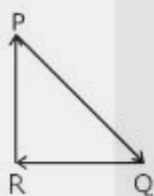


1. Average velocity of a particle executing SHM in one complete vibration is :
- (1) 1
 - (2) 0
 - (3) 2
 - (4) 3

2. Two similar thin equi-convex lenses, of focal length f each, are kept coaxially in contact with each other such that the focal length of the combination is F_1 . When the space between the two lenses is filled with glycerin (which has the same refractive index ($\mu=1.5$) as that of glass) then the equivalent focal length is F_2 . The ratio $F_1: F_2$ will be :
- (1) 2:3
 - (2) 3:4
 - (3) 2:1
 - (4) 1:2

3. A particle moving with velocity V is acted by three forces shown by the vector triangle PQR. The velocity of the particle will :

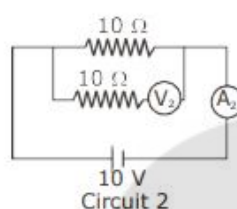
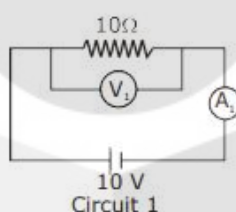


- (1) remain constant
 - (2) change according to the smallest force Q
 - (3) increase
 - (4) decrease
4. Ionized hydrogen atoms and α -particles with same momenta enters perpendicular to a constant magnetic field B . The ratio of their radii of their paths $r_H: r_\alpha$ will be :
- (1) 4 : 1
 - (2) 1 : 4
 - (3) 2 : 1
 - (4) 1 : 2
5. Body A of mass $4m$ moving with speed u collides with another body B of mass $2m$, at rest. The collision is head on and elastic in nature. After the collision the fraction of energy lost by the colliding body A is :
- (1) $4/9$
 - (2) $5/9$
 - (3) $1/9$
 - (4) $8/9$

6. The speed of a swimmer in still water is 20 m/s. The speed of river water is 10 m/s and is flowing due east. If he is standing on the south bank and wishes to cross the river along the shortest path, the angle at which he should make his strokes w.r.t. north is given by :

(1) 60° west
 (2) 45° west
 (3) 30° west
 (4) 0°

7. In the circuits shown below, the readings of the voltmeters and the ammeters will be :



(1) $V_1 = V_2$ and $i_1 = i_2$
 (3) $V_2 > V_1$ and $i_1 = i_2$

(2) $V_2 > V_1$ and $i_1 > i_2$
 (4) $V_1 = V_2$ and $i_1 > i_2$

8. A 800 turn coil of effective area 0.05 m^2 is kept perpendicular to a magnetic field $5 \times 10^{-5} \text{ T}$. When the plane of the coil is rotated by 90° around any of its coplanar axis in 0.1 s, the EMF induced in the coil will be :

(1) 0.02 V
 (2) 2 V
 (3) 0.2 V
 (4) -0.02 V

9. An electron is accelerated through a potential difference of 10,000V. its de Broglie wavelength is, (nearly) : ($m_e = 9 \times 10^{-31} \text{ kg}$)

(1) $12.2 \times 10^{-14} \text{ m}$
 (2) 12.2 nm
 (3) $12.2 \times 10^{-13} \text{ m}$
 (4) $12.2 \times 10^{-12} \text{ m}$

10. α - particle consists of :

(1) 2 electrons and 4 protons only
 (2) 2 protons only
 (3) 2 protons and 2 neutrons only
 (4) 2 electrons, 2 protons and 2 neutrons

11. A hollow metal sphere of radius R is uniformly charged, The electric field due to the sphere at a distance r from the centre :

- (1) Zero as r increases from r < R increases as r increases for r > R
- (2) decreases as r increases for r < R and for r > R
- (3) increases as r increases for r < R and for r > R
- (4) zero as r increases for r < R, decreases as r increases for r > R

12.

In an experiment the percentage of error occurred in the measurement of physical quantities A, B, C, and D are 1%, 2%, 3% and 4% respectively, Then the maximum percentage of error in

the measurement X, where $X = \frac{A^2 B^{1/2}}{C^{1/3} D^3}$, will be :

- (1) -10%
- (2) 10%
- (3) (3/13)%
- (4) 16%

13. A force $F = 20 + 10y$ acts on a particle in y - direction where F is in newton and y in meter. Work done by this force to move the particle from y = 0 to y = 1 m is

- (1) 25 J
- (2) 20 J
- (3) 30 J
- (4) 5 J

14. In Which of the following processes, heat is neither absorbed nor released by a system ?

- (1) isobaric
- (2) isochoric
- (3) isothermal
- (4) adiabatic

15. In which of the following devices the eddy current effect is not used ?

- (1) electromagnet
- (2) electric heater
- (3) induction furnace
- (4) magnetic braking in train.

