

UP-CPMT - 2008

Paper-2

Physics

1. The refractive index of glass is 1.520 for red light and 1.525 for blue light. Let D_1 and D_2 be angles of minimum deviation for red and blue light respectively in a prism of this glass. then,
 - 1) $D_1 < D_2$
 - 2) $D_1 = D_2$
 - 3) D_1 can be less than or greater than D_2 depending upon the angle of prism
 - 4) $D_1 > D_2$

2. In a mass spectrometer used for measuring the masses of ions, the ions are initially accelerated by an electric potential V and then made to describe semicircular paths of radius R using a magnetic field B . If V and B are kept constant the ratio ((charge on the ion)/(mass of the ion)) will be proportional to
 - 1) $1/R^3$
 - 2) $1/R^2$
 - 3) R^2
 - 4) R

3. In gamma ray emission from a nucleus
 - 1) both the neutron number and the proton number change
 - 2) there is no change in the proton number and the neutron number
 - 3) only the neutron number changes
 - 4) only the proton number changes

4. Spherical balls of radius R are falling in a viscous fluid of viscosity η with a velocity v . The retarding viscous force acting on the spherical ball is
 - 1) directly proportional to R but inversely proportional to v
 - 2) directly proportional to both radius R and velocity v
 - 3) inversely proportional to both radius R and velocity v
 - 4) inversely proportional to R but directly proportional to velocity v

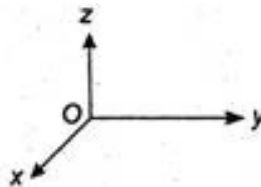
5. Mercury boils at 367°C . However, mercury thermometers are made such that they can measure temperature upto 500°C . This is done by
 - 1) maintaining vacuum above mercury column in the stem of the thermometer
 - 2) filling nitrogen gas at high pressure above the mercury column

- 3) filling oxygen gas at high pressure above the mercury column
 4) filling nitrogen gas at low pressure above the mercury column
6. In a laboratory four convex lenses L_1 , L_2 , L_3 and L_4 of focal lengths 2, 4, 6 and 8 cm, respectively are available. Two of these lenses form a telescope of length 10 cm and magnifying power 4. The objective and eye lenses are respectively
- 1) L_2 , L_3
 - 2) L_1 , L_4
 - 3) L_1 , L_2
 - 4) L_4 , L_1
7. The resistance of an ammeter is 13Ω and its scale is graduated for a current upto 100 A. After an additional shunt has been connected to this ammeter it becomes possible to measure currents upto 750 A by this meter. The value of shunt resistance is
- 1) 10Ω
 - 2) 2Ω
 - 3) 0.02Ω
 - 4) 200Ω
8. A charged particle (charge q) is moving in a circle of radius R with uniform speed v . The associated magnetic moment μ is given by
- 1) $(qvR/2)$
 - 2) $2qvR^2$
 - 3) $(qvR^2/2)$
 - 4) $2qvR$
9. The work of 146 kJ is performed in order to compress one kilo mole of a gas adiabatically and in this process the temperature of the gas increases by 7°C . The gas is ($R = 8.3 \text{ J mol}^{-1} \text{ K}^{-1}$)
- 1) diatomic
 - 2) triatomic
 - 3) a mixture of monoatomic and diatomic
 - 4) monoatomic
10. Diwali rocket is ejecting 50 g of gases/s at a velocity of 400 m/s. The accelerating force on the rocket will be
- 1) 24 dyne
 - 2) 20 N
 - 3) 20 dyne
 - 4) 50 N
11. Two satellites of earth, S_1 and S_2 , are moving in the same orbit. The mass of S_1 is four

times the mass of S_2 . Which one of the following statements is true ?

