B

ELECTRICAL ENGINEERING
(OBJECCTIVE TYPE)
PAPER – II

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.

2. ENCODE CLEARLY THE TEST BOOKLET SERIES **A, B, C** OR **D** AS THE CASE MAY BE IN THE APPROPRIATE PLACE IN THE ANSWER SHEET.

3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. *DO NOT* write *anything else* on the Test Booklet

4. This Test Booklet contains 120 items (questions), 60 in PART – A and 60 in PART – B. Each item comprises four responses (answers). You will select the response which you want to mark on the Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose *ONLY ONE* response for each item.

5. You have to mark all your responses *ONLY* on the separate Answer Sheet provided. See directions in the Answer Sheet.

6. All items carry equal marks

7. Before you proceed to mark in the Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your Admission Certificate.

8. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should hand over to the Invigilator *only the Answer Sheet*. You are permitted to take away with you the Test Booklet.

9. Sheets for rough work are appended in the Test Booklet at the end.

10. Penalty for wrong answers:

THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS.

(i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-third (0.33**) of the marks assigned to that question will be deducted as penalty.

(ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happiness to be correct and there will be same penalty as above to that question.

(iii)If a question is left blank, i.e. no answer is given by the candidate; there will be **no penalty** for that question.

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01. The advantage of hydro-electric power station over thermal power station is
    (a) The initial cost of hydro-electric power station is low
    (b) The operating cost of hydro-electric power station is low
    (c) Hydro-electric power station can supply the power throughout the year
    (d) Hydro-electric power station can be constructed at the place where the energy is required

Ans: (b)

02. The incremental cost characteristics of two generators delivering 200 MW are as follows

$$\frac{dF_1}{dP_1} = 20+0.01P_1 \quad \frac{dF_2}{dP_2} = 16+0.02P_2$$

    For economic operation generation P_1 and P_2 should be
    (a) 100MW and 100MW
    (b) 80 MW and 120MW
    (c) 200 MW and 100 MW
    (d) 120 MW and 80 MW

Ans: (d)

03. No load test was conducted on a three phase induction motor at different input voltages and the input power obtained was plotted against the input voltage. The intersection of the extrapolated curve on the Y-axis, would give
    (a) Rated core loss
    (b) Windage and friction loss
    (c) Rated copper loss
    (d) Rated core loss and Windage and friction loss

Ans: (b)

04. A power generating station has a maximum demand of 1000 MW. The annual load factor is 75% and plant capacity factor is 60%. Calculate the reserve capacity
    (a) 250 MW   (b) 500 mW
    (c) 750 mw   (d) 1250 MW

Ans: (a)

05. In order to have lower cost of power generation
    (a) The load factor and diversity factor generation
    (b) The load factor and diversity factor should be high
    (c) The load factor should be low but diversity factor should be high
    (d) The load factor should be high but diversity factor should be low

Ans: (b)

06. Consider the following statements:
    The calculation performed using short line approximate model instead of nominal –II model for a medium length transmission line delivering lagging load at a given receiving end voltage always results in higher
    1. Sending end current
    2. Sending end power
    3. Regulation
    4. Efficiency
    Which of these statements are correct?
    (a) 1 and 2 only   (b) 2 and 3 only
    (c) 1, 2 and 4   (d) 1, 3 and 4

Ans: (a)

07. The locus of constant received power is a circle of radius
    (a) $\dfrac{|V_S||V_R|}{|B|}$ (b) $\dfrac{|V_S|^2}{|B|}$
    (c) $\dfrac{|V_R|^2}{|B|}$ (d) $\dfrac{|V_S - V_R|^2}{|B|}$

Ans: (a)

08. Consider the following statements regarding convergence of the Newton-Raphson procedure
    1. It does not converge to a root when the second differential coefficient changes sign
    2. It is preferred when graph of (X) is nearly horizontal where it crosses the X-axis

3. It is used to solve algebraic and transcendental equations
   Which of these statements are correct?
   (a) 1, 2 and 3   (b) 1 and 2 only
   (c) 2 and 3 only   (d) 1 and 3 only

Ans: (d)

09. The Positive, Negative and Zero sequence per unit impedances of two generators connected in parallel are $X_1 = 0.12$, $X_2 = 0.096$ and $X_0 = 0.036$ pu. For a LG fault at generator terminals (with 1 pu voltage) the positive sequence current will be)

Ans: (a)

10. A 50 MVA, 11 kV, 3-phase generator has a stored energy of 400 MJ. Its inertia constant is
    (a) 4   (b) 8
    (c) 2   (d) 16

Ans: (b)

11. The steady state stability limit of a synchronous machine connected to infinite bus is 2.2 pu infinite bus voltage is 1 pu and synchronous machine voltage is 1.1 pu. The transfer reactance between generator and infinite bus is
    (a) J 0.5   (b) −J0.5
    (c) J 1.0   (d) −J1.0

Ans: (a)

