
    B. oscillating and quiescent
    C. NPN conduction and PNP Conduction
    D. forward conducting and reverse conducting

17. A filter having a single continuous transmission band with neither the upper nor the lower cut off frequencies being zero to infinite is called _____
    A. Band pass filter
    B. Longitudinal suppression filter
    C. High pass filter
    D. Band rejection filter

18. What physical effect will a two parallel wires and with the same direction of current flowing over them?
    A. maintain position
    B. repel each other
    C. no physical effect
    D. attract each other

19. Determine which item is not a storage device
    A. Card readers
    B. CD-ROM
    C. Diskettes
    D. Magnetic tape

20. Find the frequency in kilocycles per second in the armature of a 10 pole, 1,200 rpm generator
    A. 100
    B. 1000
    C. 10
    D. 0.100

21. Ohm's law refers to _____
    A. A current is directly proportional to both voltage and resistance
    B. power is directly proportional to the resistance and inversely as the current squared
    C. power is directly proportional to both voltage squared and the resistance
    D. current varies directly as the voltage and inversely as the resistance

22. A transistor acts as _____ when saturated
    A. open circuit
    B. very low resistance
    C. very high resistance
    D. variable resistance

23. Another very useful cell similar to solar cells however the junction is bombarded by beta particles from radioactive materials
    A. Alkaline cells
    B. Nucleus cells
    C. Selenium cells
    D. Lithium cells

24. What is an element in electronics which serves as a protection against overload?
    A. Fuse
    B. Resistor
    C. Mica
    D. Semiconductor

25. If two 0.25 micro farad capacitors are connected in series, what will be the total effective capacitance?
A. 0.125 microfarad
B. 0.0624 microfarad
C. 2.5 microfarad
D. 0.50microfarad

26. In semiconductor technology the characteristics of a transistor in a cut off refers to a condition when
A. the transistor is at its operating point
B. no current flow from emitter to collector
C. there is no base current
D. maximum current flows from emitter to collector

27. Find the current that flows through the filament of a 400 watts flat iorn connected to a 220v power line
A. 50ma
B. 5a
C. 5ma
D. 500ma

28. An electronic device draws 300watts from its 24 volt power source. Find the effective resistance
A. 1.92ohms
B. 19.2ohms
C. 1.25ohms
D. 12.50ohms

29. _____ is not a type of flip flop
A. RS
B. Latch
C. D
D. Register

30. Which are the principal characteristics of a tunnel diode?
A. a very high PIV
B. a high forward current rating
C. a high forward resistance
D. a negative resistance region

31. What is the flux density in gauss (G) having a flux of 12,000 Mx through a perpendicular area of 6m squared?
    A. 2000G
    B. 72000G
    C. 72G
    D. 200G

32. What is the distinguishing feature of a class C amplifier?
    A. output is present for less than 180 degrees of the input signal cycle
    B. output is present for the entire signal cycle
    C. output is present for exactly 180
    D. output is present for more than 180 degrees but less than 360 degrees of the input signal

33. How many nodes are needed to completely analyze a circuit according to Kirchhoff's current law?
    A. two
    B. all nodes in the circuit
    C. one less than the total number of nodes in the circuit
    D. one

34. What is the process of designing more than 100 gates on a single chip?
    A. LSI
    B. SSI
    C. MSI
    D. VLSI

35. which of the following cannot be used to make a magnet
    A. Carbon
    B. Cobalt
    C. Iron
    D. Lodestone

36. The two general types of heating methods in industrial electronics are
    A. frequency and induction heating
    B. induction and dielectric heating
    C. coil and dielectric heating
    D. coil and frequency heating

37. _____ signal represent the true signal in the truth table
    A. Two
    B. One
    C. Zero
    D. Four

38. The arrow in the schematic symbol for a diode points in which way?
    A. towards the cathode
    B. in the direction of the current flow
    C. towards the anode
    D. towards the magnetic north

39. In applying the right hand rule by holding a conductor with your right hand so that the thumb represents the current, the encircling fingers around the conductor represent _____
    A. Electric lines of force
    B. Electromagnetic field intensity
    C. Magnetic lines of force
    D. Electronic field of force

40. Which of the following describes the action of a capacitor
    A. converts ac into dc
    B. stores electrical energy
    C. opposes changes in the current flow
    D. creates a dc resistance

41. What do you call the phenomenon whereby substance attracts particle of iron
    A. Permeability
    B. Magnetism
    C. Naturalism
    D. Electromagnetism

42. Low sensitive dc voltmeter provides accurate reading when measuring _____ circuits
    A. At any resistance
    B. Low resistance
    C. Zero resistance
    D. High resistance

43. What should be the resolution of a digital voltmeter having a three digit 0-3V?
    A. 15V
    B. 3mv
    C. ½ micro volt
    D. 30mv

44. The impedance in the study of electronics is represented by resistance and _____
    A. Inductance and capacitance
    B. Inductance
    C. Reactance
    D. Capacitance

45. One of the following is characteristics of a direct current dc supply voltage
    A. its output reverses polarity
    B. its value cannot be stepped up or down by transformer
    C. easier to amplify
    D. fluctuates

46. What kind of voltage is applied to the horizontal deflection plates of the oscilloscope
    A. Trigger voltage
    B. Signal voltage
    C. Sweep voltage
    D. Supply voltage

47. Loop currents should be assumed to flow in which direction?
    A. Straight
    B. Either c or d arbitrarily selected
    C. Counter clockwise
    D. Clockwise

48. _____ is a parallel LC circuit
    A. Parallel resisting circuit
    B. Static circuit
    C. Tank circuit
    D. Hartley circuit

49. Find the half power bandwidth of a parallel resonant circuit which has a resonant frequency of 3.6 MHz and a Q of 218.
    A. 606khz
    B. 58.7khz
    C. 16.5khz
    D. 47.3khz

50. Which type of meter requires its own power source
    A. an voltmeter
    B. an ammeter
    C. an ohmmeter
    D. a wattmeter

51. In order to have the best efficiency and stability, where on the load line should a solid state power amplifier to be operated?
    A. just below the saturation point
    B. at 1.14 times the saturation point
    C. just above the saturation point
    D. at the saturation point

52. Group of magnetically aligned atoms
    A. Lattice
    B. Crystal
    C. Domain
    D. Range

53. How many nickel-cadmium cells are needed in series for a 10v battery?
    A. 8
    B. 12
    C. 5
    D. 10

54. Five picofarads is equivalent to _____
    A. 5 x 10 to the -12^{th}
    B. 50 x 10 to the -12^{th}
    C. 5 x 10 to the -10^{th}
    D. 500 x 10 to the -10^{th}

55. In order to obtain the best temperature stability, what should be the operating voltage of the reference diode in a linear voltage regulator?

E. approximately 6.0 volts

A. approximately 3.0 volts
B. approximately 2.0 volts
C. approximately 10.0 volts

56. What determines the resonant frequency of a crystal?

A. external components
B. the temperature of the crystal
C. the size and thickness of the crystal material
D. the hermetic seal

57. What is the most important specification for semiconductor diode?

A. Forward resistance
B. Reverse resistance
C. Peak inverse voltage
D. Current capacity

58. the term cut-off for a transistor refers to ____

A. the transistor is at its operating point
B. no current flow from the emitter to collector
C. maximum current flow from emitter to collector
D. there is no base point

59. What technique is used to increase gain in linear IC's

A. resistor ratio design
B. use of transistor with narrow bases
C. use of high resistance transistor
D. use of transistor with wide bases

60. One advantage of hydraulic actuator in industrial robots include _____

A. great force capability handling heavy loads
B. lower operating cost than the other type
C. low initial cost than that the other types
D. clean no oil leaks

61. When resistors are connected in series what happens?
    A. the effective resistance is decreased
    B. nothing
    C. the tolerance is decreased
    D. the effective resistance is increased

62. _____ is used to store electrical energy in an electro static field?
    A. a transformer
    B. a battery
    C. a capacitor
    D. an inductor

63. When comparing rms voltage and average voltage, which of the following statement is true, assuming sine waves?
    A. either the rms voltage or the average voltage might be larger
    B. the rms voltage is always greater than the average voltage
    C. there will always be a very large difference between the rms voltage and the average voltage
    D. the average voltage is always greater than the rms voltage

64. Which are the three terminals of a TRIAC
    A. gate, anode 1 and anode 2
    B. gate, source and sink
    C. base, emitter and collector
    D. emitter, base 1 and base 2

65. In semiconductor application, which of the following statement is not true?
    A. An ohmmeter test across the base collector terminal of a transistor should show low resistance in one polarity and high resistance in the opposite polarity
    B. A triac is a bi-directional
    C. An ohmmeter test across a diode show low resistance in one polarity and high resistance in the opposite polarity
    D. An ohmmeter test across the base collector of a transistor should show low resistance for both polarity

66. What do you call an amplifier which has an output current flowing during the whole input current cycle?
    A. Class AB amplifier
    B. Class B amplifier
    C. Class A amplifier
    D. Class C amplifier

67. PNP transistor has the following arrangement
    A. P type base, N type emitter, P type collector
    B. P type emitter, N type base, P type collector
    C. P type collector, N type base, P type emitter
    D. P type emitter, N type collector, P type base

68. How many Maxwell's is 4000 lines of magnetic force?
    A. 200
    B. 4000
    C. 2000
    D. 400

69. Solve for the base current if collector current is 600ma and the current gain is 20
    A. 30mA
    B. 3mA
    C. 12mA
    D. 1.2mA

70. Meters with moving coil are normally used for measuring _____
    A. only dc
    B. both ac and dc
    C. % value of dc
    D. only ac

71. What is the law whereby the force of attraction or repulsion between poles is inversely proportional to the square of the distance between them?
    A. Newton's first law
    B. Newton's second law
    C. Norton's law
    D. Coulomb's law

72. _____ includes two of the actuator type used in industrial robots
    A. Pneumatic and jointed arm
    B. Hydraulic and pneumatic
    C. Electric and spherical
    D. Hydraulic and cylindrical

73. find the total force producing magnetic flux of a circuit having a 40v applied across a relay coil with 80 turns on 2 ohms resistance
    A. 16,000 At
    B. 160.0 At
    C. 16.00 At
    D. 1600 At

74. What do you call a logic gate that has an output of 1 only if a single output is 1?
    A. XOR
    B. NOT
    C. XNOR
    D. AND

75. What is the simplest type of switch?
    A. Relay
    B. Toggle switch
    C. Knife switch
    D. AND

76. Single device that converts chemical energy into electrical energy is called _____
    A. Generator
    B. Battery
    C. Solar
    D. Cell

77. How long will a battery needed to operate a 240 watts equipment, whose capacity is 100 ah and 24 volts rating?
    A. 5hrs
    B. 10hrs
    C. 1hr
    D. .10 hr

78. How many electrodes does a pentode have?
    A. 4
    B. 2
    C. 3
    D. 5
79. What do you call the quantity of magnetism retained by a magnetic material after the withdrawal of a magnetizing force?
    A. Left over magnetism
    B. Coercivity
    C. Hysteresis
    D. Residual magnetism

80. Low sensitive DC voltmeter provides inaccurate result when measuring _____ circuits
    A. high resistance
    B. low resistance
    C. at any resistance
    D. zero resistance

81. _____ is the air space between poles of magnet
    A. Air gap
    B. Free zone
    C. Free space
    D. Vacuum

82. What happens in the resistance of a conductor wire when its temperature is lowered?
    A. decreased
    B. steady
    C. zero
    D. increased

83. For the greatest accuracy, what should the input impedance of a VOM be?
    A. 1000ohms/v
    B. 50,000ohms/v
    C. as large as possible
    D. as low as possible

84. Determine the percentage error of reading of an ammeter deu to ammeter insertion ammeter parameters include 70 ohms internal resitance and a load resistor of 1.4k ohms
    A. 7.5
    B. 4.76
    C. 3.76
    D. 2.9

85. Refers to digital interface in which data character are individually synchronized and may be sent at a time
    A. Half duplex
    B. Asynchronous
    C. Synchronous
    D. Simplex

86. A transistor in which N type and P type materials are used is called _____
    A. Unijunction
    B. TTL
    C. Bipolar
    D. FET

87. What is the higher voltage level in digital gates and flip-flop circuits?
    A. Yes or one
    B. One or zero
    C. Zero or no
    D. Yes or no

88. Refers to a force of field that exist between ions where they either repel or attract each other
    A. Resisting field
    B. Potential field
    C. Dielectric
    D. Electromotive

89. The basic difference between a feedback in biasing an amplifier circuit is
    A. biasing circuits may employ positive feedback while amplifier circuits use negative feedback
    B. biasing circuits have high input impedance while amplifier circuits have low output impedance
    C. in biasing circuits DC negative feedback is provided while amplifiers employ AC negative feedback
    D. in biasing circuits AC negative feedback is provided while amplifier use DC negative feedback