- 1) The time period of S_1 is four times that of S_2
 - 2) The potential energies of earth and satellite in the two cases are equal
 - 3) S_1 and S_2 are moving with the same speed
 - 4) The kinetic energies of the two satellites are equal
12. The primary and secondary coils of a transformer have 50 and 1500 turns respectively. If the magnetic flux ϕ linked with the primary coil is given by $\phi = \phi_0 + 4t$, where ϕ is in weber, t is time in second and ϕ_0 is a constant, the output voltage across the secondary coil is
- 1) 60 V
 - 2) 120 V
 - 3) 150 V
 - 4) 180 V

13. A force of $-F\hat{k}$ acts on O, the origin of the coordinate system. The torque about the point (1, -1) is



- 1) $F(\hat{i} - \hat{j})$
 - 2) $-F(\hat{i} + \hat{j})$
 - 3) $F(\hat{i} + \hat{j})$
 - 4) $-F(\hat{i} - \hat{j})$
14. A symmetric double convex lens is cut in two equal parts by a plane perpendicular to the principal axis. If the power of the original lens is 4D, the power of a cut lens will be
- 1) 2D
 - 2) 3D
 - 3) 4D
 - 4) 5D
15. Two non-ideal batteries are connected in parallel. Consider the following statements.
- (i) The equivalent emf is smaller than either of the two emfs.
 - (ii) The equivalent internal resistance is smaller than either of the two internal resistances.
- 1) Both (i) and (ii) are correct
 - 2) (i) is correct but (ii) is wrong
 - 3) (ii) is correct but (i) is wrong
 - 4) Both (i) and (ii) are wrong
16. A particle executes simple harmonic oscillation with an amplitude a . The period of oscillation is T . The minimum time taken by the particle to travel half of the amplitude from the equilibrium position is
- 1) $T/6$

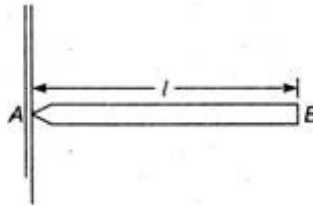
- 2) $T/9$
 3) $T/12$
 4) $T/15$
17. Which of the following parameters does not characterise the thermodynamic state of matter?
- 1) Temperature
 2) Pressure
 3) Work
 4) Volume
18. Three point charges $+q$, $-2q$ and $+q$ are placed at points $(x = 0, y = a, z = 0)$, $(x = 0, y = 0, z = 0)$ and $(x = a, y = 0, z = 0)$, respectively. The magnitude and direction of the electric dipole moment vector of this charge assembly are
- 1) $\sqrt{2} qa$ along $+y$ direction
 2) $\sqrt{2} qa$ along the line joining points $(x = 0, y = 0, z = 0)$ and $(x = a, y = a, z = 0)$
 3) $\sqrt{2} qa$ along the line joining points $(x = 0, y = 0, z = 0)$ and $(x = a, y = a, z = 0)$
 4) $\sqrt{2} qa$ along $+x$ direction
19. Dimensions of resistance in an electrical circuit, in terms of dimension of mass M , of length L , of time T and of current I , would be
- 1) $[ML^2T^{-2}I^{-1}]$
 2) $[ML^1T^{-2}]$
 3) $[ML^2T^{-1}I^{-1}]$
 4) $[ML^2T^{-3}I^{-2}]$
20. A vertical spring with force constant k is fixed on a table. A ball of mass m at a height h above the free upper end of the spring falls vertically on the spring, so that the spring is compressed by a distance d . The net work done in the process is
- 1) $mg(h + d) + (1/2)kd^2$
 2) $mg(h + d) - (1/2)kd^2$
 3) $mg(h - d) - (1/2)kd^2$
 4) $mg(h - d) + (1/2)kd^2$
21. A coil of inductance 300 mH and resistance Q is connected to a source of voltage 2 V . The current reaches half of its steady state value in
- 1) 0.015 s
 2) 0.1 s
 3) 0.125 s

4) 0.325 s

22. If g_E and g_M are the accelerations due to gravity on the surfaces of the earth and the moon respectively and if Millikan's oil drop experiment could be performed on the two surfaces, one will find the ratio((electronic charge on the moon)/(electronic charge on the earth)) to be