12. Two identical synchronous machines having same inertia constant are connected in parallel and swinging together. The effective inertia constant is 4 MJ/MVA. Then each machine has an inertia constant of
    (a) 2 MJ/MVA   (b) 4 MJ/MVA
    (c) 8 MJ/MVA   (d) 16 MJ/MVA

Ans: (a)

13. A large ac generator supplying power to an infinite bus is suddenly short-circuited at its terminals. Assuming the prime-mover input and the voltage behind the transient reactance to remain constant immediately after the fault, the acceleration of the generator rotor is
    (a) Inversely proportional to the moment of inertia of the machine
    (b) Inversely proportional to the square of the voltage
    (c) Directly proportional to the square of the short circuit current
    (d) Directly proportional to the short-circuit power

Ans: (a)

14. The regions of operation of a MOSFET to work as a linear resistor and linear amplifier are
    (a) Cut-off and saturation respectively
    (b) Triode and Cut-off respectively
    (c) Triode and saturation respectively
    (d) Saturaiton and Triode respectively

Ans: (c)

15. In a BJT, $I_{CO} = I_{CBO} = 2\mu A$. Given $\alpha = 0.99$, the value of I_{CED} is
    (a) 2 μA   (b) 99 μA
    (c) 198 μA   (d) 200μA

Ans: (d)

16. The 6 V Zener diode shown in figure has zero Zener resistance and a knee current of 5 mA. The minimum value of R, so that the voltage across it does not fall below 6 V is
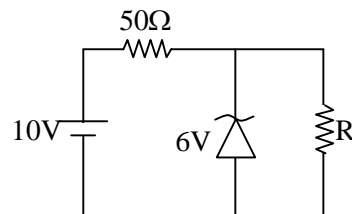
(a) 12 kΩ   (b) 80 Ω
(c) 50 Ω   (d) Zero

Ans: (b)

17. The following statements refer to an n channel FET operated in the active region
    1. The gate voltage V_{GS} reverse biases the junction.
    2. The drain voltage V_{DD} is negative with respect to the source
    3. The current in the n channel is due to electrons
    4. Increasing the reverse bias V_{DS} increases the cross section for conduction
    Which of these statements are correct?
    (a) 1 and 2   (b) 1 and 3
    (c) 2 and 3   (d) 3 and 4

Ans: (b)

18. In a synchronous machine the rotor speed becomes more than the synchronous speed during hunting, the damping bars develop
    (a) Synchronous motor torque
    (b) DC motor torque
    (c) Induction motor torque
    (d) Induction generator torque

Ans: (d)

19. A full-wave rectifier using centre tapped transformer and a bridge rectifier use similar diode and have equal to load output voltage Under equal load conditions
    (a) Output of bridge rectifier will be less than that of the other
    (b) Output of bridge rectifier will be more than that of the other
    (c) Output voltage of both will be exactly equal
    (d) Output voltage of any one may be more than that of the other

Ans: (a)

20. A signal may have frequency components which he in the range of 0.001 Hz to 10 Hz. Which one of the following types of couplings should be chosen in a multistage amplifier designed to amplifier the signal.
    (a) RC coupling
    (b) Direct coupling
    (c) Transformer coupling
    (d) Double tuned transformer

Ans: (b)

21. A feedback amplifier is designed with an amplifier gain of −1000 and feedback of β = 0.1. If the amplifier had a gain change of 20% due to temperature, the change in gain of the feedback amplifier is
    (a) 10%   (b) 5%
    (c) 0.2%   (d) 0.01%

Ans: (c)

22. A signal $V_m \sin(\omega t + \phi)$ is applied to an amplifier whose gain A is independent of frequency. The amplifier will preserve the form of the input signal (though with a delay) if the phase shift ϕ is
    (a) Constant
    (b) Inversely proportional to frequency
    (c) Proportional to frequency
    (d) Proportional to the square of the frequency

Ans: (a)

23. In any function where microphone amplifier and speakers are used often one would hear a hamming sound, which increases in volume gradually. This is due to
    (a) Positive feedback between microphone and speaker
    (b) Negative feedback between microphone and speaker
    (c) Inadequate frequency response of amplifier

(d) Noise pickup (50 Hz) from power supply

Ans: (a)

24. The effect of current shunt feedback in an amplifier is to
    (a) Increase the input resistance an decrease the output resistance
    (b) Increase both input and output resistance
    (c) Decrease both input and output resistance
    (d) Decrease the input resistance and increase the output resistance

Ans: (d)

25. An amplifier circuit has an overall current gain of −100 and an input resistance of 10kΩ with a load resistance of 1kΩ. The overall voltage gain of the amplifier is
    (a) 5 dB   (b) 10 dB
    (c) 20 dB   (d) 40 dB

Ans: (c)

