HARSHA PRIYADARS

101PC10

Test Booklet Series | C

ROLL No. | 1 | 5 | 6 | 1 | 2 |

QN. BOOKLET No. 07494

TEST FOR FIRST DEGREE PROGRAMMES IN ENGINEERING AND TECHNOLOGY

PHYSICS AND CHEMISTRY

Time: 1 Hour and 30 Minutes

Maximum Marks: 375

INSTRUCTIONS TO CANDIDATES

1. You are provided with a Question Booklet and an Optical Mark Reader (OMR) Answer Sheet to mark your responses. Do not soil your OMR Sheet. Read carefully all the instructions given on the OMR Sheet.

2. Write your Roll Number in the space provided on the top of **this page.**

3. Also write your Roll Number, Test Centre Code, Test Centre Name, Test Subject and the date and time of the examination in the columns provided for the same on the **Answer Sheet**. Darken the appropriate bubbles with HB pencil.

4. Darken the appropriate bubble corresponding to the Test Booklet Series, as given on the top of this page, in the OMR Answer Sheet. **If the corresponding bubbles are not darkened, such answer sheets will not be valued and will be summarily rejected.**

5. The paper consists of 125 objective type questions, out of which the first 75 questions are from Physics and the remaining 50 questions are from Chemistry. All questions carry equal marks.

6. Each question has four alternative responses marked **A, B, C** and **D** and you have to **darken** the bubble fully by **HB pencil** corresponding to the correct response as indicated in the example shown on the Answer Sheet. Write the alphabet of your response with Ball Pen in the starred column and for unattempted question put a 'X' mark by ball pen in the starred column as given in the example in the OMR.

7. Each correct answer carries **3** marks and each wrong answer carries **1** minus mark.

8. Please do your rough work only on the space provided for it at the end of this question booklet.

9. You should return the Answer Sheet to the Invigilator before you leave the examination hall. However Question Booklet may be retained with the Candidate.

10. Every precaution has been taken to avoid errors in the Question Booklet. In the event of such unforeseen happenings, suitable remedial measures will be taken at the time of evaluation.

11. Please feel comfortable and relaxed. You can do better in this test in tension-free disposition.

WISH YOU A SUCCESSFUL PERFORMANCE

SEAL

PHYSICS AND CHEMISTRY

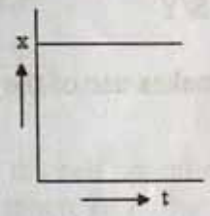
1. A black body at high temperature emits radiations of

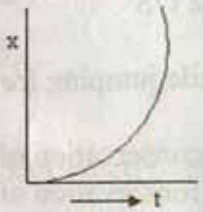
(A) large wavelengths
(B) small wavelengths
(C) one fixed wavelength
(D) all wavelengths

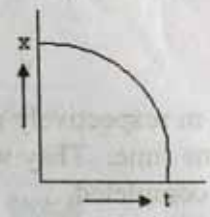
2. A man first moves 3 m due east, then 6 m due north and finally 7 m due west, then the magnitude of the resultant displacement is:

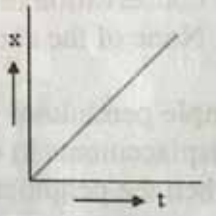
(A) $\sqrt{16}$
(B) $\sqrt{24}$
(C) $\sqrt{52}$
(D) $\sqrt{94}$

3. Which of the following distance-time graphs represents one dimensional uniform motion?

(A) 

(B) 

(C) 

(D) 

4. A bullet fired from a gun at sea level rises to a maximum height of 10 m. When fired at a ship 40 m away, the muzzle velocity should be

(A) 20 m/s
(B) 15 m/s
(C) 16 m/s
(D) none of the above

5. When a bicycle is in motion but not pedaled, the force of friction exerted by the ground on the two wheels is such that it acts:

(A) In the backward direction on both the wheels
(B) In the forward direction on both the wheels
(C) In the forward direction on the front wheel but in the backward direction on the rear wheel
(D) None of the above