90. What happens if the grid is made more positive than the saturation point?
    A. no other amplification takes place
    B. the tube stops conducting
    C. the tube elements might be damaged
    D. electrons are drawn to the grid and not reach the plate

91. What is another term for magnetic lines of force?
    A. Flux
    B. Magnetic Force
    C. Armature
    D. Lodestone

92. The speed of a dc shunt motor can be slowed down under one of the condition below
    A. Increased armature resistance
    B. Decreased field voltage
    C. Increased field voltage
    D. Increased armature voltage

93. Which of the following is not a basic part of an atom
    A. Electron
    B. Proton
    C. Neutron
    D. Coulomb

94. Find the normal operating voltage and current of LED
    A. 60v and 20mA
    B. 5v and 50mA
    C. 0.7v and 60mA
    D. 1.7v and 20mA

95. With the same voltage applied which of the following allows more current?
    A. 25ohms
    B. 250ohms
    C. 0.25ohms
    D. 2.5ohms

96. Refers to dry storage cell
    A. Carbon-zinc cell
    B. Edison cell
    C. Mercury cell
    D. Nickel-cadmium cell

97. If 12v are applied to a circuit that consumes 78w, what is the current flow through the circuit?
    A. 6.5A
    B. 936A
    C. 0.15A
    D. 9.36A

98. Which of the following does not refer to electric energy?
    A. Joule
    B. Watt second
    C. Volt coulomb
    D. Volt ampere

99. What is the other term for the secondary cells considering its capability to accept recharging
    A. Reaction cell
    B. Primary cell
    C. Storage cell
    D. Dry cell

100. Ion is _____
    A. an atom with unbalanced charges
    B. free electron
    C. proton
    D. nucleus without protons

TEST YOURSELF –EXAM 6

1. According to the classical Bohr model, the _____ is viewed as having a planetary-type structure.
   A. atom
   B. proton
   C. electron
   D. neutron

2. An n-type semi-conductive material is created by adding impurity atoms that have _____ valence electrons.
   A. 2
   B. 4
   C. 3
   D. 5

3. What composes an atom?
   A. One nucleus and only one electron
   B. Protons, electrons, and nucleus
   C. One nucleus and only one proton
   D. Electrons and protons only

4. What is nucleus of an atom?
   A. It is made up of protons and neutrons.
   B. Only protons are there.
   C. Protons and electrons are within the nucleus.
   D. It is composed only of neutrons.

5. What is the atomic number of silicon?
   A. 29
   B. 34
   C. 14
   D. 15

6. What is the atomic number of germanium?
   A. 29
   B. 34
   C. 32
   D. 15

7. What is the letter designation of the valence shell in a silicon atom?
   A. M
   B. N
   C. O
   D. L

8. Where are valence electrons found?
   A. In the closest orbit to the nucleus
   B. In various orbits around the nucleus
   C. In the most distant orbit from the nucleus
   D. In the nucleus of an atom

9. How is positive ion formed?
   A. When a valence electron breaks away from the atom
   B. When there are more holes than electrons in the outer orbit
   C. When the two atoms bond together
   D. When an atom gains an extra valence electron

10. How is negative ion formed?
    A. When a valence electron breaks away from the atom
    B. When there are more holes than electrons in the outer orbit
    C. When the two atoms bond together
    D. When an atom gains an extra valence electron

11. What is the most widely used semiconductor material in electronic devices?
    A. Germanium
    B. Silicon
    C. Gallium
    D. Arsenic

12. What energy band in which free electrons exists?
    A. Valence band
    B. Conduction band
    C. First band
    D. Second band

13. How are electron-hole pairs produced?
    A. By recombination
    B. By thermal energy
    C. By ionization
    D. By doping

14. When an electron falls into a hole this is
    A. recombination
    B. ionization
    C. avalanche breakdown
    D. doping

15. What hold together the atoms in a semiconductor crystal?
    A. By covalent bonding
    B. By forces of attraction
    C. By the interaction of valence electrons
    D. All of the choices

16. In a silicon crystal, each atom has
    A. four conduction electrons
    B. eight valence electrons, four of its own and four shared
    C. four valence electrons
    D. no valence electrons

17. What produces the current in a semiconductor?
    A. The electrons only.
    B. The holes only.
    C. Negative ions only.
    D. By both electrons and holes.

18. In an intrinsic semiconductor,
    A. the free electrons are thermally produced.
    B. there are as many free electrons as there are holes.
    C. there are no free electrons.
    D. Both A and B above.

19. What is the difference between semiconductor and an insulator?
    A. The atomic structure.
    B. The number of free electrons.
    C. A wider energy gap between the valence band and the conduction band.
    D. All of the choices.

20. What is the process of adding impurity to an intrinsic semiconductor?
    A. Doping
    B. Recombination
    C. Ionization
    D. Annihilation

21. What impurity is added to silicon to create a p-type semiconductor?
    A. Trivalent
    B. Pentavalent
    C. Intrinsic
    D. Extrinsic

22. What is the purpose of a pentavalent impurity?
    A. To reduce the conductivity of silicon
    B. To increase the number of holes
    C. To create minority carriers
    D. To increase number of free electrons

23. What are the majority carriers in an n-type semiconductor?
    A. Valence electrons
    B. Conduction electrons
    C. Protons
    D. Holes

24. What are holes in n-type semiconductor?
    A. Majority carriers that are thermally produced.
    B. Minority carriers that are thermally produced.
    C. Majority carriers that are produced by doping.
    D. Minority carriers that are produced by doping.

25. How is pn junction formed?
A. By the boundary of p-type and n-type material
B. By ionization
C. By collision of proton and neutron in the nucleus
D. By the recombination process

26. What creates the depletion region?
A. Ionization
B. Diffusion
C. Recombination
D. All of the choices

27. What are in the depletion region?
A. Positive and negative ions
B. Minority carriers
C. Majority carriers
D. All of the choices

28. What does the term bias mean?
A. The amount of current across the junction.
B. The ratio of majority to minority carriers.
C. The dc voltage applied to control the operation of the devices.
D. All of the choice

29. How to forward bias a pn junction diode?
A. By applying an external voltage that is positive to the anode and negative to the cathode
B. By applying an external voltage that is positive at the p-region and negative at the n-region
C. By applying an external voltage that is negative at the anode and positive to the cathode.
D. Either A and B above.

30. What happens when the pn junction is forward-biased?
A. The current is produced by both holes and electrons
B. Hole current is the only current
C. Electron current is only the current.
D. Majority carriers produced the only current.

31. What causes a very small current in reversed-bias condition?
    A. Majority carriers
    B. Minority carriers
    C. Forward current
    D. Reverse current

32. What is typically the forward-bias voltage for a silicon diode?
    A. Greater than 0.7 V
    B. Lesser than 0.7 V
    C. Greater than 0.3 V.
    D. Lesser than 0.3 V

33. When does a diode conduct current?
    A. When applied with a voltage
    B. When forward-biased
    C. When reverse-biased
    D. When power is on

34. What voltage is read by the voltmeter when connected across a forward-biased diode?
    A. The diode barrier potential
    B. The bias battery voltage
    C. The total circuit voltage
    D. 0 V

35. If the positive lead of an ohmmeter is connected to the anode of a diode and the negative lead to the cathode then the diode is
    A. reversed-biased
    B. opened
    C. shorted
    D. forward-biased

36. What is the ideal dc output of a capacitor filter?
    A. Equal to the rms value of the rectified voltage
    B. Equal to the average value of the rectified voltage
    C. Equal to the peak value of the rectified voltage
    D. Equal to the peak-to-peak value of the input voltage

37. If the load resistance of a capacitor-filtered full-wave rectifier is reduced, the ripple voltage
A. increases
B. decreases
C. has a different frequency
D. is not affected

38. What is the output of full-wave bridge-type rectifier when one of the diodes opens?
A. 0 V
B. A half-wave rectified voltage
C. A 120-Hz voltage
D. One fourth the amplitude of the input voltage

39. A virtual ground is a ground for
A. voltage but not for current
B. current but not for voltage
C. both current and voltage
D. neither current nor voltage

40. Normally in a zener voltage regulator the cathode is
A. more negative than the anode
B. more positive than the anode
C. at +0.7 V
D. grounded

41. What determines line regulation?
A. The load resistance
B. The load current
C. The changes in load resistance and output voltage
D. The changes in the output voltage and input voltage

42. What determines load regulation?
A. The changes in load current and input voltage
B. The changes in load current and output voltage
C. The changes in load resistance and input voltage
D. The changes in zener current and load current

43. What is a no-load condition?
    A. The load has infinite resistance.
    B. The load has zero resistance.
    C. The output terminals are open.
    D. Both A and C.

44. What is the maximum efficiency of a full-wave rectifier?
    A. 40.6%
    B. 20.3%
    C. 90%
    D. 81.2%

45. The dc output of the bridge type rectifier is nearly _____ than that of center tap circuit for a given transformer.
    A. thrice
    B. twice
    C. four times
    D. three times

46. In a center-tap circuit, _____ transformer secondary voltage is utilized.
    A. one-half
    B. full
    C. one-third
    D. one-eight

47. What is the maximum efficiency of a half-wave rectifier?
    A. 20.3%
    B. 80.6%
    C. 50%
    D. 40.6%

48. What rectifier circuit in which a transformer is essential?
    A. Bridge type
    B. Half-wave
    C. Center-tap
    D. Full-wave

49. In a full-wave rectifier, if ac supply is 50 Hz, then what is the ac ripple in the output?
    A. 50 Hz
    B. 100 Hz
    C. 25 Hz
    D. 200 Hz

50. How many diodes are used by a bridge type rectifier?
    A. Two
    B. Four
    C. Three
    D. Five

51. For the same dc output, center-tap circuit should have _____ PIV as compare to bridge type circuit.
    A. same
    B. smaller
    C. higher
    D. not comparable

52. What rectifier is used for high voltage applications?
    A. Center-tap
    B. Bridge type
    C. Half-wave
    D. Full-wave

53. What filter is generally employed in the power supply of a radio receiver?
    A. Choke filter
    B. Capacitor input
    C. Resistance
    D. Inductor input

54. What capacitor is generally used in filter circuits?
    A. Mica
    B. Paper
    C. Air
    D. Electrolytic

55. In a half-wave rectifier, if ac supply is 50 Hz, then what is the ac ripple?
    A. 100 Hz
    B. 50 Hz
    C. 25 Hz
    D. 12.5 Hz

56. The dc output of a bridge type circuit is _____ that equivalent center-tap circuit.
    A. the same as
    B. more than
    C. less than
    D. smaller

57. The values of L and C in filter circuits for a half-wave rectifier are _____ as compared to that of full-wave rectifier.
    A. same
    B. more
    C. less
    D. not related

58. What is provided by transformer coupling?
    A. Impedance matching
    B. Good frequency response
    C. Step-up in voltage
    D. Simplicity and economy

59. Germanium photodiodes have dark currents typically of the order of _____mA.
    A. 10
    B. 15
    C. 20
    D. 25

60. How many filaments are there for a mercury vapor discharge tube for domestic lighting?
    A. 2
    B. 3
    C. 4
    D. 5

61. What is the typical value of slew rate of an operational amplifier?
A. 1 V/μs
B. 2 V/μs
C. 3 V/μs
D. 4 V/μs

62. What is the typical frequency range about the center frequency of a tunable magnetron?
A. ± 1%
B. ± 3%
C. ± 4%
D. ± 5%

63. The largest computers commonly use a word size of how many bits?
A. 32
B. 64
C. 128
D. 256

64. What is the maximum number of degrees of freedom of any solid object?
A. 3
B. 4
C. 5
D. 6

65. A microprocessor can communicate with other devices in the system of _____ buses.
A. 2
B. 3
C. 4
D. 5

66. The repeatability of a servo-controlled robot is within _____ mm rather than a fraction of a mm.
A. 1
B. 2
C. 3
D. 4

67. The Kuka spot welding robot has how any degrees of freedom?
    A. 2
    B. 3
    C. 4
    D. 6

68. A negative resistance region evidenced in the Ep-Ip characteristic of a tetrode when dc screen voltage exceeds dc plate voltage. The negative slope of the plate current curve is due to the screens attractive secondary electrons from the plate when screen voltage exceeds plate voltage and the attendant reduction of plate current during the interval. What effect is mentioned above?
    A. Tetrode effect
    B. Magnetron effect
    C. Compton effect
    D. Dynatron effect

69. The reception and reproduction of radio signals by ordinary pieces of metal in contact with each other, such as sections of stovepipes. This occurs when rusty bolts, faulty welds, or mechanically loose connections within strong radiated fields near transmitter and produce intermodulation interference. The mechanically poor connections serve as nonlinear diodes. What effect is mentioned above?
    A. Singing-stovepipe effect
    B. Dynatron effect
    C. Compton effect
    D. Malter effect