16. The unit of thermal conductivity is :

- (1) W m K⁻¹
- (2) W m⁻¹ K⁻¹
- (3) J m K⁻¹

(4) $\text{J m}^{-1} \text{K}^{-1}$

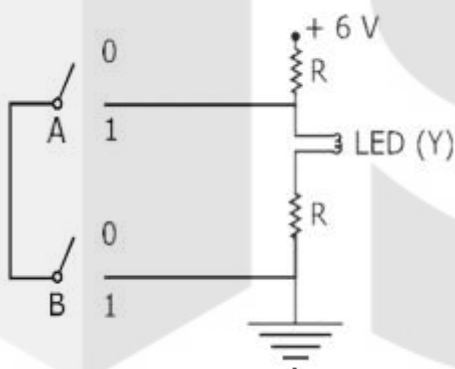
17. A body weighs 200 N on the surface of the earth. How much will it weigh half way down to the centre of the earth?

- (1) 250 N
- (2) 100 N
- (3) 150 N
- (4) 200 N

18. A mass m is attached to a thin wire and whirled in a vertical circle. The wire is most likely to break when:

- (1) the mass is at the lowest point
- (2) inclined at an angle of 60° from vertical
- (3) the mass is at the highest point
- (4) the wire is horizontal

19.



The correct Boolean operation represented by the circuit diagram drawn is:

- (1) NAND
- (2) NOR
- (3) AND
- (4) OR

20. A block of mass 10 kg is in contact against the inner wall of a hollow cylindrical drum of radius 1m. The coefficient of friction between the block and the inner wall of the cylinder is 0.1. The minimum angular velocity needed for the cylinder to keep the block stationary when the cylinder is vertical and rotating about its axis, will be : ($g = 10 \text{ m/s}^2$)

- (1) 10 rad/s
- (2) 10π rad/s
- (3) $\sqrt{10}$ rad/s

(4) $10/2\pi \text{ rad / s}$

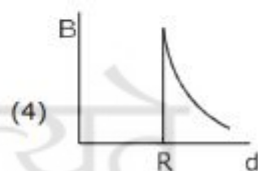
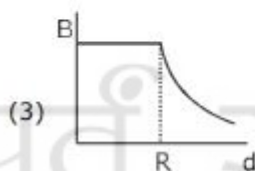
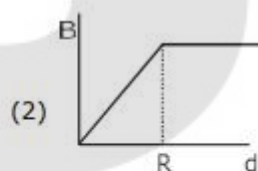
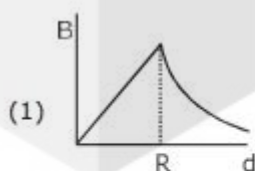
21. A small hole of area of cross-section 2 mm^2 is present near the bottom of a fully filled open tank of height 2 m . Taking $g = 10 \text{ m/s}^2$, the rate of flow of water through the open hole would be nearly:

- (1) $2.2 \times 10^{-6} \text{ m}^3/\text{s}$
- (2) $6.4 \times 10^{-6} \text{ m}^3/\text{s}$
- (3) $8.9 \times 10^{-6} \text{ m}^3/\text{s}$
- (4) $12.4 \times 10^{-6} \text{ m}^3/\text{s}$

22. When an object is shot from the bottom of a long smooth inclined plane kept at an angle 60° with horizontal, it can travel a distance x_1 along the plane. But when the inclination is decreased to 30° and the same object is shot with the same velocity, it can travel x_2 distance. Then $x_1 : x_2$ will be:

- (1) $1 : \sqrt{3}$
- (2) $1 : 2\sqrt{3}$
- (3) $1 : \sqrt{2}$
- (4) $\sqrt{2} : 1$

23. A cylindrical conductor of radius R is carrying a constant current. The plot of the magnitude of the magnetic field, B with the distance, d , from the centre of the conductor, is correctly represented by the figure