6. When a carpet is beaten by a stick, the dust particles drop down according to

(A) Newton's 1st Law of motion
(B) Newton's 2nd Law of motion
(C) Newton's 3rd Law of motion

7. A bomb of mass 16kg at rest explodes into two pieces of masses 4kg and 12kg. The velocity of the 12kg mass is 4 ms^{-1}. The kinetic energy of the other mass is

(A) 144 J
(B) 288 J
(C) 244 J
(D) 268 J

8. Two SHM $x = a\sin\omega t$ and $y = b\cos\omega t$ directed along x and y axis respectively are acted on particle. The path of the particle will be a

(A) Circle
(B) Straight line
(C) Ellipse
(D) Parabola

9. If S is stress and Y is Young's modulus of material of a wire, the energy stored in the wire per unit volume is

(A) $2\,S^2Y$
(B) $S^2/2Y$
(C) $2Y/S^2$
(D) S/Y

10. A cat while jumping from one wall to another makes use of the Law of

(A) conservation of linear momentum
(B) conservation of angular momentum
(C) conservation of energy
(D) None of the above

11. Two simple pendulums of lengths 0.5 m and 2 m respectively are given small linear displacements in one direction at the same time. They will again be in phase when the pendulum of shorter length has completed.....oscillations.

(A) 5
(B) 3
(C) 1
(D) 2

12. The electromagnetic waves in the range of wavelength 3 mm to 100 cm are used in general for the purpose of satellite communication. The corresponding frequency range is

(A) 30 MHz to 10^4 MHz
(B) 300 MHz to 10^5 MHz
(C) 3 MHz to 10^6 MHz
(D) 3 MHz to 10^8 MHz

13. According to Maxwell, a changing electric field with respect to time produces

(A) electric current
(B) emf
(C) magnetic field
(D) radiation pressure

14. Find the electric field strength if the potential of field depends upon x, y coordinates as $\phi = a\left(x^2 - y^2\right)$

(A) $E = 2a\sqrt{x^2 + y^2}$ (B) $E = a\sqrt{x^2 + y^2}$

(C) $E = \frac{a}{2}\sqrt{x^2 + y^2}$ (D) $E = a\sqrt{\frac{1}{x^2 + y^2}}$

15. A thin non-conducting ring of radius r has linear charge density $q = q_0 \cos\theta$, where q_0 is constant and θ is angle at the centre from the diameter of maximum charge density in the anticlockwise direction. Find electric field at centre of ring.

(A) $\frac{q_0}{\varepsilon_0 r}$ (B) $\frac{q_0}{4\varepsilon_0 r}$

(C) $\frac{q_0}{2\varepsilon_0 r}$ (D) $\frac{q_0}{3\varepsilon_0 r}$

16. Calculate the self potential energy of a charge q distributed over the surface of a hollow sphere of radius R

(A) $\frac{q^2}{8\varepsilon_0 R}$ (B) $\frac{q^2}{4\varepsilon_0 R}$

(C) $\frac{q^2}{4\pi\varepsilon_0 R}$ (D) $\frac{q^2}{8\pi\varepsilon_0 R}$

17. A charge moving with velocity v in X direction is subjected to a field of magnetic induction in the negative X direction. As a result the charge will

(A) remain unaffected
(B) start moving in a circular path Y-Z plane
(C) retard along X-axis
(D) move along a helical path around X-axis

18. The frequency of the e.m. wave which is best suited to observe a particle of radius 3×10^{-4}cm is of the order of:

(A) 10^{15} (B) 10^{14}
(C) 10^{13} (D) 10^{12}

19. To an astronaut in the spaceship, the sky appears pitch dark. This is due to:

(A) absence of atmosphere in neighbourhood
(B) light from sky is absorbed by medium surrounding him
(C) the fact that at height, the sky radiations are only infrared and ultraviolet
(D) the fact that human eye becomes blind from blue colour