26. A 4-pole induction motor (main) and a 6 pole motor (auxiliary) are connected in cumulative cascade. Frequency in the secondary winding of the auxiliary motor is observed to tbe 1 Hz. For a supply frequency of 50 Hz the speed of the cascade set is
    (a) 1485 rpm   (b) 990 rpm
    (c) 608 rpm   (d) 588 rpm

Ans: (d)

27. An operational amplifier is connected in voltage follower configuration. Input given to this circuit is $3\sin10^3t$. Compute the slew rate of operational amplifier
    (a) $6\pi\times10^{-3}$ V/μsec
    (b) $3\pi\times10^{-3}$ V/μsec
    (c) $15\pi\times10^{-3}$ V/μsec
    (d) $\pi\times10^{-3}$ V/μsec

Ans: (b)

28. An OPAMP has a common mode gain of 0.01 and a differential mode gain of 10^5. It common mode rejection ratio would be
    (a) 10^{-7} (b) 10^{-3}
    (c) 10^3 (d) 10^7

Ans: (d)

29. An OPAMP has slew rate of 5V/μV. The largest sine wave output voltage possible at a frequency of 1 MHz is
    (a) 10πV   (b) 5 V
    (c) $\dfrac{5}{\pi}$V   (d) $\dfrac{5}{2\pi}$V

Ans: (d)

30. Consider the following statements
    1. Astable multivibrator can be used for generating square wave
    2. Bistable multivibrator can be used for storing binary information
    Which of these statement(s) is/are correct?
    (a) 1 only   (b) 2 only
    (c) Both 1 and 2 (d) Neither 1 nor 2

Ans: (c)

31. Which of the following is correct for a gated D-type flip?
    (a) The output is either SET or RESET as soon as the D input goes HIGH or LOW
    (b) The output complement follows the input when enabled
    (c) Only one of the inputs can be HIGH at a time
    (d) The output toggles if one of the inputs is held HIGH

Ans: (a)

32. Latches constructed with NOR and NAND gates tend to remain in the latched condition due to which configuration feature?

(a) A synchronous operation
(b) Low input voltage
(c) Gate impedance
(d) Cross coupling

Ans: (d)

33. How is the speed power product of a logic family determined?
    (a) The Propagation delay in s is multiplied by the power dissipation in mW
    (b) The propagation delay in ms is multiplied by the power dissipation in mW
    (c) The propagation delay in ns is multiplied by the power dissipation in mW
    (d) The propagation delay in ns is multimplied by the power dissipation in W

Ans: (c)

34. The integrated injection logic has higher density of integration than TTK because it
    (a) Does not require transistors with high current gain and hence they have smaller geometry
    (b) Uses bipolar transistor
    (c) Does not require isolation diffusion
    (d) Uses dynamic logic instead of static logic

Ans: (a)

35. Consider the following statements
    A Darlington emitter-follower circuit is sometimes used in output stage of a TTL gate in order to
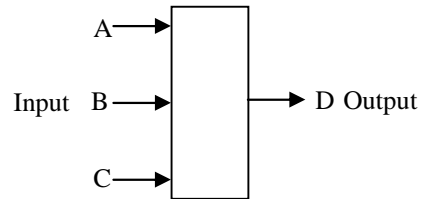   1. Increase its I_{OL}
    2. Reduce its I_{OH}
    3. Increase speed of operation
    4. Reduce power dissipation
    Which of these statement(s) is/are correct?
    (a) 1 and 3   (b) 2 and 4
    (c) 3 only   (d) 1 only

Ans: (c)

36. For the box shown the output D is true if and only if a majority of the inputs are true

The Boolean function for the output is
(a) $D = AB\overline{C} + \overline{A}BC + A\overline{B}C$
(b) $D = ABC + \overline{A}BC + A\overline{B}C + AB\overline{C}$
(c) $D = \overline{A}\,\overline{B}\,\overline{C} + AB + AC + BC$
(d) $D = \overline{A}\,\overline{B}C + A\overline{B}\,\overline{C} + \overline{A}B\overline{C} + ABC$

Ans: (b)

37. The Boolean expression
    $F = \overline{A + \overline{B} + C} + \overline{\overline{A} + \overline{B} + C}$
    $+ \overline{A + \overline{B} + \overline{C}} + ABC$ reduces to
    (a) A   (b) B
    (c) C   (d) A+B+C

Ans: (b)

38. When the output of a tri-state shift register is disabled, the output level is placed in a
    (a) Float state
    (b) Low state
    (c) High impedance state
    (d) Float state and a high impedance state

Ans: (c)

39. A programmable ROM has a decoder at the input and
    (a) Both these blocks being fully programmable
    (b) Both these blocks being partially programmable
    (c) Only the latter block being programmable
    (d) Only the former block being programmable

Ans: (c)

40. Synchronous counters eliminate the delay problems encountered with asynchronous (ripple) counter because the
    (a) Input clock pulses are applied only to the first and the last stages
    (b) Input clock pulses are applied only to the last stage
    (c) Input clock pulses are not used to activated
    (d) Input clock pulses are applied simultaneously