70. The elastic scattering of photons by electron. Since the total energy and total momentum are conserved in the collisions, the wavelength of the scattered radiation is changed by an amount that depends on the angle of scattering, and part of the photon energy is transferred to electrons. This effect is called
    A. Compton effect
    B. Hall effect
    C. Malter effect
    D. Thomson effect

71. The generation of acoustic waves, consisting of alternate regions of compression and refraction one half-wavelength apart, by a piezoelectric crystal vibrating in a longitudinal mode in a liquid. When a parallel beam of light sent through the liquid in a tank having plate-glass walls, the acoustic waves act as a diffraction grating that can be used to determine the velocity of sound in the liquid. This effect is called
    A. Damon effect
    B. Debye-Sears effect
    C. Thomson effect
    D. Malter effect

72. When light falls on a light surface of an intermetallic semiconductor located in a magnetic field that is parallel to the surface, excess hole electron pairs are created. Those carriers diffuse in the direction of the light but are deflected by the magnetic field to give a current flow through the semiconductor that is at right angles to both the light rays and magnetic field. This is known as the
    A. Photoelectromagnetic effect
    B. Conductive effect
    C. Photo effect
    D. Light effect

73. What determines the identity of an element?
    A. The number of protons in the nucleus
    B. The number of electrons in the orbit
    C. The number of neutrons in the nucleus
    D. The atomic mass

74. Who coined the term hypertext?
    A. Ted Nelson
    B. Tim Berners-Lee
    C. Larry Roberts
    D. Vannevar Bush

75. Who is known as the Father of the ARPANET?
    A. Ted Nelson
    B. Tim Berners-Lee
    C. Larry Roberts
    D. Vannevar Bush

76. Who coined the term nanotechnology?
A. Norio Taniguchi
B. Aibo Nintendo
C. Yakura Tamaguchi
D. Sato Mikado

77. What do you call waves of electrons traveling along the surface of metals?
A. Plasmons
B. Isotopes
C. Nucleons
D. Nanomons

78. Who invented Ethernet?
A. Bob Metcalfe
B. Douglas Engelbart
C. Tim Berners-Lee
D. Larry Roberts

79. Who is the inventor of the mouse?
A. Bob Metcalfe
B. Douglas Engelbart
C. Tim Berners-Lee
D. Larry Roberts

80. Who developed the internet browser called Mosaic?
A. Marc Andreesen
B. Paul Baran
C. Larry Roberts
D. Bob Metcalfe

81. Who created the World Wide Web?
A. Bob Metcalfe
B. Douglas Engelbart
C. Tim Berners-Lee
D. Larry Roberts

82. Who wrote the Transmission Control Protocol (TCP) for internet?
    A. Vinton Cerf
    B. Bob Khan
    C. Tim Berners-Lee
    D. Both A and B

83. Who wrote the Hypertext Transfer Protocol (HTTP), the language computer could use to communicate hypertext documents over the internet?
    A. Vinton Cerf
    B. Bob Khan
    C. Tim Berners-Lee
    D. Larry Roberts

84. What effect refers to a leakage current that flow over a surface path between the collector and emitter in some types of transistors?
    A. Channel effect
    B. Collector follower effect
    C. Leakage effect
    D. Emitter effect

85. An effect about the change that the susceptibility of a ferrite undergoes under the influence of high RF powder.
    A. Change effect
    B. Damon effect
    C. Dead-end effect
    D. Barnett effect

86. An outward-curving distortion of lines of force near the edges of two parallel metal plates that form a capacitor.
    A. Change effect
    B. Edge effect
    C. Dead-end effect
    D. Skin effect

87. The extension of the electrostatic field of an air capacitor outside the space between its plates.
    A. Fringe effect
    B. Edge effect
    C. Extension effect
    D. Flywheel effect

88. The sudden, large increase in current that occurs when a particular value of reverse voltage is reached, and which is due to ionization by the high intensity electric field in the depletion region in reverse-biased pn junction.
A. Zener effect
B. Avalanche effect
C. Radiation effect
D. Burst effect

89. The liberation or absorption of heat when an electric current flows from a warmer to a cooler part of a conductor.
A. Zener effect
B. Skin effect
C. Surface effect
D. Thomson effect

90. The piercing of a barrier in a semiconductor by a particle that does not have sufficient energy to go over the barrier.
A. Channel effect
B. Damon effect
C. Tunnel effect
D. Barrier effect

91. The development of a voltage across the junction of two dissimilar materials.
A. Photovoltaic effect
B. Hall effect
C. Piezoelectric effect
D. Flywheel effect

92. The increase in the effective grid-cathode capacitance of a vacuum tube due to the charge induced electrostatically on the grid by the anode through the grid-anode capacitance.
A. Hall effect
B. Barnett effect
C. Damon effect
D. Miller effect

93. The development of a voltage between the two edges of a current-carrying metal strip whose faces are perpendicular to a magnetic field.
A. Hall effect
B. Barnett effect
C. Miller effect
D. Damon effect

94. A magnetic field when applied to a right angles to the direction of a temperature gradient in a conductor, a temperature difference is produced at right angles both to the direction of temperature gradient and the direction of the magnetic field.
A. Hallwachs effect
B. Island effect
C. Isotope effect
D. Leduc effect

95. The ability of a resonant circuit to maintain oscillation at an essentially constant frequency when fed with short pulses of energy at constant frequency and phase.
A. Flywheel effect
B. Leduc effect
C. Hall effect
D. Thomson

96. The development of a DC voltage between two regions of a photoconductive semiconductor when one of the regions is illuminated by diffusion of an optically generated hole and electron pairs away from the illuminated region.
A. Destriau effect
B. Isotope effect
C. Dember effect
D. Hawks effect

97. Phenomenon of a current flowing between two unequal illuminated electrodes of a certain type when they are immersed in an electrolyte.
A. Bequerel effect
B. Destriau effect
C. Dember effect
D. Hawks effect

98. The restriction of emission from the cathode of an electron tube to a certain small areas of the cathode when the grid voltage is lower than a certain value.
A. Island effect
B. Isotope effect
C. Damon effect
D. Hawks effect

99. The tendency for layer of semiconductor having a high secondary emission ratio to become positively charged when bombarded by electrons. This occurs when a thin insulator separates the semiconductor from the metal plates. The insulator must be very thin on the order of 10^-7 meters. This results in a potential difference of up to about 100 volts.
A. Mateucci effect
B. Malter effect
C. Destriau effect
D. Hall effect

100. The magnetic force between adjacent current-carrying conductors is referred to as
A. motor effect
B. edge effect
C. proximity effect
D. generator effect

TEST YOURSELF – EXAM 7

1. What is anything that has weight had occupied space which may be a solid, liquid or gas?
   A. Alloy
   B. Matter
   C. Amalgam
   D. Compound

2. What is the capacitive reactance of a 33 microfarad capacitor at 6500 Hz?
   A. 0.74 ohms
   B. 7.4 ohms
   C. 96 ohms
   D. 1122 ohms

3. Which of the following materials refers to as a recipient of impurity element?
   A. Phosphorous
   B. Antimony
   C. Arsenic
   D. Gallium

4. In the operation of dry cells, we normally refer to the supply of current to load resistance where its current neutralizes the separated charges at the electrodes.
   A. Aligning the cells
   B. Charging the cells
   C. Discharging the cells
   D. Polarizing the cells

5. They are special class C amplifiers that are biased at 3 to 10 times the normal cutoff and used to generate frequency that is a harmonic of a lower frequency.
   A. Frequency generators
   B. Frequency stabilizers
   C. Frequency multipliers
   D. Frequency amplifiers

6. In voltmeter, the purpose of series resistor is to _____.
   A. increase speed of meter movement
   B. decrease the current range
   C. decrease the voltage range
   D. increase the voltage range

7. ICs that are combinations of monolithic and film of discrete components or any combinations thereof to allow flexibility in circuits.
   A. Hybrid IC
   B. Micro IC
   C. Mixed IC
   D. Combined IC

8. An instrument used to record the electric potentials associated with the electrical currents that traverse the heart.
   A. Electrograph
   B. Electrolysis
   C. Electroencephalograph
   D. Electrocardiograph

9. SUBRACT: 11001(subscript 2) – 1001(subscript 2).
   A. 10001
   B. 10100
   C. 10010
   D. 10000

10. What is the name of an electrode found in a pentode but not in a tetrode?
    A. Control grid
    B. Screen grid
    C. Signal grid
    D. Suppressor grid

11. What is the magnetic equivalent to electrical voltage?
    A. Flux
    B. Reluctance
    C. Magnetomotive force
    D. Magnetic field

12. The effect of 60 Hz AC 40-100 mA or DC 160-300 mA on the human body.
    A. Mascular failure
    B. Refex action
    C. Surprise
    D. Respiratory failure

13. How many junctions are there in a semiconductor diode?
    A. Two
    B. One
    C. None
    D. Four

14. A transformer composed of two or more coils which are wound around a non metallic core.
    A. Metallic core transformer
    B. Free core transformer
    C. Iron core transformer
    D. Air core transformer

15. How many half wave rectifiers will make up a half wave voltage doubler?
    A. 6
    B. 2
    C. 8
    D. 4

16. What materials are meter pointers normally made?
    A. Copper
    B. Iron
    C. Zinc
    D. Aluminum

17. In NPN transistor, when emitter junction is forward biased and collector junction is reversed biased, the transistor will operate in
    A. cut off region
    B. saturation region
    C. active region
    D. inverted region

18. An instrument used to detect presence, sign and in some configurations the magnitude of an electric charge by the mutual attraction or repulsion of metal foils or pith balls.
    A. Electroscope
    B. Electrometer
    C. Electron microscope
    D. Electrograph

19. What is the term we use to refer to the instructions we give a computer to perform?
    A. Processor
    B. Program
    C. Hardware
    D. Software

20. The total number of magnetic lines force leaving or entering the pole of a magnet.
    A. Potential field
    B. Magnetic field
    C. Magnetic space
    D. Magnetic flux

21. How do you call an eight element vacuum tube?
    A. Pentode
    B. Hexode
    C. Octode
    D. Septode

22. What is the lightest kind of atom or element?
    A. Oxygen
    B. Hydrogen
    C. Titanium
    D. Helium

23. Materials that can be easily magnetized in both direction
    A. High hysteresis magnetic materials
    B. Low hysteresis magnetic materials
    C. Hard magnetic materials
    D. Soft magnetic materials

24. Which of the following statement is true in semiconductor application?
    A. An ohmmeter test across a diode shows high resistance in both polarity of test
    B. An ohmmeter test across the base-collector of a transistor should show high resistance in the opposite polarity
    C. An ohmmeter test across the base- collector of a transistor should show low resistance for both polarity
    D. Triac is one direction semiconductor

25. A motor- generator unit in which is built to convert low voltage direct current to high voltage direct current, both use the same field windings and share armature.
    A. Vibrator
    B. Dynamotor
    C. Gen- set
    D. Electric generator

26. In order to have a good conductor material, such material shall have _____ valence electrons.
    A. more than ten
    B. five
    C. one
    D. twenty one

27. What causes damped oscillation in oscillator circuits?
    A. The resistance of the coil and inductor
    B. Due to time
    C. The increase in frequency
    D. The absence of voltage

28. How can electrical current be induced with a coil and a magnet?
    A. Holding the coil and the magnet perfectly stationary
    B. Moving either the magnet or the coil
    C. Placing the coil parallel to the magnetic field
    D. Placing the coil at right angles with the magnetic field

29. In microelectronics, it reduces weight and eliminates point-to-point wiring
    A. Harness
    B. Printed circuit board (PCB)
    C. Chassis
    D. Module

30. What is the name given to a synchro system that transmits data at two different speeds?
    A. Bi- speed synchro system
    B. Dual or double speed synchro system
    C. Double- speed synchro system
    D. Two- speed synchro system

31. A gate that produces an output when it does not receive a pulse
    A. AND Gate
    B. NOT Gate
    C. NAND Gate
    D. NOR Gate

32. It takes place when armature current causes the armature to become an electromagnet, the armature field disturbing the field from the pole pieces resulting in the shift of the neutral plane in the direction of rotation.
    A. Motor reaction
    B. Armature coupling
    C. Armature de- coupling
    D. Armature reaction

33. Find the meaning of the term beta culoff frequency with regard to a bipolar transistor.
    A. That frequency at which the grounded collector current gained decreased to 0.7 of that obtainable at 1 kHz in a transistor
    B. That frequency at which the grounded base current gain has decreased to 0.7 of that obtainable at 1 kHz in a transistor
    C. That frequency at which the grounded emitter current gain has decreased to 0.7 of that obtainable at 1 kHz in a transistor
    D. That frequency at which the grounded date current gain has decreased to 0.7 of that obtainable at 1 kHz in a transistor

34. It consists of elements inseparably associated and formed on or within a single substrate
    A. Integrated Circuit (IC)
    B. Microsoft
    C. Module
    D. Micro circuit