20. How will an image produced by a lens change, if half the lens is wrapped in black paper?

(A) there will be no effect
(B) the size of image will be reduced to one half
(C) the image will disappear
(D) the brightness of the image will be reduced

21. In the case of optical fibres, the outer cladding materials compared to the core materials of the fibre has

(A) the same refractive index
(B) higher refractive index
(C) imaginary refractive index
(D) lower refractive index

22. Rays of light having a wavelength λ are diffracted at an angle θ while passing through a single slit of width d. The condition for the first order minimum is

(A) $\cos\theta = \lambda / d$
(B) $\sin\theta = \lambda / d$
(C) $\tan\theta = 2\lambda / d$
(D) $\sin\theta = 2\lambda / d$

23. When a ray of light travels from one medium to another medium, the physical quantity that does not change is the

(A) Velocity
(B) Frequency
(C) Wavelength
(D) Amplitude

24. Depth of clear water in a well is 5.5 m and the refractive index of water is 1.33. Viewing from the top, the bottom of the well appear

(A) 1.37 m shifted up
(B) 1.37 m shifted down in depth
(C) 2.65 m shifted up
(D) Same as 5.5 m in depth

25. The doublet structure of the sodium 'D' line at 588.99nm and at 589.59 nm is basically due to

(A) Spin-spin interaction
(B) Spin-orbit interaction
(C) Tensor interaction
(D) Coulomb Interaction

26. Generally the temperature of a distant star is estimated using

(A) The luminosity measurements
(B) The red shift measurements
(C) Doppler broadening of spectral lines
(D) Absorption spectra

27. Dark lines in the solar spectrum are known as

(A) Fresnel's Lines
(B) Emission Lines
(C) Balmer Lines
(D) Fraunhofer Lines

28. The pressure and kinetic energy of ideal molecular gas numerically is related as

(A) $P = E$
(B) $P = \frac{2}{3}E$
(C) $P = \frac{1}{3}E$
(D) $P = \frac{3}{2}E$

29. The total number of helium atoms in 1 gm of Helium gas would be close to

(A) 3×10^{23}
(B) 6×10^{23}
(C) 12×10^{23}
(D) 6×10^{21}

30. 5 litre of water at 80° C is to be cooled down to 20° C by mixing cold water at 0° C. How much of the cold water is required?

(A) 1.5 litre
(B) 3.0 litre
(C) 15.0 litre
(D) 5.0 litre

31. A system consists of three coins. Tossing all the three coins simultaneously results into two coins heads up. What is the entropy of the system?

(A) k *ln* 3
(B) k *ln* 6
(C) k *ln* 2
(D) zero

32. The relationship between the current density **J** and the electric field **E** given by $\vec{J} = \sigma\vec{E}$ equivalently represents

(A) Maxwells Law
(B) Ohm's Law
(C) Coulomb's Law
(D) Gauss's Law

33. Select the expression representing a correct De Morgan's theorem.

(A) $\overline{A+B} = \overline{A} + \overline{B}$
(B) $\overline{A+B} = \overline{A} \bullet \overline{B}$
(C) $\overline{A+B} = A \bullet \overline{B}$
(D) $\overline{A+B} = A + B$

34. The circulation of magnetic field H around a closed path is equal to the current enclosed by the path is known as

(A) Biot-Savart's Law
(B) Gauss's Law of magnetostatic
(C) Ampere's circuital Law
(D) Faraday's Law

35. Mean square radius of a uniformly charged sphere of radius R is given by

(A) $\frac{1}{3}R^2$
(B) $\frac{3}{5}R^2$
(C) R^2
(D) $\frac{4}{3}R^2$

36. When a diamagnetic substance is brought near north or south pole of a bar magnet, it is

(A) attracted by the poles
(B) repelled by the poles
(C) attracted by north pole and repelled by south pole
(D) repelled by north pole and attracted by south pole

37. A copper rod of length 1 is rotated about the end perpendicular to a uniform magnetic field B with constant angular velocity ω. The induced emf between its ends is:

(A) $B\omega l^2$
(B) $\frac{1}{2}B\omega l^2$
(C) $\frac{1}{2}\frac{B\omega}{1}$
(D) $\frac{B\omega l}{2}$

38. A bar magnet is oscillating in earth's magnetic field with period T. What happens to its period and motion if its mass is quadrupled?