- 1) 1
- 2) zero
- 3) (g_E/g_M)
- 4) (g_M/g_E)

23. A uniform rod AB of length l and mass m is free to rotate about point A. The rod is released from rest in the horizontal position. Given that the moment of inertia of the rod about A is $(ml^2/3)$, the initial angular acceleration of the rod will be



- 1) $(2g/3l)$
- 2) mg/l
- 3) $3g/l$
- 4) $(3g/2l)$

24. Two spherical conductors B and C having equal radii and carrying equal charges in them repel each other with a force F when kept apart at some distance. A third spherical conductor having same radius as that of B but uncharged, is brought in contact with B, then brought in contact with C and finally removed away from both. The new force of repulsion between B and C is

- 1) $F/3$
- 2) $3F/2$
- 3) $F/5$
- 4) $3F/8$

25. A charged oil drop is suspended in uniform field of 3×10^4 V/m so that it neither falls nor rises. The charge on the drop will be (Take the mass of the charge = 9.9×10^{-15} kg and $g = 10 \text{ m/s}^2$)

- 1) $3.3 \times 10^{-18} \text{ C}$
- 2) $2.2 \times 10^{-18} \text{ C}$
- 3) $0.1 \times 10^{-18} \text{ C}$
- 4) $3.2 \times 10^{-18} \text{ C}$

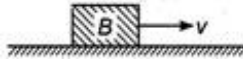
26. In radioactive decay process, the negatively charged emitted β -particles are

- 1) the electrons present inside the nucleus
- 2) the electrons produced as a result of the decay of neutrons inside the nucleus
- 3) the electrons produced as a result of collisions between atoms
- 4) the electrons orbiting around the nucleus

27. Two radioactive substances A and B have decay constants 5λ and λ respectively. At $t = 0$ they have the same number of nuclei. The ratio of number of nuclei of A to those of B will be $(1/e)^2$ after a time interval

- 1) $(1/5\lambda)$
- 2) 5λ
- 3) 2λ
- 4) $(1/2\lambda)$

28. A block B is pushed momentarily along a horizontal surface with an initial velocity v . If μ is the coefficient of sliding friction between B and the surface, block B will come to rest after a time



- 1) $(v/g\mu)$
- 2) $(g\mu/v)$
- 3) (g/v)
- 4) (μ/g)

29. A sound absorber attenuates the sound level by 20 dB. The intensity decreases by a factor of

- 1) 10
- 2) 100
- 3) 1000
- 4) 10000

30. Under the influence of a uniform magnetic field a charged particle is moving in a circle of radius R with constant speed v . The time period of the motion

- 1) depends on v and not on R
- 2) depends on both R and v
- 3) is independent of both R and v
- 4) depends on R and not on v

31. A ball is thrown from a point with a speed v_0 at an angle of projection θ . From the same point and at the same instant, a person starts running with a constant speed $(v_0/2)$ to catch the ball. Will the person be able to catch the ball? If yes, what should be the angle of projection?

- 1) Yes, 60°
- 2) Yes, 37°
- 3) No

4) Yes, 53°

32. A transformer is used to light a 100 W and 110 V lamp from a 220 V mains. If the main current is 0.5 A, the efficiency of the transformer is approximately

- 1) 30% 2) 60% 3) 90% 4) 100%

33. A particle starting from the origin (0, 0) moves in a straight line in the (x, y) plane. Its coordinates at a later time are $(\sqrt{3}, 3)$. The path of the particle makes with the x-axis an angle of

- 1) 0° 2) 30° 3) 45° 4) 60°

34. An observer moves towards a stationary source of sound, with a velocity one-fifth of the velocity of sound. What is the percentage increase in the apparent frequency ?