24. A soap bubble, having radius of 1 mm , is blown from a detergent solution having a surface tension of $2.5 \times 10^{-2} \text{ N/m}$. The pressure inside the bubble equals at a point Z_0 below the free surface of water in a container. Taking $g = 10 \text{ m/s}^2$, density of water $= 10^3 \text{ kg/m}^3$, the value of Z_0 is -

- (1) 1 cm

- (2) 0.5 cm
- (3) 100 cm
- (4) 10 cm

25. The work done to raise a mass m from the surface of the earth to a height h , which is equal to the radius of the earth, is -

- (1) $\frac{1}{2} mgR$
- (2) $\frac{3}{2} mgR$
- (3) MgR
- (4) $2 mgR$

26. Which of the following acts as a circuit protection device ?

- (1) switch
- (2) fuse
- (3) conductor
- (4) inductor

27. Two particles A and B are moving in uniform circular motion in concentric circles of radii r_A and r_B with speed v_A and v_B respectively. Their time period of rotation is the same. The ratio of angular speed of A to that of B will be :

- (1) $r_A : r_B$
- (2) 1 : 1
- (3) $r_A : r_B$
- (4) $v_A : v_B$

28. A parallel plate capacitor of capacitance $20\mu F$ is being charged by a voltage source whose potential is changing at the rate of $3 V/s$. The conduction current through the connecting wires, and the displacement current through the plates of the capacitor, would be, respectively :

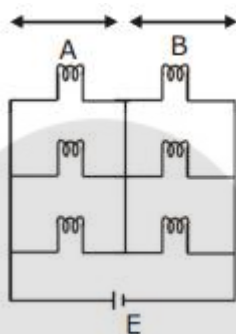
- (1) $60 \mu A$, zero
- (2) zero, zero
- (3) zero, $60 \mu A$
- (4) $60 \mu A$, $60 \mu A$

29. For a p-type semiconductor, which of the following statements is true ?

- (1) Holes are the majority carriers and pentavalent atoms are the dopants.
- (2) Electrons are the majority carriers and pentavalent atoms are the dopants
- (3) Electrons are the majority carriers and trivalent atoms are the dopants.
- (4) Holes are the majority carriers and trivalent atoms are the dopants.

30. Six similar bulbs are connected as shown in the figure with a DC source of emf E , and zero internal resistance. The ratio of power consumption by the bulbs when (i) all are

glowing and (ii) in the situation when two from section A and one from section B are glowing will be :



- (1) 1:2
- (2) 2:1
- (3) 4:9
- (4) 9:4

31. Increase in temperature of a gas filled in a container would lead to :

- (1) decrease in its pressure
- (2) decrease in intermolecular distance
- (3) increase in its mass
- (4) increase in its kinetic energy

32. In a double slit experiment, when light of wavelength 400 nm was used, the angular width of the first minima formed on a screen placed 1 m away, was found to be 0.20° . What will be the angular width of the first minima, if the entire experimental apparatus is immersed in water ? ($\mu_{\text{water}} = 4/3$)

- (1) 0.05°
- (2) 0.1°
- (3) 0.266°
- (4) 0.15°

33. The total energy of an electron in an atom in an orbit is -3.4eV . Its kinetic and potential energies are, respectively:

- (1) 3.4eV , -6.8eV
- (2) 3.4eV , 3.4eV
- (3) -3.4eV , -3.4eV
- (4) -3.4eV , -6.8eV

34. In total internal reflection when the angle of incidence is equal to the critical angle for the pair of media in contact, what will be angle of refraction ?

- (1) equal to angle of incidence
- (2) 90°
- (3) 180°
- (4) 0°

PHYSICS

(SECTION B)