(A) Motion remains simple harmonic with new period = T/2.
(B) Motion remains simple harmonic with new period = 2T.
(C) Motion remains simple harmonic with new period = 4T.
(D) Motion remains simple harmonic and the period stays nearly constant.

39. A 25 W – 120 V bulb and 100 W – 120 V bulb are connected in series across 120 V line. The bulb burning more brightly will be:

(A) 25 W – 120 V
(B) 100 W – 120 V
(C) both will have same brightness
(D) neither will give any brightness

40. The difference in frequencies of series limit of Lymen series and Balmer series is equal to the frequency of the first line of the

(A) Lymen series
(B) Balmer series
(C) Paschen series
(D) Brackett series

41. An electron with kinetic energy 5 eV is incident on a hydrogen atom in its ground state. The collision

(A) may be completely inelastic
(B) must be completely inelastic
(C) may be partially inelastic
(D) must be elastic

42. In the following nuclear reaction ${}_6C^{11} \rightarrow {}_5B^{11} + \beta^{+} + X$. What does X stand for?

(A) a neutron
(B) a neutrino
(C) an electron
(D) a proton

43. Moseley's Law shows a linear relationship between

(A) The characteristic X-ray frequency and the atomic number
(B) The characteristic X-ray frequency and the atomic mass number
(C) The square root of the characteristic X-ray frequency and the atomic number
(D) The square of the characteristic X-ray frequency and the atomic mass number

44. The dimensions of Planck's constant is the same as that of

(A) Power
(B) Frequency
(C) Energy
(D) Angular momentum

45. If a nucleus ${}^{A}_{Z}X$ undergoes β^{-} decay, then the daughter nucleus ${}^{A_d}_{Z_d}Y$ will have (A_d, Z_d) as

(A) (A, Z)
(B) $(A-1, Z+1)$
(C) $(A, Z+1)$
(D) $(A, Z-1)$

46. Though the value of Planck's constant, h is very small ($\sim 10^{-34}$Js), it is important in all the quantum processes. If we consider this value to be zero, then we are dealing with

(A) Quantum Theory of gravitation
(B) Relativistic quantum theory
(C) Super symmetric theory
(D) Classical theory

47. The wave nature of particle is supported by the

(A) Oil drop experiment
(B) Cathode ray experiment
(C) Electron diffraction experiment
(D) Compton scattering

48. The Nuclei ${}^{17}_{8}O$ and ${}^{17}_{9}F$ are

(A) Isotopes
(B) Isobars
(C) Isotones
(D) Mirror Nuclei

49. If the half-life of a radioactive element is T, then the time elapsed for 75% of its initial amount to decay is,

(A) T
(B) 2T
(C) T/2
(D) T/4

50. Which of the following is a good nuclear fuel?

(A) Uranium-236
(B) Plutonium-239
(C) Thorium-236
(D) Uranium-238

51. The displacement of a body is proportional to cube of the time elapsed. The acceleration of the body would be proportional to

(A) square of the time
(B) linear in time
(C) cube of the time
(D) square root of the time

52. The velocity of a body moving with a uniform acceleration $2m/s^2$ is 15 m/s. What would be its velocity after 5 s?

(A) 25 m/s
(B) 10 m/s
(C) 30 m/s
(D) 15 m/s

53. A stone is thrown from the top of a tower with velocity 16m/s at an angle 30^0 with the horizontal. The stone takes 4s to hit the ground. The height of the tower approximately would be

(A) 55.4 m
(B) 46.4 m
(C) 66.2 m
(D) 30.6 m

54. A bag of sand of mass M is made to hang from a rope. A bullet of mass 999 times smaller than the sand bag is fired at it with a velocity of 400 m/s. The bullet gets embedded into the bag. What is the recoil velocity of the sand bag?