35. A system in which the precise movement of a large load is controlled by a relatively weak signal.
    A. Synchro
    B. Electro
    C. Hydraulic
    D. Servo

36. The phrase which means people acquired enough understanding of common technical terms so they are not intimidated by computer jargon to make better use a home or workplace computer.
    A. Computer literacy
    B. Computer know- how
    C. Computer savvy
    D. Computer logic

37. A program which is not included in the industrial robot user- program categories is called _____.
    A. point-to-multipoint programs
    B. continuous-path programs
    C. positive-stop programs
    D. point-to-point programs

38. What instrument is used to measure the direction of earth's magnetic line of force in respect to the plane of the horizon?
    A. Inclinometer
    B. GPS
    C. Indicator
    D. Altimeter

39. What is referred to as the variation in output voltages as the load changes expressed as a percentage?
    A. Voltage regulation
    B. Voltage variance
    C. Voltage difference
    D. Voltage change

40. What type of bias opposes the pn junction barrier?
    A. No bias
    B. Reverse bias
    C. Direct bias
    D. Forward bias

41. Which of the following refers to electric power?
    A. Joule
    B. Walt second
    C. Volt coulomb
    D. Volt ampere

42. What is the first mass- produced computer built by Eckert and Mauchly Computer Company in Philadelphia USA in 1950.
    A. IBM- 701
    B. CRAY- 1
    C. UNIVAC
    D. ENIAC

43. What is the property of a material which opposes creation of magnetic flux?
    A. Resistance
    B. Permeance
    C. Reluctance
    D. Conductance

44. What is the first commercial computer that was introduced in 1953 that used values?
    A. IBM-701
    B. ENIAC
    C. IBM-1400
    D. UNIVAC

45. What composes all matter whether a liquid, solid or gas?
    A. Atom
    B. Electrons
    C. Protons
    D. Neutrons

46. A higher- power, lower- frequency diode is normally _____ than low- power high-frequency diode
    A. larger
    B. smaller
    C. heavier
    D. smoother

47. What does a dynamic memory normally contain?
    A. Column decoders only
    B. Row decoders only
    C. No decoders
    D. Both column and row decoders

48. What is the term for the number of times per second that a tank circuit energy is stored in the inductor or capacitor?
    A. Resonant frequency
    B. Non-resonant frequency
    C. Circuit frequency
    D. Broadcast frequency

49. What type of actuator of industrial robots has a great force capability and great holding strength when stopped?
    A. Pneumatic
    B. Steam
    C. Electric
    D. Hydraulic

50. What is a physical combination of compounds or elements NOT chemically combined that can be separated by physical means?
    A. Molecule
    B. Atom
    C. Substance
    D. Mixture

51. What is a thin polished slice of a semiconductor crystal on which integrated circuit can be fabricated often in duplicate for cutting into individual dice?
    A. Silicon
    B. Indium
    C. Gallium
    D. Wafer

52. A scanning device using thin, fan- shaped x-ray beam producing a cross sectional view of tissue within the human body
    A. Thermograph
    B. Mamograph
    C. Computerized Tomography (CT) or Computerized Axial Tomography (CAT)
    D. Polygraph

53. Which device uses the principle that light striking a PN junction knocks bound electrons out their "sockets" and thus greatly increases the reverse leakage current?
    A. LED
    B. Phototransistor
    C. Thyratron
    D. All of the above

54. What area of technology is associated with electronic systems designed with extremely small parts or elements?
    A. Micro- electronics
    B. Macro- electronics
    C. Electronic circuits
    D. Mini- electronics

55. Which of the following statements is not true?
    A. Edison cell is storage type
    B. The NiCd cell is primary type
    C. Output of solar cell is normally 0.5V
    D. Primary cells can be charged

56. It exists in the space surrounding a magnet
    A. Magnetic field
    B. Magnetic pole
    C. Magnetic space
    D. Potential space

57. What gyro characteristic for property provides the basis of the operation of a rate gyro?
    A. Rigidity
    B. Selectivity
    C. Precession
    D. Sensitivity

58. A control synchro device accurately governing some type of power amplifying device that is used to move heavy equipment
    A. Control transmitter
    B. Differential transmitter
    C. Control translator
    D. Control transformer

59. What is the purpose of the fetch cycle in a computer?
    A. To obtain instruction
    B. To obtain input data
    C. To obtain memory data
    D. To implement a specific data

60. The process of revising the current flow through the battery to restore the battery to its original condition
    A. Electrolysis
    B. Ionization
    C. Reverse flow
    D. Battery charge

61. Semi-conductors which are doped with either N or P types of impurities are called _____.
    A. Intrinsic
    B. P-type
    C. Extrinsic
    D. N-type

62. Which of the basic timing circuits produces sharp trigger pulses directly?
    A. Blocking circuits
    B. Integrators
    C. Astable multi-vibrators
    D. Differentiators

63. What is a three-terminal resistor with one or more sliding contacts which functions as an adjustable voltage divider?
    A. Voltage divider
    B. Rheostat
    C. Potentiometer
    D. Bleeder resistor

64. How does synchro stator receive its voltage?
    A. Self-induction
    B. Direct power source
    C. Thermal board
    D. By magnetic coupling from the rotor

65. This method of monolithic IC production, elements do not penetrate the substrate.
    A. Diffusion
    B. Evaporation
    C. Epitaxial
    D. Cathode splittering

66. A major component of a computer that communicates results to computer user in printers, screens (CRT), and discs is called _____
    A. Input device
    B. Central unit
    C. Storage
    D. Output device

67. How can a series-positive limiter be modified to limit unwanted negative portion of the input signal?
    A. Negative biasing
    B. Positive biasing
    C. Biasing
    D. Forward biasing

68. What is the purpose of using a differential synchro instead of regular synchro?
    A. Handles more signals only
    B. Performs addition and subtraction functions only
    C. Handles two signals only
    D. Differentials synchros can handle more signal and also perform addition and subtraction functions

69. The intensity of a magnetic field directly related to the magnetic force exerted by the field.
    A. Field intensity
    B. Magnetic flux
    C. Magnetic force
    D. Magnetic field

70. IC production method to prevent unwanted interaction between elements within a chip.
    A. Evaporation
    B. Cathode splittering
    C. Isolation
    D. Diffusion

71. Analysis of the spectrum of light or other form of electromagnetic radiation emitted or absorbed by a substance in order to investigate its structure.

A. Fluoroscopy
B. Calligraphy
C. Spectroscopy
D. Spectography

72. Which of the following items are elements of a computer operating system?

i. Control over input/output device
ii. Organization and control of files
iii. Control of program execution
iv. Control of memory allocation to different programs.
v. Only b, c and d
vi. Only a, c and d
vii. Only a, b and c
viii. a, b, c and d

73. Which of the following are advantages of non-servo controlled robot?

i. High repeatedly
ii. High speed operation
iii. Low cost

iv. Only a and b
v. Only b and c
vi. a, b and c
vii. Only a and c

74. Its purpose is to counteract armature reaction

A. Armature windings
B. Commutators
C. Field windings
D. Interpoles and compensating windings

75. What type of servo system whose goal is to control the positive of the load?

A. Accelerator servo
B. Velocity servo
C. Time servo
D. Position servo

76. A new concept in commercial aircraft where computers monitor aircraft systems reporting on their status only if requested by the pilot or if something is wrong and displayed on the screen when necessary.
    A. Virtual cockpit
    B. Real cockpit
    C. Glass cockpit
    D. The cockpit

77. A basic requirement of a closed loop system (not present in open-loops) that enables present load position to be sensed.
    A. Input
    B. Overload
    C. Error signal
    D. Feedback

78. Which is not a function of register in digital circuit?
    A. Data storage device
    B. Sequence generators
    C. Use in counters
    D. Use to block signal

79. Which of the following material possesses permeabilities slightly less than that of free space?
    A. Diamagnetic
    B. Paramagnetic
    C. Ferromagnetic
    D. Non-magnetic

80. An assembly of microcircuits or combination of microcircuits and discrete components packaged as replacement.
    A. Electronic module
    B. Microcircuit module
    C. PCB
    D. Minielectronics

81. An electronic oscillator which is similar to Hartley oscillator except a minor modification instead of a tapped coil, a variable capacitor is used instead across a common conductor.
    A. Crystal oscillator
    B. Armstrong oscillator
    C. R-C phase shift oscillator
    D. Colpitts ocscillator

82. The most unstable biasing method in the basic transistor amplifier.
    A. Limited bias
    B. Combination bias
    C. Base current bias of fixed bias
    D. Self bias

83. Physical phenomena where forces acting in the medium produce motion in exact proportion.
    A. Non-reciprocity effects
    B. Linearity
    C. Reciprocity
    D. Non-linear effects

84. CMRR for an operational amplifier should be
    A. As large as possible
    B. Close to zero
    C. Close to unit
    D. As small as possible

85. Sinusoidal oscillator that are turned on and off for a specific time duration to produce outputs at a predetermined frequency for an indefinite period of time.
    A. Pulsed oscillator
    B. Phase shift oscillator
    C. Crystal oscillator
    D. Basic oscillator

86. Type of MOSFET that can be independently controlled by two separate signals.
    A. JFET
    B. Dual-gate MOSFET
    C. Induced channel MOSFET
    D. IGFET

87. What physical effect will a two parallel wires and with the same direction of current flowing over them?
    A. Maintain position
    B. Repel each other
    C. No physical effect
    D. Attract each other

88. What direction is the magnetic field about a conductor when current is flowing?
    A. In a direction opposite to the current flow
    B. In all direction; omnidirectional
    C. In the same direction of the current
    D. In a direction determined by the left hand rule

89. The primary difference between the PNP and NPN amplifier
    A. Capacity
    B. Type of input
    C. Type of bias
    D. Polarity of source voltage

90. What is the purpose of an external plate-lead resistor in an amplifier circuit?
    A. To provide signal variations in plate voltage
    B. To provide screen guide voltage
    C. To provide higher amplification factor of the tube
    D. To provide required bias voltage

91. An application of an operational amplifier in which the output signal is determined by the sum of the input signals multiplied by the gain: E_{out}= Gain (E_1+E_2+. . .)
    A. Magnetic amplifier
    B. Summing amplifier
    C. Difference amplifier
    D. Scaling amplifier

92. Refers to a design of a system taking into account environmental and electronic characteristics, access and maintainability.
    A. System handling
    B. System packaging
    C. Packaging
    D. Packaging levels

93. What law in electronics where an induced current will be in such a direction that its own magnetic field will oppose the magnetic field that produces the same?
    A. Electromagnetic law
    B. Norton's law
    C. Lenz's law
    D. Maxwell's law

94. Semi-conductor chip with electrodes (leads) extended beyond the wafer
    A. DICE
    B. Flip chip
    C. Beam-lead chip
    D. DIP

95. What is skin effect?
    A. The phenomenon where RF current flows in a thinner layer of the conductor, close to the surface, as frequency decreases.
    B. The phenomenon where RF current flows in a thinner layer of the conductor, close to the surface, as frequency increases.
    C. The phenomenon where thermal effects on the surface of the conductor increases the impedance.
    D. The phenomenon where thermal effects on the surface of the conductor decreases the impedance.