35. A disc of radius 2m. and mass 100 kg rolls on a horizontal floor. Its centre of mass has speed of 20cm/s. How much work is needed to stop it ?
(1) 2J
(2) .1J
(3) .3J
(4) 30KJ
36. When a block of mass M is suspended by a long wire of length L, the length of the wire becomes (L+l). The elastic potential energy stored in the extended wire is :
(1) $\frac{1}{2} Mgl$
(2) $1/2 Mgl$
(3) Mgl
(4) MgL
37. A solid cylinder of mass 2kg and radius 4cm is rotating about its axis at the rate of 3rpm. The torque required to stop after 2π revolutions is :
(1) $12 \times 10^{-4} \text{ N m}$
(2) $2 \times 10^6 \text{ N m}$
(3) $2 \times 10^{-6} \text{ N m}$
(4) $2 \times 10^{-3} \text{ N m}$
38. Two point charges A and B, having charges +Q and -Q respectively, are placed at certain distance apart and force acting between them is F. If 25% charge of A is transferred to B, then force between the charges becomes:
(1) $16F/9$
(2) $4F/3$
(3) .F
(4) $9F/16$
39. Electric field strength due to a point charge of $5\mu\text{C}$ at a distance 80 cm from the charge is
(1) $8 \times 10^4 \text{ N/C}$
(2) $7 \times 10^4 \text{ N/C}$
(3) $5 \times 10^4 \text{ N/C}$
(4) $4 \times 10^4 \text{ N/C}$
40. An infinite line charge produces a field of $7.18 \times 10^8 \text{ N/C}$ at a distance of 2 cm. The linear charge density is
(1) $7.27 \times 10^{-4} \text{ C/m}$
(2) $7.98 \times 10^{-4} \text{ C/m}$
(3) $7.11 \times 10^{-4} \text{ C/m}$
(4) $7.04 \times 10^{-4} \text{ C/m}$

41. In C.G.S. system the magnitude of the force is 100 dynes. In another system where the fundamental physical quantities are kilogram, metre and minute, the magnitude of the force is
- 0.036
 - 0.36
 - 3.6
 - 36
42. A simple pendulum is taken to 64 km above the earth's surface. Its time period will:
- increase by 1 %
 - decrease by 1 %
 - increase by 2 %
 - decrease by 2 %
43. A tuning fork of frequency 400 Hz produces 4 beats/sec with a stretched wire. If on increasing tension on the string, the number of beats remains unchanged. The initial frequency of the wire is :-
- 386 Hz
 - 508 Hz
 - 404 Hz
 - 396 Hz
44. A body A is projected upwards with a velocity of 98 m/s. The second body B is projected upwards with the same initial velocity but after 4 sec. Both the bodies will meet after :-
- 6 sec
 - 8 sec
 - 10 sec
 - 12 sec
45. An electric pump is used to fill an overhead tank of capacity 9 m, kept at a height of 10 m above the ground. If the pump takes 5 minutes to fill the tank by consuming 10 kW power, the efficiency of the pump should be : (Take $g = 10 \text{ m/s}^2$)
- 60%
 - 40%
 - 20%
 - 30%
46. Fission of nuclei is possible because the binding energy per nucleon in them -
- Decreases with mass number at low mass numbers

- (2) Increases with mass number at low mass numbers.
- (3) Decreases with mass number at high mass numbers.
- (4) Increases with mass number at high mass numbers

47. Assertion (A) :- For best contrast between maxima and minima in the interference pattern of Young's double slit experiment, the intensity of light emerging out of the two slits should equal.

Reason (R) :- The intensity of interference pattern is directly proportional to the square of amplitude.

- (1) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
- (2) (A) is correct but (R) is not correct
- (3) (A) is incorrect but (R) is correct
- (4) Both (A) and (R) are correct but (R) is the correct explanation of (A)

48. In a circuit for finding the resistance of a galvanometer by half deflection method, a 6 volt battery and a high resistance of 11 k Ω are used. The figure of merit of the galvanometer is 60 $\mu\text{A}/\text{division}$. In the absence of shunt resistance, the galvanometer produces a deflection of $\theta = 9$ divisions when current flows in the circuit. The value of shunt resistance that can cause deflection of $\theta/2$ is closest to :

- (1) 55 Ω
- (2) 110 Ω
- (3) 220 Ω
- (4) 550 Ω

49. Two particles of masses m and $2m$ with charges $2q$ and q are placed in a uniform electric field E and allowed to move for the same time. The ratio of their kinetic energies will be :

- (1) 2 : 1
- (2) 8 : 1
- (3) 4 : 1
- (4) 1 : 4

50. A transformer is employed to reduce 220 V to 11 V. The primary draws a current of 5 A and the secondary 90 A. The efficiency of the transformer is :

- (1) 20%
- (2) 40%
- (3) 70%
- (4) 90%

CHEMISTRY

SECTION A

51. If law of conservation of mass was to hold true, then 20.8 g of BaCl_2 on reaction with 9.8 g of H_2SO_4 will produce 7.3 g of HCl and BaSO_4 equal to:

- (1) 11.65 g
- (2) 23.3 g

- (3) 25.5 g
- (4) 30.6 g

52. Which of the following contains the highest number of molecules?

- (1) 2.8 g of CO**
- (2) 3.2 g of CH_4
- (3) 1.7 g of NH_3
- (4) 3.2 g of SO_2

53. The chloride of a metal contains 71% chlorine by weight and the vapour density of it is 50, the atomic weight of the metal will be:

- (1) 29
- (2) 58
- (3) 35.5
- (4) 71

54. hydrocarbon contains 80% of carbon, then the hydrocarbon is:

- (1) CH_4
- (2) C_2H_4
- (3) C_2H_6
- (4) C_2H_2

55. The chloride of a metal contains 71% chlorine by weight and the vapour density of it is 50, the atomic weight of the metal will be:

- (1) 29
- (2) 58
- (3) 35.5
- (4) 71

56. Two flasks A & B of equal capacity of volume contain NH_3 and SO_2 gas respectively under similar conditions. Which flask has more number of moles:

- (1) A
- (2) B
- (3) Both have same moles
- (4) None

57. If mass of neutron is halved and mass of proton is doubled and mass of electron is made then find out the new atomic mass of ${}^{16}_8\text{O}$ and the percent by which it is increased:

- (1) 50%
- (2) 40%
- (3) 25%
- (4) 60%

58. A particular radio-station broadcasts at a frequency of 1350 Kilohertz another radio station broadcasts at a frequency of 2025 Kilohertz. What is the ratio of the wave length of radiations from each station?

- (1) 2 : 1
- (2) 4 : 5
- (3) 2 : 3
- (4) 3 : 2

59. If the total energy of an electron is 0.54 eV in hydrogen atom then find out P.E. of the electron in that orbit.

- (1) -1.08 eV
- (2) 0.27 eV
- (3) -0.54 eV
- (4) 2.16 eV

60. With conc. HBr ethyl phenyl ether yields :-

- (1) Phenol and ethyl bromide.
- (2) Bromobenzene and ethanol
- (3) Phenol and ethane
- (4) Bromobenzene and ethane

61. Phenol on treatment with methyl chloride in the presence of anhydrous AlCl_3 gives chiefly :-

- (1) o-cresol
- (2) m-cresol
- (3) anisole
- (4) p-cresol

62. On heating an aliphatic primary amine with chloroform and ethanolic KOH, the organic compound formed is

- (1) an alkyl cyanide
- (2) an alkyl isocyanide
- (3) an alkanol
- (4) an alkanediol

63. Gabriel reaction for the synthesis of amines, involves the use of

- (1) 1° amide
- (2) 2° amide
- (3) Imide
- (4) Aliphatic amide

64. The gas leaked from a storage tank of the Union Carbide plant in Bhopal gas tragedy was:-

- (1) Methylisocyanate
- (2) Methylamine
- (3) Ammonia
- (4) Phosgene

65. Which of following is water insoluble and stable at room temperature.

- (1) $C_6H_5N_2^+Cl^-$
- (2) $C_6H_5N_2^+F_4^-$
- (3) $C_6H_5N_2^+HSO_4^-$
- (4) All

66. Glucose gives silver mirror with Tollen's reagent. It shows the presence of

- (1) An acidic group
- (2) An alcoholic group
- (3) A ketonic group
- (4) An aldehydic group

67. Molecular formula of pentahydroxy acid obtained when glucose is oxidised with Br_2 water is

- (1) $C_6H_{12}O_7$
- (2) $C_6H_{12}O_8$
- (3) $C_6H_{12}O_6$
- (4) $C_6H_{10}O_6$

68. The molecular weight of protein is

- (1) < 10000
- (2) > 10000
- (3) > 1000
- (4) > 1000 and < 10000

69. The percent s-character in CH_4 is :-

- (1) 100%
- (2) 45%
- (3) 75%
- (4) 25%

70. Density of ice is less than that of water because of

- (1) due to change in physical state
- (2) crystal modification of ice
- (3) open porous structure of ice due to hydrogen bonding
- (4) different physical states of these

71. Correct order of covalent character of alkaline earth metal chloride is

- (1) $BeCl_2 < MgCl_2 < CaCl_2 < SrCl_2$
- (2) $BeCl_2 < CaCl_2 < SrCl_2 < MgCl_2$
- (3) $BeCl_2 > MgCl_2 > CaCl_2 > SrCl_2$
- (4) $SrCl_2 > BeCl_2 > CaCl_2 > MgCl_2$