Ans: (d)

41. When a transformers is first energized the transient current during first few cycles is
    (a) Less than full load current
    (b) Equal to full load current
    (c) Equal to no load current
    (d) Much higher than full load current

Ans: (d)

42. For power transformers of larger ratings, the tapings are located in the middle portion of the winding to
    (a) Increase the break-down strength of the winding insulation
    (b) Enable better cooling of the windings
    (c) Enable better distribution of inter-turn voltage
    (d) Reduce the mechanical forces affecting the windings during short circuits

Ans: (d)

43. Tappings are normally provided on the high voltage winding of a transformer only, because
    (a) It has larger number of turns which allows smoother variation of voltage
    (b) It has to handle low currents
    (c) It is easily accessible physically

    (d) it has larger number of turns, has to handle low currents and also easily accessible physically

Ans: (d)

44. Short circuit test is performed on a transformer with a certain impressed voltage at rated frequency. If the short circuit test is now performed with the same magnitude of impressed voltage, but at a frequency higher than the rated frequency, then the magnitude of current.
    (a) And power-factor will both increase
    (b) Will decrease but the power factor will increase
    (c) Will increase, but power factor will decrease
    (d) And power factor will both decrease.

Ans: (d)

45. The impedance of a Δ/Y, 11000 V/400 V, transformer of capacity 100 kVA, on its name plate data base is $(0.02+j0.07)$ pu. The ohmic impedance pu phase referred to the primary (11000V) side is
    (a) $(0.02 + j0.07)\Omega$
    (b) $(0.55 + j1.925)\Omega$
    (c) $(42+j147)\Omega$
    (d) $(72.6 + j254.1)\Omega$

Ans: (d)

46. A 2000 kA, single-phase transformer is in circuit continuously. For 8 hours in a day, the load is 160 kW at unity pf and for the period remaining out of 24 hours, it runs on no-load. If the full load copper losses are 3.02 kW, the total copper losses in 24 hours are
    (a) 35.62 kW   (b) 24.16 kW
    (c) 11.46 kW   (d) 38.40 kW

Ans: No Anwer (\Wrong Data)

47. A 50 kVA transformer has a core loss of 500 W and full-load core loss of 900 W. The load at which the efficiency is maximum is
    (a) 27.45 kVA   (b) 37.75 kVA
    (c) 45.5 kVA   (d) 47.5 kVA

Ans: (b)

48. For a two-winding power transformer, with the effects of the no-load current being neglected, the 'Voltage Regulation' can be zero at load, when the load power factor is
    (a) Lagging only
    (b) Leading only
    (c) Eitehr lagging or leading, depending upon power rating of the transformer
    (d) unity

Ans: (b)

49. The ratio of primary/secondary voltages is 2 1 The saving in terms of weight of copper required if an autotransformer is used instead of a two winding transformer will be
    (a) 95%   (b) 66.7%
    (c) 50%   (d) 33.3%

Ans: (c)

50. Consider the following statements concerning the utility of mesh-connected tertiary windings in star-star transformers
    1. It is used to suppress harmonic voltages
    2. It is used to allow flow of earth fault current for operation of protective devices
    3. It facilitates supply of single phase loads
    4. It provides low reactance paths for zero sequence currents
    Which of these statements are correct?
    (a) 1, 2, 3 and 4   (b) 1, 2 and 3 only
    (c) 1, 2 and 4 only(d) 3 and 4 only

Ans: (a)

51. The most essential condition for parallel operation of two 1-ϕ transformers is that they should have the same
    (a) kVA rating
    (b) Percentage impedance
    (c) Polarity
    (d) Voltage ratio

Ans: (c)

52. Two single-phase 100 kVA transformers, each having different leakage impedances are connected in parallel. When a load of 150 kVA at 0.8 power factor lagging is applied
    (a) Both transformers will operate at power factor more than 0.8 lagging
    (b) Both transformers will operate at power factor less than 0.8 lagging
    (c) One of the transformers will operate at power factor more than 0.8 lagging
    (d) Both transformers will operate at identical power factors

Ans: (c)

53. A triangular mmf wave is produced in the air gap of an electric machine. Such a wave is produced by
    (a) Stator of an induction machine
    (b) Rotor of a synchronous machine
    (c) Stator of a dc machine
    (d) Rotor of a dc machine

Ans: (d)

54. At 1200 rpm the induced emf of a dc machine is 200V. For an armature current of 15 A the electromagnetic torque produced would be
    (a) 23.8 N-m   (b) 238 N-m
    (c) 2000 N-m   (d) 3000 N-m

Ans: (a)

55. A 4 pole lap wound dc generator has a developed power of P watt and voltage of E volt Two andjacent brushes of the

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machine are removed as they are worm out. If the machine operates with the remaining brushes, the developed voltage and power that can be obtained from the machine are
(a) E and P   (b) E/2 and P/2
(c) E and P/4   (d) E and P/2