96. What do you call the ratio between the intensity of magnetization produced in a substance, to the source of magnetizing force?
    A. Magnetic resistivity
    B. Magnetic conductivity
    C. Magnetic susceptibility
    D. Magnetic reluctivity

97. What do you call the non-metallic material that has ferromagnetic properties?
    A. Ferrite
    B. Ferromagnetic
    C. Diamagnetic
    D. Paramagnetic

98. Process by which a magnetic substance becomes a magnet when it is placed near a magnet.
    A. Electromagnetic induction
    B. Magnetic reflection
    C. Influx of density
    D. Magnetic induction

99. Which class of amplifier provides the highest efficiency?
    A. Class A
    B. Class AB
    C. Class C
    D. Class B

100. Fine wires connecting the bonding pad to the chip to the external lead of the package.
    A. Harness
    B. Cables
    C. Bonding wires
    D. Leads

TEST YOURSELF –EXAM 8

1. What is the term given to arranging data records in a predefined sequence or order?
   A. Sorting
   B. Arranging
   C. Sequencing
   D. Ordering

2. What computer language was developed for mathematical work?
   A. MATIMATICA
   B. BASIC
   C. MATHTYPE
   D. FORTRAN

3. What IF frequencies are normally used in radar receivers?
   A. 30 or 60 MHz
   B. 60 or 80 MHz
   C. 30 or 40 MHz
   D. 60 or 70 MHz

4. Mechanical rotation frequency is measured using a device called ___.
   A. Frequency counter
   B. Accelerometer
   C. Frequency meter
   D. Tachometer

5. Electrical-output frequencies of ac generators can be measured by ___.
   A. Vibrating-reed devices or tuned circuits
   B. Accelerometer
   C. Frequency meter
   D. Tachometer

6. Audio frequencies can be measured by a process known as ___.
   A. Frequency counting
   B. Beating
   C. Zero beating
   D. Mixing

7. What is another term for zero beating?
   A. Frequency counting
   B. Beating
   C. Heterodyning
   D. Mixing

8. What wavemeter is used for measuring frequencies in the microwave range?
   A. Frequency counter
   B. Cavity wavemeter
   C. Bolometer
   D. Absorption wavemeter

9. What is the process of matching an unknown signal with a locally generated signal of the same frequency obtained from a calibrated high-precision oscillator?
   A. Frequency beating
   B. Beating
   C. Zero beating
   D. Mixing

10. What device that sweeps over a band of frequencies to determine what frequencies are being produced by a specific circuit under test and the amplitude of each frequency component?
    A. Frequency counter
    B. Cavity wavemeter
    C. Bolometer
    D. Spectrum analyzer

11. What is commonly used for the analysis of waveforms generated by electronic equipment?
    A. Frequency counter
    B. Cavity wavemeter
    C. Cathode-ray oscilloscope(CRO or O-SCOPE)
    D. Bolometer

12. What is device used to measure frequencies above the audio range?
    A. Frequency counter
    B. Cavity wavemeter
    C. Bolometer
    D. Electronic frequency counter

13. What are calibrated resonant circuits used to measure frequency?
    A. Frequency counter
    B. Cavity wavemeter
    C. Wavemeters
    D. Spectrum analyzer

14. What is the difference in frequency between the oscillator frequency and the unknown frequency?
    A. Beat frequency
    B. Image frequency
    C. IF
    D. Signal frequency

15. The rotation frequency of recording devices and teletypewriter motors can be measured by the use of a ___.
    A. Tachometer
    B. Frequency counter
    C. Oscilloscope
    D. Stroboscope

16. What is an instrument that allows you to view rotating or reciprocating objects intermittently and produces the optical effect of a slowing down or stopping motion?
    A. Tachometer
    B. Frequency counter
    C. Oscilloscope
    D. Stroboscope

17. What is an electronic flash device in which the flash duration is very short, a few millionths of a second and can measure very rapid motion?
    A. Tachometer
    B. Frequency counter
    C. Strobotac
    D. Stroboscope

18. What is a combination of watch and revolution counter?
    A. Chronometric tachometer
    B. Frequency counter
    C. Strobotac
    D. Stroboscope

19. What type of bolometer is characterized by an increase in resistance as the dissipated power rises?
    A. Chronometric tachometer
    B. Barretter
    C. Strobotac
    D. Stroboscope

20. What type of bolometer is characterized by decrease in resistance as the power increases?
    A. Chronometric tachometer
    B. Barretter
    C. Strobotac
    D. Thermistor

21. What instrument is used for measuring radio frequency (rf) power?
    A. Thermocouple ammeter
    B. Barretter
    C. Strobotac
    D. Thermistor

22. When using strobotac, at what speed is "flicker" becomes a problem because the human eye can retain successive images long enough to create the illusion of continuous motion?
    A. 600 rpm
    B. 1200 rpm
    C. 500 rpm
    D. 300 rpm

23. What is the approximate life of the strobotron lamp if used at flashing speeds of less than 5,000 rpm?
    A. 250 hours
    B. 1200 hours
    C. 500 hours
    D. 300 hours

24. What is the approximate life of the strobotron lamp if used at flashing speeds of more than 5,000 rpm?
    A. 250 hours
    B. 100 hours
    C. 500 hours
    D. 300 hours

25. What are used as filters for the passage or rejection of specific frequencies?
    A. Tuned circuits
    B. Band pass filter
    C. Filter circuits
    D. High pass filter

26. An elementary, single coil, dc generator will have an output voltage with how many pulsations per revolution?
    A. One
    B. Three
    C. Two
    D. Four

27. How many commutator segments are required in a two-coil generator?
    A. One
    B. Three
    C. Two
    D. Four

28. How can field strength be varied in a practical dc generator?
    A. By varying the input voltage to the field coils
    B. By varying the output voltage to the field coils
    C. By increasing the number of field windings
    D. By decreasing the number of field windings

29. Are dc generators that are designed to act as high-gain amplifier.
    A. Amplidynes
    B. Dynamos
    C. Synchros
    D. Servos

30. The power output of the amplidynes may be up to ___ times larger than the power input to its control windings.
    A. 100,000
    B. 1,000
    C. 10,000
    D. 100

31. What generators have both series field windings and shunt field windings?
    A. Universal generators
    B. Series-wound dc generators
    C. Parallel-wound dc generators
    D. Compound-wound dc generators

32. The substrate of an N-channel MOSFET is made of what material?
    A. P-type material
    B. Intrinsic material
    C. N-type material
    D. Extrinsic material

33. In a MOSFET, which element is insulated from the channel material?
    A. The source terminal
    B. The gate terminal
    C. The substrate terminal
    D. The drain material

34. What type of MOSFET can be independently controlled by two separate signals?
    A. The single-gate MOSFET
    B. The four-gate MOSFET
    C. The dual-gate MOSFET
    D. The dual-drain MOSFET

35. What is the purpose of the spring or wire around the leads of a new MOSFET?
    A. To prevent damage from static electricity
    B. To prevent damage from dynamic electricity
    C. To prevent damage from intense pressure
    D. To prevent damage from intense temperature

36. What is a typical light-to-dark resistance ratio for photocell?
    A. 1:1000
    B. 1:2000
    C. 1:10000
    D. 1:20000

37. What semiconductor device produces electrical energy when exposed to light?
    A. Photoelectronic cell
    B. Photovoltaic cell
    C. Photoelectric cell
    D. Optoelectronic device

38. The UJT has how many PN junctions?
    A. One
    B. Three
    C. Two
    D. Four

39. The area between base 1 and base 2 in a UJT acts as what type of common circuit component?
    A. Variable inductor
    B. Variable resistor
    C. Variable capacitor
    D. Fixed resistor

40. The sequential rise in voltage between the two bases of the UJT is called what?
    A. A voltage spike
    B. A voltage peak
    C. A voltage gradient
    D. A voltage surge

41. What is the normal current path for a UJT?
    A. From base 1 to the emitter
    B. From base 1 to base 2
    C. From base 2 to the emitter
    D. From the input to output

42. What is one of the primary advantages of the FET when compared to the bipolar transistor?
    A. Low input impedance
    B. High input impedance
    C. Low output impedance
    D. High output impedance

43. The SCR is primarily used for what function?
    A. The SCR is primarily used for amplifying
    B. The SCR is for both switching and amplifying
    C. The SCR is primarily used for switching power on or off
    D. The SCR is for any electronic application

44. When an SCR is forward biased, what is needed to cause it to conduct?
    A. A drain signal
    B. A source signal
    C. A anode signal
    D. A gate signal

45. What is the only way to cause an SCR to stop conducting?
    A. The forward bias must be reduced below the minimum conduction level
    B. The forward bias must be increased above the minimum conduction level
    C. The forward bias must be equal to the minimum conduction level
    D. The reverse bias must be reduced below the minimum conduction level

46. The TRIAC is similar in operation to what device?
    A. SCS
    B. SCR
    C. UJT
    D. DIAC

47. When used for ac current control, during which alternation of the ac cycle does the TRIAC control current flow?
    A. During both alternations
    B. With only one alternation
    C. During positive alternation only
    D. During negative alternation only

48. What type of bias is required to cause an LED to produce light?
    A. Forward bias
    B. Either a of b
    C. Reverse bias
    D. Neither a nor b

49. When compared to incandescent lamps, what is the power requirement of an LED?
    A. Very high
    B. Very low
    C. High
    D. Low

50. The varactor displays what useful electrical property?
    A. Variable resistance
    B. Variable capacitance
    C. Variable inductance
    D. Variable frequency

51. When a PN junction is forward biased, what happens to the depletion region?
    A. The depletion region decreases
    B. The depletion region increases
    C. The depletion region disappears
    D. The depletion region remains the same

52. When the reverse bias on a varactor is increased, what happens to the effective capacitors?
    A. Capacitance increases
    B. Capacitance decreases
    C. Capacitance remains the same
    D. Temperature coefficient increases

53. In a reverse biased PN-junction, which current carriers cause leakage current?
    A. The majority carriers
    B. The minority carriers
    C. The majority and minority carriers
    D. Either the majority or minority carriers

54. The action of a PN-junction during breakdown can be explained by what two theories?
    A. Zener effect and avalanche effect
    B. Zener and flywheel effects
    C. Avalanche and flywheel effects
    D. Zener and miller effects

55. Which breakdown theory explains the action that takes place in a heavily doped PN-junction with a reverse bias of less than 5 volts?
    A. Miller effect
    B. Zener effect
    C. Avalanche effect
    D. Flywheel effect

56. In SCR, the anode current is made up of
    A. Electrons
    B. Holes
    C. Electrons and holes
    D. Positive ions

57. What is the most popular oscillator configuration for audio application?
    A. Wien bridge oscillator
    B. Hartley oscillator
    C. Colpitt's oscillator
    D. Tuned oscillator

58. The suppressor grid is added to a tetrode to reduce what undesirable characteristic of tetrode operation?
    A. Primary emission
    B. Secondary emission
    C. Tertiary emission
    D. Quaternary emission

59. What type of bias requires constant current flow through the cathode circuit of a triode?
    A. Anode biasing
    B. Cathode biasing
    C. Fixed biasing
    D. Self biasing

60. How are computers classified?
    A. Technology
    B. Purpose
    C. Data they handle
    D. All of the choices

61. Mechanical computers are considered to be of what type?
    A. Analog
    B. Special
    C. Digital
    D. General

62. In a general-purpose computer, the ability to perform a wide variety of operations is achieved at the expense of what capabilities?
    A. Speed and accuracy
    B. Speed and memory capacity
    C. **Speed and efficiency**
    D. Speed and versatility

63. All analog computers are what type of computers?
    A. Special-purpose
    B. Mechanical
    C. Electromechanical
    D. First generation

64. What are analog computers deigned to measure?
    A. Electrical quantities
    B. Physical quantities
    C. Natural quantities
    D. Continuous electrical or physical conditions

65. Early analog computers were what type of devices?
    A. Mechanical or electromechanical
    B. Sold state type
    C. Vacuum type
    D. Electrical

66. What are computers called that combine the functions of both analog and digital computers?
    A. Versatile computers
    B. Hybrid computers
    C. Anadigi computers
    D. Mainframe computers

67. Which on is the first generation of IC op-amps?
    A. Fair child 709
    B. Texas instrument 709
    C. Motorola 709
    D. National semiconductor 709

68. What is the most basic type of filter?
    A. The capacitor filter
    B. Inductor filter
    C. LC filter
    D. Mechanical filter

69. What is the range of values usually chosen for a choke?
    A. From 20 to 100 H
    B. From 1 to 20 H
    C. From 1 to 10 H
    D. From 10 to 20 H

70. What is the ripple frequency of a full-wave rectifier with an input frequency of 60 Hz?
    A. 120 Hz
    B. 60 Hz
    C. 240 Hz
    D. 360 Hz

71. A standard programming language of the U.S. defence department similar to Pascal.
    A. Ada
    B. C++
    C. BASIC
    D. RPG

72. The electron tube replaces what component in an electron tube voltage regulator?
    A. Variable inductor
    B. Variable resistor
    C. Variable capacitor
    D. Transistor

73. Which of the following is referred to as organized data?
    A. Source
    B. Input
    C. Information
    D. Output

74. What is the common mode rejection ratio of an ideal differential amplifier?
    A. Infinity
    B. Less than unity
    C. Unity
    D. Zero

75. The type of feedback used to improve the fidelity of an amplifier and to increase its frequency response.
    A. Fidelity feedback
    B. Positive feedback
    C. Unwanted feedback
    D. Negative feedback

76. A negatively charge atom is sometimes called ___.
    A. Electron
    B. Anion
    C. Cation
    D. Ion

77. If the magnitude of the potential difference is generated by a single conductor passing through a magnetic field, which of the following statements is false?
    A. The potential difference depends on the speed with which the conductor cuts the magnetic field
    B. The potential difference depends on the length of the conductor that cuts the magnetic field
    C. The potential difference depends on the magnetic field density that is present
    D. **The potential difference depends on the diameter of the conductor that cuts the magnetic field**

78. LEDs normally work on a voltage from
    A. 1 to 2 V
    B. 10 to 20 V
    C. 2 to 5 V
    D. 3 to 6 V

79. Which of the following statements is true?
    A. An ideal current source cannot be in parallel with a short circuit
    B. An ideal voltage source can be in parallel with an open circuit
    C. An ideal current source can be in series with an open circuit
    D. An ideal voltage source cannot be in series with an ideal current source