72. The correct order of decreasing polarisable ions is:

- (1) Cl^- , Br^- , I^- , F^-
- (2) F^- , I^- , Br^- , Cl^-
- (3) F^- , Cl^- , Br^- , I^-
- (4) I^- , Br^- , Cl^- , F^-

73. For which reaction at 298 K, the value of K_P/K_C is maximum and minimum respectively:

- (a) $\text{N}_2\text{O}_4(\text{g}) \rightarrow 2\text{NO}_2(\text{g})$
 - (b) $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{SO}_3(\text{g})$
 - (c) $\text{X}(\text{g}) + \text{Y}(\text{g}) \rightarrow 4\text{Z}(\text{g})$
 - (d) $\text{A}(\text{g}) + 3\text{B}(\text{g}) \rightarrow 7\text{C}(\text{g})$
- (1) d, c
 - (2) d, b
 - (3) c, b
 - (4) d, a

74. $\text{PCl}_5(\text{g}) \rightarrow \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$

In above reaction, at equilibrium condition mole fraction of PCl_5 is 0.4 and mole fraction of Cl_2 is 0.3. Then find out mole fraction of PCl_3

- (1) 0.3
- (2) 0.7
- (3) 0.4
- (4) 0.6

75. If 8 g mol of PCl_5 heated in a closed vessel of 10 L capacity and 25% of it dissociates into PCl_3 and Cl_2 at the equilibrium then value of K_p will be equal to: (P is total pressure)

- (1) $P/30$
- (2) $P/15$
- (3) $2/3P$
- (4) $3/2P$

76. Which of the following statement is correct for a reaction $\text{X} + 2\text{Y} \rightarrow \text{Product (p)}$

- (1) The rate of disappearance of X = twice the rate of disappearance of Y.
- (2) The rate of disappearance of X = $1/2$ rate of appearance of product (p)
- (3) The rate of appearance of product (p) = $1/2$ the rate of disappearance of Y
- (4) The rate of appearance of product (p) = $1/2$ the rate of disappearance of X

77. A chemical reaction involves two reacting species. The rate of reaction is directly proportional to square of the concentration of one of them and inversely proportional to the concentration of the other. The order of reaction is –

- (1) 1
- (2) 2

- (3) Zero
- (4) Unpredictable

78. In a first order reaction the concentration of the reactant is decreased from 1.0 M to 0.25 M in 20 min. The rate constant of the reaction would be-

- (1) 10 min⁻¹
- (2) 6.931 min⁻¹
- (3) 0.6931 min⁻¹
- (4) 0.06931 min⁻¹

79. 99 % of a first order reaction was completed in 32 min. when will 99.9 % of the reaction complete?

- (1) 50 min.
- (2) 46 min.
- (3) 49 min.
- (4) 48 min.

80. Molecular formula C₄H₈O₂ represents :-

- (1) An acid only
- (2) An ester only
- (3) An alcohol only
- (4) An acid and an ester also

81. Which of the following compound has sp-hybridised carbon atom :-

- (1) CH₃COOH
- (2) CH₃COCH₃
- (3) CH₃CH₂CN
- (4) CH₂=CH-CH=CH₂

82. The IUPAC name for isobutyl chloride is :-

- (1) 2-Methyl-2-chlorobutane
- (2) 2-Chloro-2-methylbutane
- (3) 1-Chloro-2-methylpropane
- (4) 2-Methyl-3-chloropropane

83. IUPAC name of (CH₃)₂CHCH(CH₃)₂ is :-

- (1) 2,2-Dimethylbutane
- (2) 2,3-Dimethylbutane
- (3) 2,4-Dimethylbutane
- (4) 1-Methylpentane

84. The IUPAC name from the incorrect name 4-Amino-3-hydroxy-2-butene is :-

- (1) 1-Amino-2-hydroxy-2-butene
- (2) 4-Amino-2-buten-3-ol
- (3) 1-Amino-2-buten-2-ol

(4) 1-Amino-2-butenol

CHEMISTRY

(SECTION B)

85. What is the oxidation state of Fe in $[\text{Fe}(\text{H}_2\text{O})_5(\text{NO})]^{2+}$ ion?

- (1) +2
- (2) +3
- (3) +1
- (4) 0

86. The IUPAC name for $[\text{Co}(\text{NH}_3)_6][\text{Cr}(\text{CN})_6]$ is :-

- (1) Hexaammine cobalt (III) hexacyanochromate (III)
- (2) Hexacyanochromium cobalt hexaammine (VI)
- (3) Hexaammine cobalt (III) hexacyanochromium (VI)
- (4) Hexacyanochromium (III) hexaammine cobalt (III)