(A) 0.4 m/s
(B) 40 m/s
(C) 400 m/s
(D) 0.004 m/s

55. He established the law in 1885 which states that the rate of diffusion in any direction is proportional to the concentration gradient of the solute in that direction. Who was he?

(A) Graham (B) Robert Austen
(C) Hevesy (D) Fick

56. In the case of a soap bubble the pressure inside must be

(A) equal to that out side (B) greater than that out side
(C) smaller than that out side (D) ½ of the atmospheric pressure

57. An earth bound satellite has time period of 90 minutes. Assuming the orbit to be circular, the satellite must be at an altitude of

(A) 800 km (B) 963 km
(C) 3500 km (D) 272 km

58. The Young's modulus of three different materials A, B, C satisfy the relation $Y_A > Y_B$ and $Y_C > Y_A$. The most elastic material among the materials A, B, C is

(A) material B (B) material A
(C) material C (D) material A and C

59. As a car starts to move from rest with acceleration 1.4 m/s^2, another car moving with a constant speed of 12 m/s passes in a parallel lane. At what time span the first car can over take the second car?

(A) 17 s (B) 20 s
(C) 13.4 s (D) 12.4 s

60. The critical value of this number decides the transition from the laminar flow to tubular flow of a liquid.

(A) Mach number (B) Bernoulli's number
(C) Reynolds number (D) Stokes number

61. The energy required to increase radius of a soap bubble from 1 cm to 2 cm is (The surface tension is 30 dyne/cm):

(A) 240π erg (B) 720π erg
(C) 480π erg (D) 840π erg

62. Eight equal drops of water each of radius $r = 2$ mm are falling through air with a terminal velocity of 16 cm/s. The eight drops combine to form a big drop. The terminal velocity of big drop is:

(A) 16 m/s (B) 32 m/s
(C) 64 m/s (D) 48 m/s

63. If intensity of sound wave is increased nine times, then by what factor the pressure amplitude of the wave is increased?

(A) 3 (B) 6
(C) 9 (D) $\sqrt{3}$

64. Two tuning forks have frequencies 450 Hz and 454 Hz respectively. On sounding these forks together, the time interval between successive maximum intensities will be

(A) $\frac{1}{4}$ s (B) $\frac{1}{2}$ s
(C) 1 s (D) 2 s

65. A body initially at 80°C cools at 64°C in 5 min and to 52°C in the next 5 min. The temperature of the surroundings will be:

(A) 16°C (B) 8°C
(C) 4°C (D) 12°C

66. In a container having water filled upto a height h, a hole is made in the bottom. The velocity of water flowing out of the hole will be

(A) proportional to h (B) proportional to h^2
(C) proportional to $h^{1/2}$ (D) independent of h

67. Lissajou's figure obtained by combining $x = A\sin\omega t$ and $y = A\sin\left(\omega t + \frac{\pi}{4}\right)$ will be:

(A) an ellipse (B) a circle
(C) a straight line (D) a parabola

68. A man standing symmetrically between parallel cliffs claps his hands and hears a series of echoes at intervals of sec. If the speed of sound in air is 340 m/sec then distance between two cliffs is:

(A) 340m (B) 510m
(C) 680m (D) 270m

69. A closed organ pipe and an open organ pipe have their first overtone identical in frequency. Their lengths are in ratio:

(A) 1 : 2 (B) 2 : 3
(C) 3 : 4 (D) 4 : 5

70. Compressed air coming out of punctured football become cooler because of

(A) adiabatic compression
(B) Joule Thomson effect
(C) isothermal expansion
(D) energy dissipation