- 1) Zero 2) 0.25% 3) 25% 4) 20%

35. A steady current of 1.5 A flows through a copper voltameter for 10 min. If the electrochemical equivalent of copper is $30 \times 10^{-5} \text{ g C}^{-1}$, the mass of copper deposited on the electrode will be

- 1) 0.30 g
2) 0.60 g
3) 0.57g
4) 0.27 g

36. The maximum number of possible interference maxima for slit-separation equal to twice the wavelength in Young's double-slit experiment, is

- 1) infinite
2) five
3) three
4) zero

37. The potential energy of a molecule on the surface of a liquid compared to one inside the liquid is

- 1) zero
2) lesser
3) equal
4) greater

38. For a metallic wire, the ratio (V/i) (V = applied potential difference and i = current flowing) is

- 1) independent of temperature
2) increases as the temperature rises
3) decreases as the temperature rises
4) increases or decreases as temperature rises depending upon the metal

39. The frequency of a light wave in a material is 2×10^{14} Hz and wavelength is 5000 Å. The refractive index of material will be
- 2.40
 - 2.50
 - 3.00
 - 2.33
40. A wheel has angular acceleration of 3.0 rad/s^2 and an initial angular speed of 2.00 rad/s . In a time of 2 s it has rotated through an angle (in radian) of
- 5
 - 10
 - 15
 - 20
41. What is the value of inductance L for which the current is a maximum in a series LCR circuit with $C = 10 \mu\text{F}$ and $\omega = 1000 \text{ s}^{-1}$?
- 100 mH
 - 5 mH
 - Cannot be calculated unless R is known
 - 50 mH
42. An alpha nucleus of energy $(1/2) \text{ mv}^2$ bombards a heavy nuclear target of charge Ze . Then the distance of closest approach for the alpha nucleus will be proportional to
- v^3
 - $1/m$
 - $1/v^4$
 - $1/Ze$
43. A frame made of metallic wire enclosing a surface area A is covered with a soap film. If the area of the frame of metallic wire is reduced by 50%, the energy of the soap film will be changed by
- 100%
 - 75%
 - 50%
 - 25%
44. Nickel shows ferromagnetic property at room temperature. If the temperature is increased beyond Curie temperature, then it will show
- paramagnetism
 - anti-ferromagnetism
 - no magnetic property
 - diamagnetism
45. A car moves from X to Y with a uniform speed v_u and returns to Y with a uniform speed v_d .

The average speed for this round trip is

- 1) $(2v_d v_u / v_d + v_u)$
- 2) $\sqrt{(v_u v_d)}$
- 3) $(v_d v_u / v_d + 2v_u)$
- 4) $(2v_u + v_d / 2)$

46. If M_O is the mass of an oxygen isotope ${}_8O^{17}$, M_P and M_n are the masses of a proton and a neutron, respectively, the nuclear binding energy of the isotope is

- 1) $(M_O - 8M_P)c^2$
- 2) $(M_O - 8M_P - 9M_n)c^2$
- 3) $M_O c^2$
- 4) $(M_O - 17M_n)c^2$

47. Three resistances P, Q, R each of 2Ω and an unknown resistance S form the four arms of a Wheatstone's bridge circuit. When a resistance of 8Ω is connected in parallel to S the bridge gets balanced. What is the value of S ?

- 1) 2Ω
- 2) 3Ω
- 3) 5Ω
- 4) 7Ω

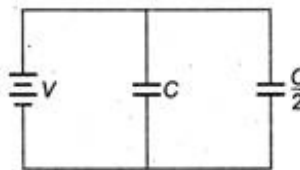
48. A mass of M kg is suspended by a weightless string. The horizontal force that is required to displace it until the string makes an angle of 45° with the initial vertical direction is

- 1) $Mg(\sqrt{2} + 1)$
- 2) $Mg\sqrt{2}$
- 3) $Mg/\sqrt{2}$
- 4) $Mg(\sqrt{2} - 1)$

49. A particle of mass 100 g is thrown vertically upwards with a speed of 5 m/s. The work done by the force of gravity during the time the particle goes up is