Ans: (c)

56. A 6 pole dc armature has simplex lap connected 720 conductors, 3 turns per coil and 4 coil-sides per slot. Determine the number of slots in the armature and state whether equalizers can be employed or not
(a) 60 slots and Not possible
(b) 30 slots and Possible
(c) 60 slots and Possible
(d) 30 slots and Not possible

Ans: (c)

57. Determine the flux pole for 6 pole dc machine having 240 wave connected conductors, which generators an open circuit, voltage of 500 volt, which is running at 1000 rpm
(a) 0.129 Wb   (b) 0.021 Wb
(c) 0.042 Wb   (d) 7 mWb
Ans: (c)

58. Consider the following statements
The armature reaction mmf in a dc machine is
1. Stationary with respect to the field poles
2. Rotating with respect to the field poles
3. Rotating with respect to the armature
Which of these statements are correct?
(a) 1, 2 and 3   (b) 1 and 2 only
(c) 1 and 3 only (d) 2 and 3 only

Ans: (c)

59. In case of dc motor, maximum mechanical power is developed when back emf equals

(a) The applied voltage
(b) Half the applied voltage
(c) One third of the applied voltage
(d) Double the applied voltage

Ans: (b)

60. The induced emf of a dc machine running at 750 rpm is 220 V the percentage increase in field flux for generating an induced emf of 250 V at 700 rpm would be
(a) 7%   (b) 11.25%
(c) 21.7%   (d) 42.4%

Ans: (c)

61. The speed of a separately excited dc motor is varied by varying the armature voltage in the range zero to base speed and by varying the field current above the base speed. It is suitable for constant
(a) Torque drive at all speeds
(b) Power drive at all speeds
(c) Torque drive till base speed and constant power drive beyond base speed
(d) Power drive till base speed and constant torque drive beyond base speed

Ans: (c)

62. A dc shunt motor is required to drive a constant power load at rated speed while drawing rated armature current. Neglecting saturation and an machine losses, if both the terminal voltage and the field current of the machine are halved then
(a) The speed becomes 2 pu but armature current remains at 1 pu
(b) The speed remains at 1 pu but armature current becomes 2 pu
(c) Both speed and armature current become 2 pu
(d) Both speed and armature current remain at 1 pu

Ans: (b)

63. The dc series motor is best suited for traction work, because
    (a) Torque is proportional to the square of armature current and speed is inversely proportional to torque
    (b) Torque is proportional to the square of armature current and speed is directly proportional to torque
    (c) Both torque and speed are proportional to the square of armature current
    (d) Torque is proportional to armature current and speed is inversely proportional to torque.

Ans: (a)

64. A 3-phase synchronous motor with constant excitation is driving a certain load drawing electric power from infinite bus at leading power factor. If the shaft load decreases
    (a) The power angle decrease while power factor increases
    (b) The power angle increases while power factor decreases
    (c) Both power angle and power factor increase
    (d) Both power angle and power factor decrease

Ans: (d)

65. The maximum power delivered by 1500 kW, 3-phase, star-connected, 4 kV, 48 pole 50 Hz synchronous motor, with synchronous reactance of 4Ω per phase and unity power factor:
    (a) 4271.2 kW   (b) 35.5 kW
    (c) 120.61 kW   (d) 2078 kW

Ans: (a)

66. Consider the following statements regarding synchronous machines
    1. When a synchronous motor is over excited, its back emf is greater than the supply
    2. When a synchronous motor is over excited, its power factor is leading
    3. Synchronous motor is used as capacitor where load is so large that construction of a static capacitor is impractical.
    Which of these statements are correct?
    (a) 1 and 2 only   (b) 1 and 3 only
    (c) 2 and 3 only   (d) 1, 2 and 3

Ans: (d)

Directions:
Each of the next THIRTEEN (13) items consists of two statements, one labeled as the 'Statement (I)' and the other as "Statement (II)'. Your are to examine these two statements carefully and select the answers to these items using the codes given below

Codes:
(a) Both statement (I) and Statement (II) are individually true and Statement (II) is the correct explanation of Statement (I)
(b) Both Statement (I) and Statement (II) are individually true but Statement (II) is NOT the correct explanation of Statement (I)
(c) Statement (I) is true but Statement (II) is false
(d) Statement (I) is false but Statement (II) is true

67. **Statement (I):** Large power transformer testing under full load current is not possible
    Statement (II): Short circuit test of transformer gives indication of copper loss

Ans: (b)

68. **Statement (I):** In large dc motors which drive reversing rolls of a steel mill and in the generators which supply them, large fluctuations of currents cause higher voltages being induced in the coils located between

adjacent commutator segments. This may result in the so called 'flash-over' between adjacent brushes, causing a heavy short circuit.