71. Of the following which one has the highest specific heat?

(A) Aluminium
(B) Copper
(C) Water
(D) Hydrogen

72. A bimetallic strip consists of brass and iron. When it is heated it bends into an arc with the brass on the convex and iron on the concave side of the arc. This happens because:

(A) density of brass is more than that of the iron
(B) brass has higher specific heat capacity than iron
(C) brass has higher coefficient of linear expansion than iron
(D) None of the above

73. The source and sink temperature of a Carnot engine are 400K and 300K respectively. What is the efficiency?

(A) 100%
(B) 75%
(C) 33.3%
(D) 25%

74. By opening the door of a refrigerator which is inside a room for one hour, you can

(A) cool the room to a certain degree
(B) cool the room to the temperature inside the refrigerator
(C) warm the room slightly
(D) neither cool nor warm the room

75. In Searle's method for finding conductivity the temperature gradient along the bar is

(A) greater near the hot end
(B) greater near the cold end
(C) the same at all points
(D) increases as we go from hot end to the cold end

76. Valence bond theory is unable to account for

(A) the para-magnetism of oxygen molecule
(B) the ionic character of sodium chloride
(C) the covalent character of chlorine molecule
(D) the structure of ammonium chloride

77. Le Chatelier's principle applies

(A) only to reactions among gases
(B) to all chemical reactions
(C) to all systems at equilibrium
(D) to all physical equilibria

78. The boiling point of para-nitrophenol is higher than that of ortho-nitrophenol because

(A) Nitro group at para position behaves in a different way from that in the ortho-position
(B) intra molecular hydrogen bonding exists in para-nitrophenol
(C) there is intermolecular hydrogen bonding in para-nitrophenol
(D) para-nitrophenol has a higher molecular weight than ortho-nitrophenol

79. $C_6H_5CONH_2 \xrightarrow{P_2O_5} A \xrightarrow{Na/alcohol} B$. Compound B is

(A) Benzalaniline
(B) Aniline
(C) Benzylamine
(D) Benzanilide

80. A dilute solution of Na_2SO_4 is electrolyzed using Pt electrodes. The products at the anode and cathode respectively are

(A) O_2 and H_2
(B) $S_2O_8^{2-}$ and Na^+
(C) O_2 and Na^+
(D) $S_2O_8^{2-}$ and H_2

81. The total number of ions present in a solution of potassium hexacyanoferrate (III) is

(A) two
(B) three
(C) four
(D) five

82. 5.36 gram of a metal displaces from an acid 1,120 mL of hydrogen at NTP. The equivalent weight of the metal is

(A) 26.8
(B) 107.2
(C) 5.36
(D) 53.6

83. The solubility product of AgCl is 1.4×10^{-4} at 373 K. The solubility of AgCl in boiling water is

(A) 1.18 g-mol/litre
(B) 0.118 g-mol/litre
(C) 1.18×10^{-2} g-mol/litre
(D) 1.18×10^{-4} g-mol/litre

84. The carboxylic group in an organic acid can be replaced by hydrogen by heating the acid with

(A) Zinc and hydrochloric acid
(B) Hydrogen in the presence of nickel
(C) Soda lime
(D) Bromine and concentrated aqueous alkali

85. Glucose is a (an)

(A) Aldohexose
(B) Aldopentose
(C) Ketohexose
(D) Ketopentose

86. The temperature at which the vapour pressure of a liquid equal to the atmospheric pressure is

(A) boiling point
(B) freezing point
(C) absolute temperature
(D) depression of boiling point

87. An element has two main isotopes of mass numbers 85 and 87. Their abundance are 70% and 30% respectively. The atomic weight of the element is therefore,

(A) 86
(B) 85.6
(C) 85.5
(D) 86.5

88. Given that K_a for HF is 6.8×10^{-4}. The value of K_b for F^- is

(A) 1.5×10^{-11}
(B) 6.8×10^{-4}
(C) 1.0×10^{-14}
(D) 6.8×10^{-11}

89. An isomer of ethyl alcohol is

(A) Methanol
(B) Dimethyl ether
(C) Diethyl ether
(D) Glycol

90. Vulcanization of rubber is the process in which rubber is heated with

(A) peroxide
(B) phosphorus
(C) sulphur
(D) oxygen

91. The half-life period of a radioactive sample is 2 hours. If we start with 1g of the sample at 8 AM, how much of it will remain at 4 PM?