80. What is the average power dissipated by an electric heater with resistance of 50 Ω drawing a current of 20sin (30t) A?
    A. 0 kW
    B. 14.14 kW
    C. 10 kW
    D. 20 kW

81. What measurements are required to determine the phase angle of a single-phase circuit?
    A. The power in watts consumed by the circuit
    B. The frequency, capacitance and inductance
    C. The power in watts, voltage and current
    D. The resistance, current and voltage

82. The conductance and inductive susceptance of a circuit have the same magnitude. What is the power factor of the circuit?
    A. 1
    B. 0.5
    C. 0.707
    D. 0.866

83. A circuit has a resonant frequency of 455 kHz and a bandwidth of 57.2 kHz. Find the Q of the circuit.
    A. 795
    B. 0.795
    C. 79.5
    D. 7.95

84. A semiconductor logic output which pulls neither to a high nor a low voltage state.
    A. Logic 1
    B. Logic 0
    C. Floating state
    D. Limbo

85. An intrinsic semiconductor has some holes in it at room temperature. What causes these holes?
    A. Doping process
    B. Thermal energy
    C. Ionization
    D. Radiant flux

86. Refers to a field surrounding electrons and protons at stationary period indicating a stored energy.
    A. Magnetic field
    B. Electron field
    C. Electrostatic field
    D. Electrodynamic field

87. The time required to complete one cycle of a waveform.
    A. Wavetime
    B. Frequency
    C. Wavelength
    D. Period

88. Lines of flux that do not follow the intended path
    A. Flux loss
    B. Inductance leakage
    C. Leakage flux
    D. Hysteresis loss

89. What consist of elements inseparably associated and formed on a single substrate?
    A. Micro-circuit
    B. Module
    C. Integrated circuit
    D. PCB

90. What determines whether a substance is an insulator or a conductor?
    A. Number of protons
    B. Number of photons
    C. Number of valence electrons
    D. Number of neutrons

91. What do you call the space between and around charged bodies?
    A. Magnetic field
    B. Electromagnetic field
    C. Electromotive field
    D. **Electrostatic field**

92. What electrical quantity is measured by a watt-hour meter?
    A. Current
    B. Voltage
    C. Energy
    D. Power

93. What do you call the process of converting chemical energy into electrical energy in a cell?
    A. Electron flow
    B. Polarization
    C. Electrolysis
    D. Electrochemical action

94. A transformer has 500 turns in the primary and 1500 in the secondary, assuming no losses, if 45 V is applied to the primary, what is the voltage developed in the secondary?
    A. 13.5 V
    B. 135 V
    C. 180 V
    D. 90 V

95. What do you call the maintenance of oscillation in a circuit in the intervals between pulses of excitation energy?
    A. Auto-oscillation
    B. Flywheel effect
    C. Damping
    D. Feedback

96. Which one of the following can be used to generate a pulse whenever triggered?
    A. Flip flop
    B. Monostable multivibrator
    C. Stable multivibrator
    D. Schmitt trigger

97. What is energy of motion called?
    A. Potential energy
    B. Pneumatics
    C. Kinematics
    D. Kinetic energy

98. A fully charged lead-acid battery will indicate a specific gravity reading between ___.
    A. 1.175 to 1.200
    B. 1.225 to 1.250
    C. 1.200 to 1.225
    D. **1.275 to 1.300**

99. An effect about microwave oscillation that occurs in a small block of N-type gallium arsenide when a constant DC voltage above a critical value is applied to contact on opposite faces.
    A. Gunn effect
    B. Edison effect
    C. Mossbauer effect
    D. Miller effect

100. What is the most influential factor in the switching speed of saturated bipolar transistor?
    A. Charge storage
    B. h_{te}
    C. Collector current
    D. h_{ie}

TEST YOURSELF –EXAM 9

1. What is a precision piece of test equipment used to compare an unknown voltage with an internal reference voltage and to indicate the difference in their values?
   A. Integral voltmeter
   B. Digital voltmeter
   C. Differential voltmeter
   D. Comparator

2. What is the primary advantage of power-amplifier transmitters over keyed-oscillator transmitter?
   A. Frequency stability
   B. Practicality
   C. Power capability
   D. Availability

3. What is the name given to a variety of rotary electromechanical, position sensing devices?
   A. Sychros
   B. Servos
   C. Gyros
   D. Rotors

4. What is a system in which the precise movement of large load is controlled by a relatively weak control signal?
   A. Sychro
   B. Servo
   C. Gyro
   D. Rotor

5. What type of capacitor with a usual range in values from 1 picofarad to 0.01 microfarad and may be used with voltages as high as 30,000 volts?
   A. Mylar
   B. Paper capacitor
   C. Ceramic capacitor
   D. Electrolytic capacitor

6. A material that removes oxides from surfaces to be joined by soldering or welding
   A. Sandpaper
   B. Rust converter
   C. Acid
   D. Flux

7. What type of radar transmitter power is measured over a period of time?
   A. Average power
   B. Peak envelope power (PEP)
   C. RMS power
   D. Apparent power

8. What is a mechanical device containing a spinning mass that is universally mounted?
   A. Sychro
   B. Servo
   C. Gyroscope
   D. Rotor

9. What type of tube best meets the requirements of a modulator switching element?
   A. Thyratron
   B. Klystron
   C. Magnetron
   D. TWT

10. In what manner are current-measuring instruments connected to a circuit?
    A. Series-parallel
    B. Series
    C. Parallel-series
    D. Parallel

11. What refers to the ability of a gyro to keep its axis fixed in space?
    A. Precession
    B. Stability
    C. Rigidity
    D. Flexibility

12. Most meggers you will use are rated at what voltage?
    A. 1000
    B. 100
    C. 300
    D. 500

13. Power transformer normally operates at ___ alternating current.
    A. 60 Hz or 400 Hz
    B. 30 Hz or 60 Hz
    C. 60 Hz or 50 Hz
    D. 60 Hz or 120 Hz

14. What type of maintenance is used to isolate troubles by means of test techniques and practices that realign or readjust equipment or otherwise bring the equipment back up to proper performance?
    A. Maintenance
    B. Preventive maintenance
    C. Corrective and preventive
    D. Corrective maintenance

15. The magnesium-manganese dioxide cell has a voltage of approximately how many volts?
    A. 2 V
    B. 1.5 V
    C. 1.2 V
    D. 1.35 V

16. In a gyro, a vector representing the rotary motion applied to change the direction of the rotor axis is called ___.
    A. Torque vector
    B. Rotary vector
    C. Horizontal vector
    D. Torque gyro

17. The strength of the magnetic field of the coils is dependent upon
    a. The number of turns of the wire in the coil
    b. The amount of current in the coil
    c. The ratio of the coil length to the coil width
    d. The type of material in the core

    A. A, B and C
    B. A,B,C and D
    C. B,C and D
    D. D, A and C

18. What is the frequency range of magnetron oscillator?
    A. 600 to 30 GHz
    B. 600 to 30 THz
    C. 600 to 30 MHz
    D. 600 to 30 PHz

19. Which of the basic timing circuits produces sharp trigger pulses directly?
    A. 555 timer
    B. Pulsed oscillator
    C. Blocking oscillator
    D. Keyed oscillator

20. When taking resistance reading with a VOM, you will obtain the most accurate readings at or near what part of the scale?
    A. Midscale
    B. End scale
    C. Full scale
    D. Quarter scale

21. Medium 1 range is designed to check what resistance values?
    A. 10 to 50 kΩ
    B. 100 to 500 kΩ
    C. 50 to 10 kΩ
    D. 10 to 1000 kΩ

22. What does the Greek word “gyro” means?
    A. Revolution
    B. Rotation
    C. Cycle
    D. Spin

23. What maximum voltage level can be attained in the pulse generator section by adjusting the LEVEL control?
    A. 2.5 V
    B. 10 V
    C. 1.5 V
    D. 5 V

24. What frequencies are provided through the back-panel BNC?

    A. 1 MHz and 10 MHz
    B. 10 MHz and 15 MHz
    C. 5 MHz and 10 MHz
    D. 20 MHz and 30 MHz

25. What is the direction of the magnetic field around a vertical conductor when the current flows upward?
    A. Counterclockwise
    B. Forward
    C. Backward
    D. Clockwise

26. What term is used to describe the ability of a radar system to distinguish between targets that are close together?
    A. Target marking
    B. Target resolution
    C. Target locking
    D. Target range

27. What is the typical frequency range about the center frequency of a tunable magnetron?
    A. ± 5 %
    B. ± 1 %
    C. ± 10 %
    D. ± 15 %

28. The maximum voltage that can be steadily applied to the capacitor without the capacitor breaking down (shorting) is called ___ of the capacitor.
    A. Safe voltage
    B. Working voltage
    C. Breakdown voltage
    D. Dielectric voltage

29. What refers to the number of axes about which a gyro is free to process?
    A. Gyroscopic axis
    B. Freedom axis
    C. Degree of freedom
    D. Axis of space

30. What type of switches is used as duplexers?
    A. Mechanical
    B. Electrical
    C. Electronics
    D. Digital

31. In a dc position servo system, the _____ and _____ of a dc error signal respectively are used to determine the amount and direction the load will be driven?
    A. amplitude, polarity
    B. polarity, phase
    C. amplitude, frequency
    D. polarity, frequency

32. What rule is used to determine the polarity of a coil when the direction of the electron current flow in the coil is known?
    A. use the left-hand rule for coils
    B. use the right-hand rule for coils
    C. use the cork-screw rule for coils
    D. either the right or left hand rules for coils

33. What radar subsystem supplies timing signals to coordinate the operation of the complete system?
    A. Synchronizer
    B. Transmitter
    C. Duplexer
    D. Diplexer

34. In what direction will a gyro precess in response to an outside force?
A. perpendicular to the force
B. parallel to the force
C. forward direction
D. reverse direction

35. What is the power source of synchros?
A. DC
B. Generator
C. AC
D. DC/AC

36. A carbon resistor has a resistance of 50 ohms and a tolerance of 5 percent. What are the colors of bands one, two, three and four, respectively?
A. green, green, black and gold
B. green, black, green and gold
C. green, black, black and gold
D. green, green, brown and gold

37. What is the resistance of one unit of volume of a substance?
A. specific resistance
B. intrinsic resistance
C. resistivity
D. both A and C

38. A chart used to find the time constant of a circuit if the impressed voltage and the values of R and C or R and L are known.
A. UTC chart
B. Transient chart
C. Resonance chart
D. Either B or C

39. What type of capacitor is made of flat thin strips of metal foil conductors that are separated by waxed paper (the dielectric material)?
A. ceramic capacitor
B. mylar capacitor
C. paper capacitor
D. electrolytic

40. The working voltage of a _____ capacitor rarely exceeds 600 volts.
A. paper
B. ceramic
C. electrolytic
D. mica

41. What is the main advantage of a series motor?
A. high torque (turning force) at low speed
B. low torque (turning force) at low speed
C. high torque (turning force) at high speed
D. low torque (turning force) at low speed

42. What is the electrolyte of a lead-acid cell?
A. sulfuric acid
B. hydrochloric acid
C. sulfuric acid and water
D. hydroxide

43. In what year did Leon Foucault coin the word gyroscope?
A. 1950
B. 1952
C. 1850
D. 1852

44. What is a rotary, electromechanical device used to perform trigonometric computations by varying the magnetic couplings between its primary and secondary windings?
A. revolver
B. rotor
C. circulator
D. gyroscope

45. What is the electrolyte of a nicad cell?
A. potassium hydroxide and water
B. hydrochloric acid and water
C. sulfuric and water
D. hydroxide and water

46. What is the stationary member of a synchro that consists of a cylindrical structure of a slotted laminations on which three Y-connected coils are wound with their axes 120 apart?
A. revolver
B. rotor
C. stator
D. gyroscope

47. What is the process of adjusting a synchro to its electrical zero position?
A. initializing
B. zeroing
C. setting
D. starting

48. A synthetic mixture of rosins that is flexible and used as an insulating material. Generally used as an insulator for low- and medium-range voltages.
A. Teflon
B. PE
C. PVC
D. Thermoplastic

49. A step-transmitter is a modification of what electrical device?
A. rotary switch
B. stepper rotor
C. mechanical switch
D. stepper transformer

50. In the ac position servo system, the _____ and _____ of the ac error signal determine the amount and direction the load will be driven.
A. amplitude, polarity
B. polarity, phase
C. amplitude, phase
D. polarity, frequency

51. What is(are) the general source(s) of mechanical drift?
A. unbalance
B. inertia of Gimbals
C. bearing friction
D. all of the choices

52. What are the three types of nonmetallic insulating materials that can be used in a high-temperature environments?
    A. FEP
    B. silicone rubber
    C. extruded polytetrafluoroethylene
    D. all of the choices