- 1) - 0.125 J
- 2) - 1.25 J
- 3) 12.5 J
- 4) 0.25 J

50. Two condensers, one of capacity C and the other of capacity $(C/2)$, are connected to a V volt battery, as shown.



The work done in charging fully both the condensers is

- 1) $4CV^2$
- 2) $(1/4)CV^2$

3) $(3/4)CV^2$

4) $(4/3)CV^2$

Chemistry

51. Which of the following is not correct?

- 1) Al reacts with NaOH and liberate H_2
- 2) $AlCl_3$ is a Lewis acid
- 3) Al is used in the manufacture of electrical cables
- 4) NaOH is used during Hall's process of purification of bauxite

52. A mixture of amylose and amylopectin is called

- 1) lactose
- 2) starch
- 3) cellulose
- 4) sucrose

53. Which of the following reagents converts both acetaldehyde and acetone to alkanes?

- 1) Ni/H_2
- 2) $LiAlH_4$
- 3) $I_2/NaOH$
- 4) $Zn-Hg/conc. HCl$

54. SiO_2 is reacted with sodium carbonate. What is the gas liberated?

- 1) CO
- 2) O_2
- 3) CO_2
- 4) O_3

55. What is the wave number of 4th line in Balmer series of hydrogen spectrum ? ($R = 1,09,677 \text{ cm}^{-1}$)

- 1) $24,750 \text{ cm}^{-1}$
- 2) $24,550 \text{ cm}^{-1}$
- 3) $24,730 \text{ cm}^{-1}$
- 4) $24,372 \text{ cm}^{-1}$

56. Methyl alcohol when reacted with carbon monoxide using cobalt or rhodium as catalyst, compound 'A' is formed. On heating 'A' with HI in the presence of red phosphorus as catalyst 'B' is formed. Identify 'B'.

- 1) CH_3COOH

- 2) $\text{CH}_3 \cdot \text{CHO}$
- 3) $\text{CH}_3 \cdot \text{CH}_2 \cdot \text{I}$
- 4) $\text{CH}_3 \cdot \text{CH}_3$

57. One gas bleaches the colour of flowers by reduction and another gas by oxidation. The gases respectively are

- 1) SO_2 and Cl_2
- 2) CO and Cl_2
- 3) NH_3 and SO_2
- 4) H_2S and Br_2

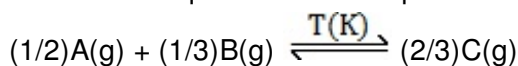
58. A 0.5 g/L solution of glucose is found to be isotonic with a 2.5 g/L solution of an organic compound. What will be the molecular weight of that organic compound?

- 1) 300
- 2) 600
- 3) 900
- 4) 200

59. The compounds formed at anode in the electrolysis of an aqueous solution of potassium acetate, are

- 1) C_2H_6 and CO_2
- 2) C_2H_4 and CO_2
- 3) CH_4 and H_2
- 4) CH_4 and CO_2

60. What is the equation for the equilibrium constant (K_c) for the following reaction?



- 1) $K_c = ([\text{A}]^{1/2}[\text{B}]^{1/3}/[\text{C}]^{3/2})$
- 2) $K_c = ([\text{C}]^{3/2}/[\text{A}]^2[\text{B}]^3)$
- 3) $K_c = ([\text{C}]^{2/3}/[\text{A}]^{1/2}[\text{B}]^{1/3})$
- 4) $K_c = ([\text{C}]^{2/3}/[\text{A}]^{1/2} + [\text{B}]^{1/3})$

61. Which of the following dissolves in water but does not give any oxyacid solution?

- 1) SO_2
- 2) OF_2
- 3) SCl_4
- 4) SO_3

62. Which of the following is not correct regarding the electrolytic preparation of H_2O_2 ?

- 1) Lead is used as cathode
- 2) 50% H_2SO_4 is used
- 3) Hydrogen is liberated at anode

4) Sulphuric acid undergoes oxidation

63. Oxidation state of oxygen in F_2O is

- 1) +1 2) -1 3) +2 4) -2

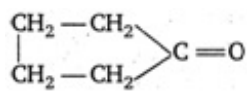
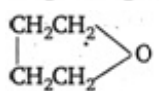
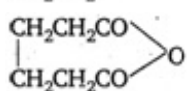
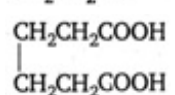
64. During, acetylation of amines, what is replaced by acetyl group?