(A) 0.5 g
(B) 0.25 g
(C) 0.125 g
(D) 0.0625 g

92. The number of moles of sucrose in 200 mL of a 0.100 M solution ($C_{12}H_{22}O_{11}$, molar mass 342 g/mol)

(A) 2 mol
(B) 0.2 mol
(C) 0.02 mol
(D) 20 mol

93. Amount of CO_2 formed during the complete combustion of two moles of ethanol is

(A) 44 g
(B) 88 g
(C) 17.6 g
(D) 176 g

94. The reducing agent in Clemmensen reduction is

(A) $LiAlH_4$
(B) Zn/NaOH
(C) Na/ethanol
(D) Zn-Hg/HCl

95. The percentage of nitrogen content in urea is

(A) 26
(B) 36
(C) 46
(D) 56

96. If the pH of the solution is 5, then $[OH^-]$ will be

(A) 5
(B) 9
(C) 1×10^{-5}
(D) 1×10^{-9}

97. The substance in which Phosphorus is in the +3 oxidation state is

(A) Phosphorus acid
(B) Hypophosphorus acid
(C) Ortho phosphoric acid
(D) Metalphosphoric acid

98. A chemical reaction is said to be equilibrium when

(A) The reactants are completely transformed into products
(B) The rates of forward reaction and backward reaction are equal
(C) Equal amounts of reactants and products are present
(D) The formation of the product is minimized

99. Lactic acid can be obtained by the oxidation of

(A) Propylene glycol
(B) α- bromopropionic acid
(C) Acetaldehyde cyanohydrin
(D) None of the above

100. Denaturation of protein is due to

(A) oxidation of protein
(B) dissolution of protein
(C) hydrolysis of protein into amino acids
(D) disruption of three dimensional structure

101. Which one of the following elements is the main metallic constituent of haemoglobin?

(A) Aluminium
(B) Copper
(C) Iron
(D) Magnesium

102. $K_3 [Al(C_2O_4)_3]$ is known as

(A) Potassium alumino oxalate
(B) Potassium tris(oxalato)aluminate (III)
(C) Potassium aluminium(III) oxalate
(D) Potassium trioxalato aluminate (IV)

103. An increase in pressure shifts the position of the equilibrium in the direction in which

(A) There is an increase in volume
(B) There is a decrease in volume
(C) There is no change in volume
(D) There is an increase in the number of molecules

104. A compound A of molecular formula $C_{13}H_{10}O$ on reduction with zinc amalgam and HCl gives diphenylmethane. Hence compound A is

(A) Diphenylcarbinol
(B) Benzophenone
(C) Acetophenone
(D) Phenyl hexyl ketone

105. According to Bronsted concept, acid is

(A) proton acceptor
(B) proton donor
(C) electron donor
(D) electron acceptor

106. Which of the following species has a pyramidal shape?

(A) PCl_3
(B) SO_3
(C) CO_3^{2-}
(D) NO_3^-

107. In very dilute hydrochloric acid, the solubility of silver chloride

(A) Increases
(B) Decreases
(C) Remains unchanged
(D) Changes only to a negligible extent

108. Ferric salts give blood red colouration with

(A) Potassium ferricyanide
(B) Potassium ferriccyanide
(C) Ammonium thiocynate
(D) Potassium permanganate

109. Which one of the following compounds does not undergo Cannizzaro reaction?

(A) HCHO
(B) C_6H_5CHO
(C) $H_3C\,C(CH_3)_2\,CHO$
(D) CH_3CHO

110. For strong electrolytes, as dilution increases the equivalent conductance

(A) increases
(B) decreases
(C) remains constant
(D) may increase or decrease depending on electrolyte