53. In what directions will the compass needle point when the compass is placed in the magnetic field surrounding a wire?
    A. the south pole of the compass will point in the direction of the magnetic lines of force
    B. the north pole of the compass will point in the direction of the current
    C. the south pole of the compass will point in the direction of the current
    D. the north pole of the compass will point in the directions of the magnetic lines of force

54. What are used when power form a conventional servo amplifier is too small to drive large servo motors (either ac or dc)?
    A. power amplifiers
    B. prime movers
    C. magnetic amplifiers
    D. additional servo amplifiers

55. The amount of precession that results from a given force is determined by what quantity?
    A. elasticity
    B. rigidity
    C. flexibility
    D. viscousity

56. The IC synchros or Interior Communication synchros are sometimes called as _____.
    A. reverse synchros
    B. forward synchros
    C. flexible synchros
    D. fixed synchros

57. What factors determine the rigidity of a gyro?
    A. rotor speed
    B. shape
    C. weight
    D. all of the choices

58. What is the capacity of the battery for a specific rate of discharge?
A. rating
B. cycling
C. discharging
D. battery life

59. The motions of a gyroscope can be analyzed in accordance to what basic quantity(ies)?
A. spin
B. precession
C. torque
D. all of the choices

60. How are servo systems classified?
A. according to their functions
B. according to their sizes
C. according to their weights
D. according to their load capacity

61. Which of the following is (are) the form(s) of servo systems?
A. electromechanical
B. hydraulic
C. pneumatic
D. all of the choices

62. What is another name for a servo system?
A. closed-loop control system
B. digital control system
C. analog control system
D. open-loop control system

63. The noise signal can cause _____ to the servo system and must be eliminated.
A. damage
B. error
C. malfunctions
D. roughness

64. What is combined with the error signal in the proper ratio to obtain the desired servo operation with reduced overshooting and minimum time tag?
A. correction voltage
B. swamp voltage
C. feedback voltage
D. trigger voltage

65. What are the major differences of the dc rate generator and the dc generator?
A. size
B. load
C. prime mover
D. both A and C

66. What is the Barkhausen criteria for sustained oscillations?
A. $A\beta = 1$
B. $A\beta = -1$
C. $A\beta = 0$
D. $\beta = 1/A\beta$

67. What is the cathode of a lead-acid cell?
A. sponge lead
B. lead peroxide
C. sulfuric acid and water
D. hydroxide

68. What is a Miller integrator?
A. sweep generator
B. function generator
C. low distortion audio generator
D. RF generator

69. What system provides instant response to an error signal but results in the load oscillating about the point of synchronization?
A. overdamped system
B. critically damped system
C. underdamped system
D. all of the choices

70. What are the ways to prevent polarization?
    A. vent the cell
    B. use a material that will absorb hydrogen
    C. add a material rich in oxygen
    D. all of the choices

71. What is the simplest form of damping?
    A. overdamping
    B. underdamping
    C. error-rate damping
    D. friction clutch damping

72. What is the production of hydrogen gas caused by a portion of the charge current breaking down the water in the electrolyte?
    A. charging
    B. gassing
    C. condensing
    D. evaporating

73. What is the most suitable oscillator circuit for generating 1 MHz?
    A. Colpitt's oscillator
    B. Hartley oscillator
    C. tuned collector oscillator
    D. Wien bridge oscillator

74. A circuit has a source voltage of 100 volts and two 50-ohm resistors connected in series. If the reference point for this circuit is placed between the two resistors, what would be the voltage at the reference point?
    A. 10 V
    B. 40 V
    C. 30 V
    D. 50 V

75. What amplifiers are biased so that collector current is zero (cutoff) for a portion of one alternation of the input signal?
    A. class AB
    B. class A
    C. class C
    D. class B

76. What amplifiers are biased so that the collector current is cut off during one-half of the input signal?
    A. class A
    B. class B
    C. class C
    D. class AB

77. What serves as the cathode in a common type of dry cell?
    A. carbon electrode
    B. steel cover
    C. zinc container
    D. nickel terminal

78. Which of the following types of resistors will overcome the disadvantage of a carbon resistor?
    A. rheostat
    B. molded composition
    C. potentiometer
    D. wirewound resistor

79. To flush a hydrometer, which of the following liquids should be used?
    A. sulfuric acid
    B. salt water
    C. fresh water
    D. a solution of baking soda and water

80. The space between and around charged bodies in which their influence is felt. This is also called electric field of force or an electrostatic field.
    A. magnetic field
    B. air gap
    C. free space
    D. dielectric field

81. What switch is one in which the movement of the switch contacts is relatively independent of the actuator movement?
    A. fast-acting switch
    B. knife switch
    C. snap-acting switch
    D. toggle switch

82. A _____ is an accurate snap-acting switch and the operating point is preset and very accurately known.
A. fast-acting switch
B. knife switch
C. snap-acting switch
D. microswitch

83. The power consumed in a conductor in realigning the atoms which setup the magnetic field is known as what type of loss?
A. hysteresis loss
B. field loss
C. magnetic loss
D. heat loss

84. A magnetic shield or screen used to protect a delicate instrument should be made of which of the following materials?
A. plastic
B. soft iron
C. copper
D. aluminum

85. The communication stations or terminals in local area network are usually linked by cable and are within ____ feet of each other.
A. 1000
B. 500
C. 1500
D. 2000

86. The number of record stored in a record block.
A. density
B. blocking factor
C. capacity
D. capability

87. _____ in a dc motor can be accomplished by reversing the field connections or by reversing the armature connections.
A. series reversal
B. shunt reversal
C. armature reaction
D. motor reversal

88. What is the distortion of the main field in a motor by the armature field?
    A. armature distortion
    B. armature loss
    C. armature reaction
    D. armature noise

89. The evaluation of the performance of an equipment compared to your knowledge of how the equipment should operate with the way it is actually performing is known as _____.
    A. maintenance
    B. troubleshooting
    C. test evaluation
    D. diagnosing

90. What is a data processing system designed to provide a standardized system for the recall and scheduling of test, measurement and diagnostic equipment into calibration facilities?
    A. MEASURE
    B. DIAGNOSTIC
    C. CALIBRATE
    D. TROUBLESHOOTING

91. What are the three hazards that could create damage to electrical measuring instrument?
    A. mechanical shock
    B. excessive current flow
    C. exposure to magnetic field
    D. all of the choices

92. The possibility of electrical shock can be reduce by ensuring all motors, generators and other electronic equipments are at _____.
    A. reference potential
    B. ground potential
    C. 110 V
    D. 220 V

93. What are the types of power losses in an inductor?
    A. copper loss
    B. eddy-current loss
    C. hysteresis loss
    D. all of the choices

94. What is the property existing between two coils so positioned that flux from one coil cuts the windings of the other coil?
A. coupling
B. induction
C. mutual inductance
D. Faraday's law

95. When were mnemonic instruction codes and symbolic addresses developed?
A. in the early 1950's
B. 1970s
C. 1960s
D. 1980s

96. If disks are stored horizontally, how many can be stacked?
A. no more than 20
B. no more than 10
C. no more than 30
D. no more than 40

97. What is the temperature range within which a disk will operate?
A. 10 to 50 degrees Celsius
B. 20 to 40 degrees Celsius
C. 50 to 100 degrees Celsius
D. 10 to 20 degrees Celsius

98. The data cell had a storage capacity of how many characters?
A. over 200 million
B. over 100 million
C. over 50 million
D. over 300 million

99. Technological advancement is measured by what, in the electronic computer world?
A. generations
B. processor speeds
C. IC integration
D. softwares

100. A set of program instructions, a microprogram, permanently stored in read-only memory.

A. OS

B. firmware

C. BIOS

D. Software

TEST YOURSELF –EXAM 10

1. What is the maximum number of electrons in a subshell?
   A. 2
   B. 6
   C. 10
   D. 14

2. The repeatability of a servo-controlled robot is within _____ mm rather than a fraction of a mm.
   A. 2
   B. 4
   C. 3
   D. 5

3. What is the principal quantum number of a Q shell?
   A. 6
   B. 5
   C. 4
   D. 7

4. What time when the voltage across L will be equal to the voltage across R in a series RL transient circuit where E = 24 V, R = 10 Ω and L = 1 H?
   A. 69.3 ms
   B. 69.3 s
   C. 6.93 ms
   D. 6.93 s

5. What is the hysteresis loss at a frequency of 60 cycles per second of an audio transformer magnetic core which has a maximum flux density of 10,000 gausses? The volume of solid iron of this core is 66.8 cubic cm and the hysteresis coefficient (a constant that depends upon grade and quality of iron) id 5.35×10^{-4}.
   A. 0.5386 W
   B. 53.86 W
   C. 5.386 W
   D. 5386 W

6. When two coils of equal inductances are connected in series with coefficient of coupling and their fields in phase, find the total inductance of two coils.
   A. $2L_A$
   B. $2L_A$ (1+k)
   C. $2kL_A$
   D. L_A (2 + k)

7. A 2 μF capacitor with initial charge q_0 = 100 μC, is connected across a 100 Ω resistor at t = 0. Calculate the time in which the transient voltage across the resistor drops from 40 to 10 V.
   A. 2.77 s
   B. 0.277 ms
   C. 2.77 ms
   C. 0.277 s

8. What do you call a small D.C generator built into alternators to provide excitation current to field windings?
   A. prime mover
   B. excitor
   C. commutator
   D. load

9. What is the condition of the diode in a parallel-limiter when the output is developed?
   A. Shunted
   B. Conducting
   C. Cut-off
   D. Shorted

10. What is the payload of the industrial robot AEA IRb-60?
    A. 60kg
    B. 80kg
    C. 50kg
    D.70kg

11. Which of the following robot is primarily used for machining processes?
    A. Cincinatti T1
    B. Cincinatti T3
    C. Cincinatti T2
    D. Cincinatti T4

12. The Kuka spot welding robot has how many degrees of freedom?
    A. 4
    B. 6
    C. 5
    D.7

13. What system in industrial electronics has the ability to monitor certain variable in the industrial processes, the same can perform self-correcting action?
    A. Coal-slurry system
    B. Closed-loop system
    C. Open-loop system
    D. Feed forward control system

14. What is the property of a gyro so that the axis of rotation or spin axis tends to remain in a fixed direction in space if no force is applied to it?
    A. Selectivity
    B. Precession
    C. Rigidity
    D. Sensitivity

15. In a series RLC circuit with R= 200Ω L= 0.1 H and C= 5μF, find the transient current after the switch is closed at t=0 applying a 200V source.
    A. $2^{e-1000t}$sin 1000t
    B. $2^{e-1000t}$cos 1000t
    C. 2^{e-100t}sin 100t
    D. 2^{e-100t}cos 100t

16. A 0.09 μF capacitor is charged to 220V. How long in milliseconds will it discharge to a level of 110V if the discharge resistor has a resistance of 20kΩ?
    A. 1.25
    B. 12.5
    C. 125
    D. 0.125

17. What are the heavy particles that include the proton and the neutron?
    A. Mesons
    B. Baryons
    C. Leptons
    D. Quarks

18. What particles have rest masses ranging down to about 0.1amu?
    A. Leptons
    B. Baryons
    C. Quarks
    D. Mesons

19. By definition, what is the individual angular momentum of the neutron proton and electron?
A. h/4π
B. h/2π
C. h/π
D. 4πh

20. In the hysteresis loop, what do you call the product of the residual magnetic flux and coercive field strength?
A. Effectivity product
B. Hysteresis coefficient
C. Residual-coercive product
D. Steinmetz's product

21. Programming of a continuous-path robot is normally carried out by a method called _____ through.
A. See
B. Walk
C. Pull
D. Push

22. What do you call the strong magnetism that occurs in certain ceramic compounds such as ferrites?
A. Ferromagnetism
B. Ferrimagnetism
C. Diamagnetism
D. Paramagnetism

23. What characteristic is determined by the time required for a voltage wave to travel from the input end of an electrical transmission line to the output end and back again?
A. Pulse position
B. Pulse line
C. Pulse width
D. Pulse code

24. A disturbance similar to brownout but of shorter duration that occurs when the line voltage drops below 80-85% of its rated voltage by one or more cycles.
A. Sag or dip
B. Chronic overvoltage
C. Spike
D. Transient

25. What term is given to the positions of the rotors of a synchro transmitter and the synchro receiver when both rotors are on a 0 degree displaced from 0 degree by the same angle?

A. Correspondence

B. Overlap

C. Fine tune

D. Stability

26. What ac voltage defect refers to a high voltage (up to 6000V or more) peak lasting approximately 100µs to one-half cycle?