- 1) Hydrogen atom attached to nitrogen atom
2) One or more hydrogen atoms attached to carbon atom
3) One or more hydrogen atoms attached to nitrogen atom
4) Hydrogen atoms attached to either carbon atom or nitrogen atom

65. Which one of the following reactions is called Rosenmund reaction ?

- 1) Aldehydes are reduced to alcohols
2) Acids are converted to acid chlorides
3) Alcohols are reduced to hydrocarbons
4) Acid chlorides are reduced to aldehydes

66. Adipic acid on heating form

- 1)  $\begin{array}{l} \text{CH}_2 - \text{CH}_2 \\ | \quad \quad | \\ \text{CH}_2 - \text{CH}_2 \end{array} \begin{array}{l} \diagup \\ \diagdown \end{array} \text{C} = \text{O}$
2)  $\begin{array}{l} \text{CH}_2\text{CH}_2 \\ | \quad \quad | \\ \text{CH}_2\text{CH}_2 \end{array} \begin{array}{l} \diagup \\ \diagdown \end{array} \text{O}$
3)  $\begin{array}{l} \text{CH}_2\text{CH}_2\text{CO} \\ | \quad \quad | \\ \text{CH}_2\text{CH}_2\text{CO} \end{array} \begin{array}{l} \diagup \\ \diagdown \end{array} \text{O}$
4)  $\begin{array}{l} \text{CH}_2\text{CH}_2\text{COOH} \\ | \\ \text{CH}_2\text{CH}_2\text{COOH} \end{array}$

67. In an oxidation reduction reaction, dichromate ($\text{Cr}_2\text{O}_7^{2-}$) ion is reduced to Cr^{3+} ion. The equivalent weight of $\text{K}_2\text{Cr}_2\text{O}_7$ in this reaction is

- 1) (molecular weight)/3
2) (molecular weight)/6
3) (molecular weight)/1
4) (molecular weight)/2

68. t-butyl chloride preferably undergo hydrolysis by

- 1) $\text{S}_{\text{N}}1$ mechanism
2) $\text{S}_{\text{N}}2$ mechanism
3) Any of (1) and (2)
4) None of the above

69. What is the electrode potential (in V) of the following electrode at 25°C ?

Ni^{2+} (0.1 M) | Ni(s) (Standard reaction potential of Ni^{2+} | Ni is -0.25V, $(2.303 RT/F) = 0.06$

- 1) -0.28 V
- 2) -0.32 V
- 3) -0.36 V
- 4) -0.40 V

70. H — O — H bond angle in H_2O is 104.5° and not $109^\circ 28'$ because of

- 1) lone pair-lone pair repulsion
- 2) lone pair-bond pair repulsion
- 3) bond pair-bond pair repulsion
- 4) high electronegativity of oxygen

71. Which is used in alcoholic beverages?

- 1) Methanol
- 2) Ethanol
- 3) Phenol
- 4) Glycerol

72. The best method to separate the mixture of ortho and para nitrophenol (1 : 1) is

- 1) vaporisation
- 2) colour spectrum
- 3) distillation
- 4) crystallisation

73. The total number of orbitals in the fifth energy level is

- | | | | |
|------|-------|-------|-------|
| 1) 5 | 2) 10 | 3) 20 | 4) 25 |
|------|-------|-------|-------|

74. Iodoform gives a precipitate with AgNO_3 on heating but chloroform does not because

- 1) C — I bond in iodoform is weak and C — Cl bond in chloroform is strong
- 2) chloroform is covalent
- 3) iodoform is ionic
- 4) None of the above

75. What are the values of n_1 and n_2 respectively for H_β line in the Lyman series of hydrogen atomic spectrum?

- 1) 3 and 5
- 2) 2 and 3
- 3) 1 and 3
- 4) 2 and 4

76. Disperse phase and dispersion medium in butter are respectively

- 1) solid and liquid
- 2) liquid and solid
- 3) liquid and liquid
- 4) solid and solid

77. In an oxidation-reduction reaction, MnO_4^- ion is converted to Mn^{2+} . What is the number of equivalents of KMnO_4 (mol. wt. = 158) present in 250 mL of 0.04 M KMnO_4 solution?