Statement (II): To counteract the possibilities of a 'flesh-over' a 'compensating winding', which is embedded in the slots on the pole faces, is connected in series with the armature winding, and which supplies an mmf that magnetizes in the opposite direction to that of the armature mmf

Ans: (a)

69. **Statement (I):** The direct on line (DOL) starter is used to start a small dc motor
Statement (II): DOL starter limits initial current drawn by the armature circuit.

Ans: (c)

70. **Statement (I):** Tower to ground impedance must be kept high
Statement (II): High impedance produces high voltage at the insulator disc

Ans: (d)

71. **Statement (I):** No compensation is needed in HVDC lines, unlike EHV-AC system where series and/or shunt compensation is required
Statement (II): Charging current is absent in HVDC system

Ans: (a)

72. **Statement (I):** In push pull operation one transistor conducts only for negative half cycle and other for positive half cycle
Statement (II): Class-B power amplifier is fixed in cutoff, which gives non-distorted output.

Ans: (c)

73. **Statement (I):** Program counter is a register that contains the address of the next instruction to be executed
Statement (II): IR (Instruction Register) is not accessible to programmer.

Ans: (b)

74. **Statement (I):** Partial memory address decoding can result in simplified decoding logic
Statement (II): Partial decoding causes many to-one mappig of addresses to memory location

Ans: (b)

75. **Statement (I):** In AM system the modulation index ($0 < m < 1$) should be high
Statement (II): The higher the value of m the greater is the power in the side bands

Ans: (a)

76. **Statement (I):** The total power in the original carrier signal is redistributed between all the components of the spectrum of the frequency – modulated signal
Statement (II): The amplitude of the carrier and the FM signal remain unchanged

Ans: (b)

77. **Statement (I):** MOSFETs are intrinsically faster than bipolar devices
Statement (II): MOSFETs have excess minority carrier
Ans: (c)

78. **Statement (I):** The output current of a current source inverter remains constant irrespective of load
Statement (II): The load voltage in CSI depends on the load impedance
Ans: (a)

79. **Statement (I):** A forward dc-to-dc converter requires a minimum load at the output

    Statement (II): Without minimum load excess output voltage can be produced

Ans: (a)

80. In TV transmission, picture signal is amplitude modulated and sound signal is frequency modulated. This is done because
    (a) It is not possible to frequency modulate the picture signal
    (b) Band width requirement is minimized
    (c) Sound signal is more susceptible to noise than picture signal
    (d) Synchronization of picture frames becomes easier.

Ans: (b)

81. A system has a receiver noise resistance of 50Ω. It is connected to an antenna with an outout resistance of 50Ω. The noise figure of the system is
    (a) 1   (b) 2
    (c) 50   (d) 101

Ans: (b)

82. The power gain of an antenna using paraboloid reflector is directly proportional to
    (a) Mouth diameter
    (b) Wavelength
    (c) Aperture ratio
    (d) Square of aperture ratio

Ans: (d)

83. A binary channel with capacity of 36 kbits/sec is available for PCM voice transmission. If signal is band limited to 3.2 kHz, then L and the sampling frequency respectively are
    (a) 32 and 36 kHz
    (b) 64 and 72 kHz
    (c) 64 and 36 kHz
    (d) 32 and 72 kHz

Ans: (d)

84. A 8-bit A/D converter is used over a span of zero to 256 V. The binary representation of 10V signal is
    (a) 011 001 00   (b) 011 100 01
    (c) 101 001 01   (d) 101 000 10

Ans: (a)

85. RF carrier 10 kV at 1 MHz is amplitude modulated and modulation index is 0.6 peak voltage of the signal is
    (a) 600 kV   (b) 1200 kV
    (c) 6 kV   (d) 10 kV

Ans: (c)

86. Output data ratio of a 8-bit PCM-TDM system sampling 24 voice channels, comparing these using μ-law at he rate of 8 kHz and with a 1 frame alignment word, is
    (a) 12×10^6 bits/sec
    (b) 14×10^6 bits/sec
    (c) 16×10^6 bits/sec
    (d) 18×10^6 bits/sec

Ans: (c)

87. 24 voice channels are sampled uniformly ate a rate of 8 kHz and then time division multiplexed. The sampling process uses flat-top samples with 1 μs duration. The multiplexing operation includes provision of sysnchronization by adding an extra pulse of 1 μs duration. The spacing between successive pulses of the multiplexed signal is
    (a) 4 s   (b) 6 μs
    (c) 72 s   (d) 84 μs

Ans: (a)

88. A signal is passed through a LPF with cut-off frequency 10 kHz. The minimum sampling frequency is
    (a) 5 kHz   (b) 10 kHz
    (c) 20 kHz   (d) 30 kHz

Ans: (c)

89. The man advantage of time division multiplexing (TDM) over frequency division multiplexing (FDM) is that it
    (a) Requires less bandwidth
    (b) Requires less power
    (c) Requires simple circuitry
    (d) Provide better signal-to noise ratio

Ans: (d)