A. Sag or dip

B. Spike

C. Chronic overvoltage

D. Transient

27. The largest computers commonly use a word size of _____ bits.

A. 32

B. 128

C. 64

D. 256

28. What do you call the ratio of the safe load to the nameplate load of an electrical motor?

A. Service factor

B. Load factor

C. Efficiency

D. Service life

29. Covalent bond energy in germanium is about ____ eV.

A. 1.5

B. 7.4

C. 3.0

D. 4.7

30. The service factors of motors vary from ____ to _____.

A. 2.5 to 2.9

B. 1.15 to 1.4

C. 1.1 to 1.3

D. 3.1 to 5.5

31. How many voltage are available from two-phase, three wire alternator?
    A. One
    B. Three
    C. Two
    D. Four

32. At what frequency does the RC circuit of an amplifier reduce the voltage gain to 70.7 percent of its midrange value?
    A. Resonant
    B. Cutoff
    C. Critical
    D. Natural

33. What is the operating temperature of class A motor under motor classification?
    A. 105°C
    B. 130°C
    C. 155°C
    D. 180°C

34. What particular motor class in which the operating temperature is 180°C?
    A. Class H
    B. Class F
    C. Class A
    D. Class B

35. What are the basic components of a harmonic drive used in robot transmission system?
    A. Wave generator
    B. Flexspline
    C. Circular spline
    D. All of the choices

36. What is the operating temperature of class B motor?
    A. 200°C
    B. 155°C
    C. 130°C
    D. 180°C

37. What is the width of the pulse radiated by a fire control tracking radar?
    A. Very thick
    B. Narrow
    C. Thick
    D. Very narrow

38. If the operating temperature is 155°C then it falls under what motor classification?
    A. Class F
    B. Class B
    C. Class H
    D. Class A

39. How much percent is stray losses in dc machines?
    A. 1%
    B. 2%
    C. 5%
    D. 10%

40. What are considered standard minimum distance between components on a chip?
    A. 4 and 5 µm
    B. 5 and 10 µm
    C. 2 and 3 µm
    D. 1 and 2µm

41. For an advanced chip, the minimum distance between components is
    A. 1 µm
    B. 2 µm
    C. 3 µm
    D. 4 µm

42. What are used to apply or remove power and to select a function or a circuit within a device?
    A. Switch
    B. Relay
    C. Circuit control devices
    D. Breaker

43. What do you call a register on the CPU used for the temporary storage of data during arithmetic or logic operations?
    A. Flip-flop
    B. Accumulator
    C. Memory
    D. RAM

44. What parameter specifies the value of voltage from cathode to cathode at which the SCR breaks into the avalanches region and begins to conduct heavily as in the pn junction diode?
A. Forward-breakover voltage
B. Reverse-breakover voltage
C. Break-over voltage
D. Stop-over voltage

45. What type of servo system based on the same principle of error-signal generation where velocity is sensed, and the load is moving at the desired velocity?
A. Velocity servo
B. Rate servo
C. Speed servo
D. Controlled servo

46. What is the term for the switch that disconnects the circuit completely at one position before the connection of the next position made?
A. Break-before-make
B. Make-before-break
C. Break-before-break
D. Make-before-make

47. What is the identifying feature of a colpitts oscillator?
A. Split inductor
B. Split resistor
C. Split transformer
D. Split capacitor

48. What instrument is used to measure the amount of active ingredients in the electrolyte of a battery?
A. Hygrometer
B. Voltmeter
C. Electrometer
D. Hydrometer

49. What is the typical frequency range about the center frequency of a tunable magnetron?
A. ± 5%
B. ± 2%
C. ± 4%
D. ± 6%

50. What is a gaseous tube that uses a poll of liquid mercury at its cathode?
    A. Thyratron
    B. Phanotron
    C. Klystron
    D. Ignitron

51. What is the science of interaction or interconversion of electrical and acoustic phenomena?
    A. Electrodynamics
    B. Electrography
    C. Electroanalysis
    D. Electroacoustics

52. What do you call the graphic record or the curve traced by the electrical activity of the brain as recorded by the electroencephalograph?
    A. Electroform
    B. Electrograph
    C. Electrocardiogram
    D. Electroencephalogram

53. What imaging technique produces clear view of flowing blood or its blockage in narrow vessels?
    A. Blood collation
    B. Chemotography
    C. Blood chemistry
    D. Digital subtraction anglography

54. What tube in a duplexer has the primary function of disconnecting the receiver?
    A. Klystron tube
    B. Magnetron tube
    C. Thyratron tube
    D. TR tube

55. What requirement for a vacuum tube that does not exist for semiconductor?
    A. Filament or heater voltage
    B. Envelope
    C. Grid
    D. Screen

56. An internal component of a klystron oscillator which modulates the velocity of the electrons.
    A. the pair of buncher grids
    B. The pair o f plates
    C. The pair of catcher grids
    D. The collector plate

57. Given a power supply with a no load voltage of 12 volts and a full load voltage of 10 volts, what is the percentage of voltage regulation?
    A. 17%
    B. 20%
    C. 80%
    D. 83%

58. A 50-µA meter movement has an internal resistance of 2kΩ. What applied voltage is required to indicate half-scale deflection?
    A. 0.01volt
    B. 0.10volt
    C. 0.005volt
    D. 0.05volt

59. The expression "voltage regulation" as it applies to a shunt-wound DC generator operating at a constant frequency refers to
    A. Voltage output efficiency
    B. Voltage in the secondary compared to the primary
    C. Voltage fluctuations from load to no-load
    D. Rotor winding voltage

60. The expression "voltage regulation" as it applies to a generator operating at a constant frequency refers to
    A. Full load to no load
    B. Limited load to peak load
    C. Source input supply frequency
    D. Field frequency

61. When an emergency transmitter uses 325 watts and a receiver uses 50 watts, how many hours can a 12.6 volt, 55 ampere-hour battery supply full power to both units?
    A. 6hours
    B. 3hours
    C. 1.8hours
    D. 1.2hours

62. What is the total voltage when 12 nickel-cadmium batteries are connected in series?
    A. 12volts
    B. 12.6volts
    C. 15volts
    D. 72volts

63. The turn ratio of a transformer is 1:20. When a 120 volt ac source is connected to its primary winding, the secondary voltage is
    A. 120volts
    B. 1200volts
    C. 600volts
    D. 2400volts

64. A power transformer has a single primary winding and three secondary windings producing 5.0 volts, 12.6 volts, and 150 volts. Which of the three secondary windings will have the highest measured DC resistance
    A. The 12.6 volt winding
    B. The 5.0 volt winding
    C. The 150 volt winding
    D. All will have equal resistance values

65. A special type of power supply filter choke inductance is inversely proportional to the amount of current flowing through it is a
    A. AF choke
    B. RF choke
    C. Smoothing choke
    D. Swinging choke

66. What is the most suitable oscillator circuit for generating 1kHz?
    A. Hartley oscillator
    B. Colpitt's oscillator
    C. Wien bridge oscillator
    D. Tuned collector oscillator

67. How many the range of a thermocouple ammeter be increased?
    A. By using a current transformer
    B. By using a capacitor shunt
    C. By using a current transformer and a capacitor shunt
    D. By using a resistor shunt

68. By what factor must the voltage of an ac circuit, as indicated on the scale of an ac voltmeter, be multiplied to obtain the average voltage value?
    A. 0.707
    B. 0.9
    C. 1.414
    D. 3.14

69. What special type of diode is capable of both amplification and oscillation?
    A. Point contact diodes
    B. Zener diodes
    C. Tunnel diodes
    D. Junction diodes

70. What is a common use of hot-carrier diode?
    A. As balanced inputs SSB
    B. As a variable capacitance in a automatic frequency control circuit
    C. As a constant voltage reference in a power supply
    D. As VHF and UHF mixers and detectors

71. What is the normal operating voltage and current for a light-emitting diode?
    A. 60 volts and 20 mA
    B. 5 volts and 50 mA
    C. 1.7 volts and 20 mA
    D. 0.7 volts and 60 mA

72. What type of bias is required for an LED to produce luminescence?
    E. Reverse bias
    A. Forward bias
    B. Zero bias
    C. Inductive bias

73. What is the name of the semi-conductor IC that has a fixed pattern of digital data stored in its memory matrix?
    A. RAM—Random-Access Memory
    B. ROM—Read-Only Memory
    C. Register
    D. Latch

74. What would be the bandwidth of a good crystal lattice band-pass filter for a double-sideband phone emission?
    A. 1 kHz at -6 dB
    B. 500 Hz at -6 dB
    C. 6 kHz at -6 dB
    D. 15 kHz at -6 dB

75. What technique can be used to construct low cost, high performance crystal lattice filters?
    A. Splitting and tumbling
    B. Tumbling and grinding
    C. Etching and splitting
    D. Etching and grinding

76. What term defines a series of overshoots in a servo system?
    A. Positioning
    B. Variation
    C. Hunting
    D. Oscillating

77. What is the acceptable ratio of back-to-forward resistance for a diode?
    A. 2 to 1.5
    B. Greater than 10 to 1
    C. Less than 10 to 1
    D. 3 to 2

78. Packaging is required for what reason in IC production?
    A. To meet storage requirement
    B. To increase shelf-life
    C. To dissipate heat
    D. Ease of handling and protection from damage

79. In radioactivity, what is the unit to measure the biological damage caused by radiation?
    A. rem
    B. rad
    C. lumen
    D. reb

80. What do you call the fine wires connecting the bonding pad to the chip t the external lead of the package?
    A. Harness
    B. Cables
    C. Bonding wires
    D. Leads

81. What do you call the ratio between the intensity of magnetization produced in a substance, to the source of magnetizing force?
    A. Magnetic resistivity
    B. Magnetic conductivity
    C. Magnetic susceptibility
    D. Magnetic reluctivity

82. What is a semi-conductor chip with electrodes (leads) extended beyond the wafer?
    A. DICE
    B. Flip chip
    C. Beam-lead chip
    D. DIP

83. What do you call an assembly of microcircuits or a combination of microcircuits and discrete components packaged as replacement?
    E. Electronic module
    F. Microcircuit module
    G. PCB
    H. Minielectronics

84. In the operation of dry cells, we normally refer to the supply of current to load resistance where its current neutralizes the separated charges at the electrodes as _____>.
    A. aligning the cells
    B. charging the cells
    C. discharging the cells
    D. polarizing the cells

85. What are the special class C amplifiers that are biased at 3 to 10 times the normal cutoff and used to generate frequency that is a harmonic of a lower frequency?
    A. Frequency generators
    B. Frequency stabilizers
    C. Frequency multipliers
    D. Frequency amplifiers

86. Which of the following capacitors costs more per μF of capacitance?
    A. Plastic
    B. Mica
    C. Paper
    D. Electrolytic

87. What capacitors are suitable for dc filter circuits?
    A. Mica
    B. Electrolytic
    C. Ceramic
    D. Plastic

88. What is the other name or relative permittivity?
    E. Dielectric strength
    F. Breakdown voltage
    G. Specific inductive capacity
    H. Potential gradient

89. In RF amplifier with optimum coupling, what method provides the widest bandpass?
    A. A parallel circuit
    B. A swamping resistor
    C. A parallel variable resistor
    D. A dc coupling capacitor

90. What is the operating condition of a circuit when no input signal is being applied to the circuit?
    A. Neutral
    B. Quantum
    C. Quiescence
    D. No load condition

91. What is the reading of a fully charged lead-acid battery?
    A. 1.025-1.075
    B. 1.200-1.500
    C. 1.050-1.350
    D. 1.280-1.300

92. Which of the following are the basic elements in a 555 timer IC?
    a) Two comparators
    b) A flip-flop
    c) A discharge transistor
    d) A resistive voltage divider

    A. A, B and D only
    B. A, B and C only
    C. B, C and D only
    D. A, B, C and D

93. In a sawtooth generator, increasing gate does what to linearity?
    A. Nothing
    B. Increases linearity
    C. Blocks linearity
    D. Decreases linearity

94. Why are digital multimeters well suited for testing sensitive devices?
    A. High current flow
    B. It is portable and ruggedized
    C. Because of its sensitivity
    D. Current flows through the component is limited to 1 mA

95. Compensation to an op-amp means _____ bandwidth and _____ slew rate.
    A. reduced, increased
    B. reduced, reduced
    C. increased, reduced
    D. increased, increased

96. Boolean algebra is based on the assumption that most quantities have _____ possible states.
    A. four
    B. two
    C. three
    D. single

97. Which of the following are types of resonant LC oscillators?
    A. Colpitts
    B. Clapp
    C. Hartley
    D. Armstrong
    E. Crystal-controlled

    A. A, B, C and E only
    B. A, B, C and D only
    C. B, C, D and E only
    D. A, B, C, D and E

98. What does the base or radix of a number system tell you about the system?
    A. Number of units used in the system
    B. Number of items used in the system
    C. Number of symbols used in the system
    D. Number of numerals used in the system

99. The specific gravity of a lead-acid battery is a measure of its _____
    A. battery life
    B. operating temperature
    C. state of charge
    D. rate of discharge

100. In active filter, what type of filter passes a range of frequency and a certain higher frequency?
    A. Band-stop
    B. High pass
    C. Low pass
    D. Band-pass