- 1) 0.06
- 2) 0.05
- 3) 0.04
- 4) 0.01

78. In which of the following pairs, both molecules possess dipole moment ?

- 1) CO_2 , SO_2
- 2) BCl_3 , PCl_3
- 3) H_2O , SO_2
- 4) CO_2 , CS_2

79. 9.2 g N_2O_4 is heated in a 1 L vessel till equilibrium state is established $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$

In equilibrium state 50% N_2O_4 was dissociated, equilibrium constant will be (mol. wt. of N_2O_4 = 92)

- 1) 0.1
- 2) 0.2
- 3) 0.5
- 4) 0.7

80. Element with atomic number 38, belongs to

- 1) II A group and 5th period
- 2) II A group and 2nd period
- 3) V A group and 2nd period
- 4) III A group and 5th period

81. Which of the following is correct?

- 1) Catalyst undergoes permanent chemical change
- 2) Particle size of solute in true solution is 10^{-3}m
- 3) Starch solution is a hydrosol
- 4) Hydrolysis of liquid ester in the presence of mineral acid is an example of heterogeneous catalysis reactions

82. Which of the following is correct?

- 1) The pH of one litre solution containing 0.49 g of H_2SO_4 is 2.0
 - 2) The conjugate base of H_2S is S^{2-}
 - 3) BF_3 is a Lewis base
 - 4) Phenolphthalein is colourless in basic medium
83. Which of the following is not correct?
- 1) Hydrolysis of NCl_3 gives NH_3 and HOCl
 - 2) NH_3 is less stable than PH_3
 - 3) NH_3 is a weak reducing reagent compared to PH_3
 - 4) Nitric oxide in solid state exhibits diamagnetic property
84. A 0.1 aqueous solution of a weak acid is 2% ionised. If the ionic product of water is 1×10^{-14} , the $[\text{OH}^-]$ is
- 1) $5 \times 10^{-12} \text{ M}$
 - 2) $5 \times 10^{-3} \text{ M}$
 - 3) $5 \times 10^{-14} \text{ M}$
 - 4) None of these
85. Steel is heated to below red heat and then, cooled slowly. The process refers to
- 1) hardening
 - 2) annealing
 - 3) tempering
 - 4) nitriding
86. The atomic number of an element 'M' is 26. How many electrons are present in the M-shell of the element in its M^{3+} state ?
- 1) 17
 - 2) 14
 - 3) 10
 - 4) 13
87. If 50% of a radioactive substance dissociates in 15 min, then the time taken by substance to dissociate 99% will be
- 1) 33 min
 - 2) 44 min
 - 3) 99 min
 - 4) 55 min
88. Which of the following carbonates decomposes readily at low temperatures ?
- 1) Na_2CO_3

- 2) K_2CO_3
- 3) Li_2CO_3
- 4) Rb_2CO_3

89. The most probable velocity be (in cm/s) of hydrogen molecule at $27^\circ C$ will be

- 1) 20.3×10^4
- 2) 17.8×10^4
- 3) 25.93×10^9
- 4) 28×10^8

90. The reaction, $C_6H_5CHO + CH_3COOC_2H_5 \rightarrow C_6H_5CH = CHCOOC_2H_5$, is called

- 1) Benzoin condensation
- 2) Claisen condensation
- 3) Cannizaro's reaction
- 4) Perkin reaction