90. In a 8085 microprocessor system with memory mapped I/O, which of the following is true?
    (a) Devices have 8-bit address line
    (b) Devices are accessed using IN and OUT instructions
    (c) There can be maximum of 256 input devices and 256 output devices
    (d) Arithmetic an logic operations can be directly performed with the I/O data

Ans: (d)

91. Consider the following statements:
    Arithmetic Logic Unit (ALU)
    1. Performs arithmetic operations
    2. Performs comparisons
    3. Communicates with I/O devices
    4. Keeps watch on the system
    Which of these statements are correct?
    (a) 1, 2, 3 and 4   (b) 1, 2 and 3 only
    (c) 1 and 2 only   (d) 3 and 4 only

Ans: (c)

92. The 8085 programming manual says that it takes seven T states to fetch and execute the MOV instruction. If the system clock has a frequency of 25 MHz, how long is an instruction cycle?
    (a) 28 s   (b) 25 ns
    (c) 28 ns   (d) 28 μs
Ans: (d)

93. According to Flynn's classification, which architecture is of only theoretical interest and no practical system has been developed based on it?

(a) Single Instruction Single Data (SISD)
(b) Single Instruction Multiple Data (SIMD)
(c) Multiple Instruction Single Data (MISD)
(d) Multiple Instruction Multiple Data (MIMD)

Ans: (c)

94. What is the content of accumulator of 8085 μP after the execution of XRI FOH instruction?
    (a) Only the upper nibble of accumulator is complemented
    (b) Only the lower nibble is complemented
    (c) Only the upper nibble is reset to zero
    (d) Only the lower nibble is reset to zero

Ans: (a)

95. A software delay sub routine 4s written as given below
    DELAY MVI   H, 255 D
           MVI   L, 255 D
    LOOP   DCR   L
           JNZ   LOOP
           DCR   H
           JNZ   LOOP
    How many times DCR instruction will be executed?
    (a) 255   (b) 510
    (c) 65025   (d) 65279

Ans: (d)

96. The content of Accumulator are 7 OH. Initially all flags are zero. What will be values of Cy and S after executing instruction RLC?
    (a) Cy = 0 and S = 0
    (b) Cy = 1 and S = 1
    (c) Cy = 1 and S = 0
    (d) Cy = 0 and S = 1

Ans: (a)

97. The difference between 8085 instructions RST n and PCHL is
    (a) RST n is equivalent to a sub-routine call while PCHL is equivalent to unconditional branch
    (b) RST n uses direct addressing while PCJL uses register indirect addressing
    (c) RST n is a software interrupt while PCHL simulates a hardware interrupt
    (d) RST n resets the processor while PCJL restarts the processor

Ans: (a)

98. The following program starts at location 0100H
    LXI SP, 00F
    LXI H, 0701
    MVI A, 20H
    SUB M
    The content of accumulator when the program counter reaches 0107 H is
    (a) 20 H   (b) 02 H
    (c) 00 H   (d) FF H

Ans: (c)

99. Find the content of the accumulator after the execution of the following program
    MVI   A,   FO H
    ORI   FF H
    XRI   FO H
    (a) OOH   (b) FOH
    (c) OFH   (d) FFH

Ans: (c)

100. It is desired to multiply the numbers 0A H by 0B H and store the result int eh accumulator. The numbers are available in registers B and C respectively. A part of the 8085 program for this purpose is given below
    MVI A, 00H
    Loop
    HLT END
    The sequence of instruction to complete the program would be
    (a) JNZ LOOP, ADD B, DCR C
    (b) ADD B, JNZ LOOP, DCR C
    (c) DCR C, JNZ LOOP, ADD B
    (d) ADD B, DCR C, JNZ LOOP

Ans: (d)

101. Assume that the Accumulator and the register C of 8085 microprocessor contain respectively FO H OF H initially. What will be the content of Accumulator after execution of instruction ADD C?
    (a) OO H   (b) FF H
    (c) EF H   (d) FE H

Ans: (b)

102. Cycle-stealing mode of DMA operation involves
    (a) DMA controller takes over the address, data and control buses while a block of data is transferred between memory and an I/O devices
    (b) While the μP is executing a program an interface circuit takes over control of the address, data and control buses when not in use by the μP
    (c) Data transfer takes place between the I/O device and memory during every alternate clock cycle
    (d) The DMA controller waits for the μP to finish execution of the program and then takes over the buses

Ans: (c)

103. In a microprocessor based system, DMA facility is required to increase the speed of the data transfer between the
    (a) Microprocessor and the memory
    (b) Microprocessor and the memory
    (c) Memory and the I/O devices
    (d) Memory and register

Ans: (c)

104. I/O mapped system identify their input/output devices by giving them an
(a) 8 bit port number
(b) 16 bit port number
(c) 8 bit buffer number
(d) 16 bit buffer number

Ans: (a)