87. Which gives only 25% mole of AgCl, when reacts with AgNO_3 :-

- (1) $\text{PtCl}_2 \cdot 4\text{NH}_3$
- (2) $\text{PtCl}_4 \cdot 5\text{NH}_3$
- (3) $\text{PtCl}_4 \cdot 4\text{NH}_3$
- (4) $\text{PtCl}_4 \cdot 3\text{NH}_3$

88. Which of the following transition metal do not form amalgam with Hg ?

- (1) Fe
- (2) Co
- (3) Ni
- (4) All of the above

89. Permanganate titrations in presence of Hydrochloric acid are not satisfactory because :

- (1) HCl is a weak acid
- (2) HCl is a volatile acid
- (3) KMnO_4 will oxidise HCl into Cl_2
- (4) KMnO_4 will show disproportionation in presence of HCl

90. Which of the following show +8 oxidation state ?

- (1) Fe, Ru
- (2) Fe, Os
- (3) Ru, Os
- (4) Mo, W

91. Which oxidation state is not shown by lanthanoids?

- (1) +2
- (2) +3
- (3) +4
- (4) +6

92. Which of the following solutions of KCl has the lowest value of equivalent conductance ?

- (1) 1 M
- (2) 0.1 M
- (3) 0.01 M
- (4) 0.001 M

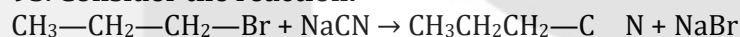
93. Kohlrausch's law states that at :-

- (1) Infinite dilution, each ion makes definite contribution to conductance of an electrolyte whatever be the nature of the other ion of the electrolyte.
- (2) Infinite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte whatever be the nature of the other ion of the electrolyte.
- (3) Finite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte whatever be the nature of the other ion of the electrolyte.
- (4) Infinite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte depending on the nature of the other ion of electrolyte.

94. Phenyl magnesium bromide reacts with methanol to give :-

- (1) A mixture of anisole and $\text{Mg}(\text{OH})\text{Br}$
- (2) A mixture of benzene and $\text{Mg}(\text{OMe})\text{Br}$
- (3) A mixture of toluene and $\text{Mg}(\text{OH})\text{Br}$
- (4) A mixture of phenol and $\text{Mg}(\text{Me})\text{Br}$

95. Consider the reaction:



The correct statement is :-

- (1) The reaction will be fastest in water
- (2) The reaction will be fastest in N, N-dimethylformamide (DMF)
- (3) Transition state of $\text{S}_\text{N}2$ is tetrahedral and sp^3 hybridized
- (4) If conc. of alkyl bromide is tripled and conc. of CN^- is reduced to half rate of $\text{S}_\text{N}2$ increased by 2 times

96. 2-bromopentane is heated with potassium ethoxide in ethanol. The major product obtained is

- (1) 1-Pentene
- (2) cis-2-pentene
- (3) trans-2-pentene
- (4) 2-ethoxypentane

97. $\text{CH}_3\text{CHOHCH}_2\text{CHO}$ and $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ constitute a pair of:-

- (1) Position isomers
- (2) Metamers
- (3) Optical isomers
- (4) Functional isomers

98. Which are metamers:-

- (1) $\text{CH}_3-\text{O}-\text{CH}_2\text{CH}_2\text{CH}_3$, $\text{CH}_3-\text{CH}_2-\text{O}-\text{CH}_2-\text{CH}_3$
- (2) $\text{C}_2\text{H}_5-\text{O}-\text{C}_2\text{H}_5$, $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

- (3) $\text{CH}_3\text{-O-C}_2\text{H}_5$, $\text{CH}_3\text{-CH}_2\text{-O-CH}_3$
(4) $\text{CH}_3\text{-CH}_3$, $\text{CH}_3\text{-CH}_2\text{-H}$

99. The borax bead test is based upon the formation of

- (1) Boron oxide
(2) Boric acid
(3) Meta borates
(4) Elemental boron

100. In a reaction 4 mole of electrons are transferred to one mole of HNO_3 when it acts as an oxidant. The possible reduction product is :

- (1) $(1/2)$ mole N_2
(2) $(1/2)$ mole N_2O
(3) 1 mole of NO_2
(4) 1 mole NH_3

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