111. CsBr crystallizes in a BCC type structure. The density of CsBr crystal is $4.24 gcm^{-3}$. The probable unit cell length is

(A) 437 nm
(B) 437 pm
(C) 437 μm
(D) 437 mm

112. Which of the following has zero dipole moment?

(A) CH_2Cl_2
(B) BF_3
(C) NF_3
(D) ClO_2

113. An organic compound (C_5H_8) on hydrogenation gave C_5H_{12}. The original compound (C_5H_8) on ozonolysis gave formaldehyde and 2-ketopropanal. The original compound is

(A) Pentene
(B) 2-methyl-1,3-butadiene
(C) 1-methyl-1,3-butadiene
(D) none of the above

114. The order of acidity of alcohol, carboxylic acid and phenol is

(A) carboxylic acid > alcohol > phenol
(B) alcohol > phenol > carboxylic acid
(C) carboxylic acid > phenol > alcohol
(D) phenol > carboxylic acid > alcohol

115. When hydrochloric acid is exactly neutralized by NaOH solution which one of the following groups represents most accurately the ions which are present in the neutral solution?

(A) Sodium ions and chloride ions $\left(Na^+ \text{ and } Cl^-\right)$

(B) Sodium ions, chloride ions and hydroxide ions $\left(Na^+, Cl^- \text{ and } OH^-\right)$

(C) Sodium ions, chloride ions and hydrogen ions $\left(Na^+, Cl^- \text{ and } H^+\right)$

(D) Hydroxyl ions and $H_3O\left(OH^- \text{ and } H_3O^+\right)$

116. The value of the equilibrium constant of the following reaction is 10

$HA + B \leftrightarrow BH^+ + A^-$

The value of the forward rate constant is 10^5. The rate constant for the reverse reaction is

(A) 10 (B) 10^4

(C) 10^5 (D) 10^2

117. The Rate of a reaction is given by Rate K [A] $[B]^2$. The concentration of A and B are doubled, then the rate will be

(A) The same as the original concentration
(B) Twice of the original rate
(C) Eight times the original rate
(D) Six times the original rate

118. Methyl isocyanide on reduction gives

(A) Methylamine (B) Ethyleamine

(C) Dimethylamine (D) Trimethylamine

119. Phenol is converted into salicylaldehyde by one of the following reactions

(A) Riemer-Tiemann reaction (B) Kolbe synthesis

(C) Kolbe Schmidt reaction (D) Scotten-Baumann reaction

120. The ionisation constants of aniline, diethylamine and ammonia are 4.2×10^{-10}, 1.76×10^{-5} and 9.6×10^{-4} respectively. The increasing order of their base strengths is

(A) Aniline < ammonia < diethylamine
(B) Aniline < diethylamine < ammonia
(C) Ammonia < aniline < diethylamine
(D) Ammonia < diethylamine < aniline

121. Which of the following has the least number of molecules?

(A) 11.2 litres of SO_2 at STP
(B) 1 mol of SO_2 gas
(C) 1×10^{23} molecules
(D) 5.6 litre of SO_2 at STP

122. The De Broglie wavelength of a stone of mass 10 gram moving with a velocity of 2×10^{-2} m s^{-1} if 'h' is taken as 6.6×10^{-34} kg m^2 s^{-1} is

(A) 3.3×10^{-30} m
(B) 3.3 m
(C) 3.3×10^{-28} m
(D) 3.3 nm

123. Formic acid reacts with ammoniacal silver nitrate to form

(A) Metallic silver
(B) Silver acetylide
(C) Formaldehyde
(D) Acetaldehyde

124. The number of isomers possible for hydroxybenzoic acid is

(A) one
(B) two
(C) three
(D) four

125. The ratio between the root mean square velocity of H_2 at 50 K and that of O_2 at 800K is

(A) 16
(B) 8
(C) 1
(D) $\frac{1}{16}$

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