91. Which of the following can give a Grignard reagent when reacted with magnesium in dry ether?

- 1) C_2H_6
- 2) C_2H_5Cl
- 3) C_2H_5OH
- 4) C_2H_5CN

92. In III group precipitation, NH_4Cl is added before adding NH_4OH to

- 1) decrease conc. of OH^-
- 2) prevent interference of PO_4^{3-}
- 3) increase conc. of Cl^-
- 4) increase conc. of OH^- ion

93. The homologue of ethyne is

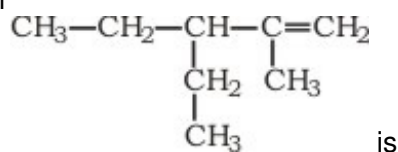
- 1) C_2H_2
- 2) C_2H_6
- 3) C_3H_8
- 4) C_3H_4

94. The heat of formation of $CO(g)$ and $CO_2(g)$ are $\Delta H = -110$ and $\Delta H = -393 \text{ kJ mol}^{-1}$ respectively. What is the heat of reaction (ΔH) (in kJ mol^{-1}) for the following reaction?
 $CO(g) + (1/2)O_2(g) \rightarrow CO_2(g)$

- 1) -503

- 2) - 152.5
- 3) - 283
- 4) 502

95. IUPAC name of



- 1) 2-methyl-3-ethyl-1-pentene
- 2) 3-ethyl-4-methyl-4-pentene
- 3) 3-ethyl-2-methyl-1-pentene
- 4) 3-methyl-2-ethyl-1-pentene

96. Match the following

	Set-I		Set-II
A.	10 vol H ₂ O ₂	1.	perhydrol
B.	20 vol H ₂ O ₂	2.	5.358 N
C.	30 vol H ₂ O ₂	3.	1.785 M
D.	100 vol H ₂ O ₂	4.	3.03%

The correct match is

- 1) A-4, B-3, C-2, D-1
- 2) A-1, B-2, C-3, D-4
- 3) A-1, B-3, C-2, D-4
- 4) A-4, B-2, C-3, D-1

97. Which of the following does not have coordinate bond?

- 1) SO₂
- 2) HNO₃
- 3) H₂SO₃
- 4) HNO₂

98. To dissolve argentite ore which of the following is used?

- 1) Na [Ag (CN)₂]
- 2) NaCN
- 3) NaCl
- 4) HCl

99. What is the wavelength (in m) of a particle of mass 6.62×10^{-29} g moving with a velocity of 10^3 ms^{-1} ?

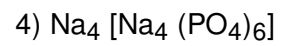
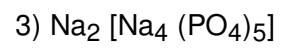
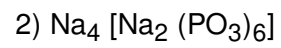
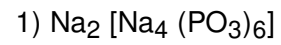
- 1) 4.62×10^{-4}

2) 4.62×10^{-3}

3) 10^{-5}

4) 10^5

100. The formula of Calgon, used for water softening is



Answer Key

1) 1	2) 2	3) 2	4) 2	5) 2	6) 4	7) 2	8) 1	9) 1	10) 2
11) 3	12) 2	13) 3	14) 1	15) 3	16) 3	17) 3	18) 2	19) 4	20) 2
21) 2	22) 1	23) 4	24) 4	25) 1	26) 2	27) 4	28) 1	29) 2	30) 3
31) 1	32) 3	33) 4	34) 4	35) 4	36) 2	37) 4	38) 2	39) 3	40) 2
41) 1	42) 2	43) 3	44) 1	45) 1	46) 2	47) 2	48) 4	49) 2	50) 3
51) 4	52) 2	53) 4	54) 3	55) 4	56) 4	57) 1	58) 3	59) 1	60) 3
61) 2	62) 3	63) 3	64) 3	65) 4	66) 1	67) 2	68) 1	69) 1	70) 1
71) 2	72) 3	73) 4	74) 1	75) 3	76) 2	77) 2	78) 3	79) 2	80) 1
81) 3	82) 1	83) 2	84) 1	85) 2	86) 4	87) 3	88) 3	89) 2	90) 2
91) 2	92) 1	93) 4	94) 3	95) 3	96) 1	97) 3	98) 2	99) 3	100) 1