105. A microprocessor based safety control system installed in a nuclear power plant must be stress tested under which of the following conditions?
1. Ageing due to radiation
2. Thermal stresses
3. Seismic vibration
4. Inadequate nuclear reactor coolant
(a) 1 and 2 only   (b) 2 and 4 only
(c) 1, 2 and 3 only (d) 1, 2, 3 and 4

Ans: (d)

106. A carrier wave of frequency 25 GHz amplitude is modulated with two modulating frequencies equal to 1 kHz and 2 kHz. The modulated wave will have the total bandwidth
(a) 6 kHz   (b) 2 kHz
(c) 4 kHz   (d) 3 kHz

Ans: (c)

107. In a frequency modulation system, maximum frequency deviation allowed is 1000 and modulating frequency is 1 kHz. Determine modulation index β
(a) 2   (b) 2000
(c) 1   (d) 1000

Ans: (c)

108. In an amplitude Modulated (AM) wave with 100% modulation (m), the carrier is suppressed. The percentage of power saving will be
(a) 100%   (b) 50%
(c) 25%   (d) 66.7%

Ans: (d)

109. The Nyquist sampling interval, for the signal sinc(700t) + sinc(500t) is
(a) $\dfrac{1}{350}$ sec   (b) $\dfrac{\pi}{350}$ sec
(c) $\dfrac{1}{700}$ sec   (d) $\dfrac{\pi}{175}$ sec

Ans: (c)

110. A 1000-W carrier is amplitude modulated and has a side-band power of 300W. The depth of modulation is
(a) 0.255   (b) 0.545
(c) 0.775   (d) 0.95

Ans: (c)

111. The value of the capacity reactance obtainable from a reactance FET whose g_m is 12 ms when the gate-to-source resistance is $\dfrac{1}{9}$ of the reactance of the gate-to –drain capacitor at frequency 5 MHz is
(a) 650Ω (b) 750 Ω
(c) 775 Ω (d) 800 Ω

Ans:

112. A thyristor has internal power dissipation of 40 W and is operated at an ambient temperature of 20^0 C If thermal resistance is 16^0C/W, the junction temperature is
(a) 114^0 C   (b) 164^0C
(c) 94^0 C   (d) 84^0 C

Ans: (d)

113. Consider the following statements:
1. A synchronous motor has no starting torque but when started it always runs at a fixed speed
2. A single-phase reluctance motor is not self starting even if paths for eddy currents are provided in the rotor
3. A single-phase hysterises motor is self-starting
Which of these statement(s) is/are correct?
(a) 1, 2 and 3   (b) 1 only
(c) 1 and 2 only   (d) 2 and 3 only

Ans: (a)

114. Consider the following statements regarding Thyristor
    1. It conducts when forward biased and positive current flows through the gate
    2. It conducts when forward biased and negative current flows through the gate
    3. It commutates when reverse biased and negative current flows through the gate
    4. It commutate when the gate current is withdrawn
    Which of these statement(s) is/are correct?
    (a) 1, 2 and 3   (b) 1 and 2 only
    (c) 2 and 3 only   (d) 1 only

Ans: (d)

115. The average output of a semi converter connected to a 120 V, 50 Hz supply and firing angle of $\frac{\pi}{2}$ is
    (a) 5402 V   (b) 5602 V
    (c) 10804 V   (d) Zero

Ans: (a)

116. Compute the ripple factor of a single phase full wave rectifier with load resistance $R_L = 10$ kΩ. Forward bias dynamic resistance of diodes used is 100Ω. The rms voltage across secondary winding is 330 V
    (a) 482   (b) 121
    (c) 0.482   (d) 0.812

Ans: (c)

117. A 3-phase semi-converter is feeding a separately excited dc motor at constant field current. The motor can operate in the following condition
    (a) Speed positive, torque positive
    (b) Speed positive or negative, rorque positive
    (c) Speed positive, torque positive or negative
    (d) Speed positive or negative torque positive or negative

Ans: (a)

118. A 3 phase converter feeds a pure resistance load at a firing angle of $\alpha = 60^0$. The average value of current flowing in the load is 10 A. If a very large inductance is connected in the load circuit, then the
    (a) Average value of current will remain as 10 A
    (b) Average value of current will become greater 10 A
    (c) Average value of current will become less than 10 A
    (d) Trend of variation of current cannot be predicted unless the exact value of inductance connected is known

Ans: (a)

119. A PWM switching scheme is used with a three phase inverter to
    (a) Reduce the total harmonic distortion with modest filtering
    (b) Minimize the load on the DC side
    (c) Increase the life of the batteries
    (d) Reduce low order harmonics and increase high order harmonics

Ans: (a)

120. Consider the following statements. Switched mode power supplies are preferred over the continuous types because they are
    1. Suitable for use in both ac and dc
    2. More efficient
    3. Suitable for low-power circuits
    4. Suitable for high-power circuits
    Which of these statements are correct?
    (a) 1 and 2   (b) 1 and 3
    (c) 2 and 3   (d) 3 and 4

Ans: (c)

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