S ANSWER KEY & SOLUTION KEY FINAL ROUND - 10 (PCB) Dt.19.04.2024

PHYSICS

SECTION - A (35 Questions)

01. **(1)** $E = \sigma T^4 =$ energy radiated per unit surface are per unit time by a black body

$$\therefore \sigma = \left(\frac{E}{T^4}\right) = \left[\frac{ML^2T^{-2}}{L^2T\theta^4}\right] = [MT^{-3}\theta^{-4}]$$

(2) $b = \lambda_m T$

$\therefore \quad [b] = [L\theta]$

(3) Emissive power is energy radiated per unit time per unit surface area.

$$\therefore [E] = \left[\frac{ML^2T^{-2}}{L^2T}\right] = [MT^{-3}]$$

(4) $H = \frac{dQ}{dt} = \frac{TD}{R}$

$$\therefore \quad R = \frac{TD}{(dQ/dt)} = \frac{\theta}{[ML^2T^{-2}/T]}$$

$$= [M^{-1}L^{-2}T^3\theta]$$

02. **(1)** Mean free path $\lambda = \frac{1}{\sqrt{2}\pi d^2 n}$

n : number of molecules/volume
d : Diameter of molecules

03. **(1)** $u_x = 16 \cos 60° = 8$ m/s
Time taken to reach the wall = 8/8 = 1s
Now, $u_y = 16 \sin 60° = 8\sqrt{3}$ m/s

$$h = 8\sqrt{3} \times 1 - \frac{1}{2} \times 10 \times 1 = 13.86 - 5 = 8.9m$$

04. **(3)** $PV^\gamma = P'\left(\frac{V}{32}\right)^\gamma$

$$P' = (32)^\gamma P = (2^5)^{7/5} P = (2)^7 P = 128P.$$

05. **(2)** Electric field on the axis of a ring of radius R at a distance h from the centre,

$$E = \frac{kQh}{\left(h^2 + R^2\right)^{3/2}}$$

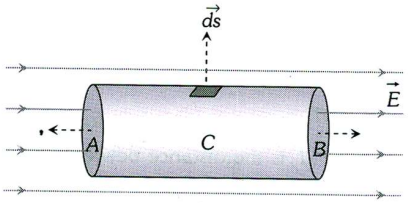
Condition: for maximum electric field $\frac{dE}{dh} = 0$

$$\Rightarrow \frac{d}{dh}\left[\frac{kQh}{\left(R^2 + h^2\right)^{3/2}}\right] = 0$$

By using the concept of maxima and minima we get, $h = \frac{R}{\sqrt{2}}$

06. **(4)** Flux through surface

$A \quad \phi_A = E \times \pi R^2$ and $\phi_B = -E \times \pi R^2$



Flux through curved surface

$$C = \int \vec{E}.\vec{ds} = \int Eds\cos 90° = 0$$

$\therefore$ Total flux through cylinder = $\phi_A + \phi_B + \phi_C = 0$

07. **(2)** Volume = $Al = 3 \Rightarrow A = \frac{3}{l}$

Now

$$R = \rho\frac{l}{A} \Rightarrow 3 = \frac{\rho \times l}{3/l} = \frac{\rho l^2}{3} \Rightarrow l^2 = \frac{9}{\rho} = \frac{3}{\sqrt{\rho}}$$

08. **(2)** If the radius of circle is r, then

$$2\pi r = L \Rightarrow r = \frac{L}{2\pi}$$

$$\text{Area} = \pi r^2 = \frac{\pi L^2}{4\pi^2} = \frac{L^2}{4\pi}$$

$$\text{Magnetic moment} = IA = \frac{IL^2}{4\pi}$$

09. **(3)** 20 vernier scale divisions are equivalent to 19 Main scale division

So 1 V.S.D. is equivalent to $\frac{19}{20}$ M.S.D.

Now least count = 1 M.S.D. – 1 V.S.D.

$0.1\text{ mm} = 1\text{ M.S.D.} - \frac{19}{20}\text{ M.S.D.}$

$\Rightarrow 0.1\text{ mm} = \frac{1}{20}\text{ M.S.D.}$

$\Rightarrow \text{M.S.D.} = 2\text{ mm}$

10. **(3)** Here, $r = 0, 1$ m, $n = 10$ *rps*, B = 0.1 T

$e = \frac{1}{2}B\,\omega\,r^2 = \frac{1}{2}B(2\pi n)r^2$

$= B\,\pi\,n\,r^2 = 0.1\times\pi\times10(0.1)^2 = 10^{-2}\pi$ volt

11. **(2)**

12. **(4)** Transition form $n = 1$ to $n = 3$ $\Delta E = 12.1eV$.

13. **(3)**

14. **(2)** In forward bias $V_P > V_N$

15. **(1)** Here, Max. velocity, $V_{\max} = V_0 = A\omega$

When $y = A/2$, then velocity $V = ?$

$V = \omega\sqrt{A^2 - y^2} = \omega\sqrt{A^2 - A^2/4}$

$= \frac{\sqrt{3}\omega A}{2} = \frac{\sqrt{3}V_0}{2}.$

16. **(3)** $y = 0.5\sin\left(\frac{2\pi}{\lambda}400t - \frac{2\pi}{\lambda}x\right)$

$\omega = \frac{2\pi}{\lambda}400$ and $k = \frac{2\pi}{\lambda}$

Velocity of wave, $v = \frac{\omega}{k} = 400$ m/s

17. **(2)**

$x = n_1\beta_1 = n_2\times\beta_2;\ n_2 = n_1\frac{\beta_1}{\beta_2} = n_1\times\frac{\lambda_1}{\lambda_2} = 12\times\frac{600}{400} = 18$

18. **(1)** As width of central maxima $W = \frac{2\lambda}{b}$.

So $W \propto \lambda \Rightarrow W' = 2W$

19. **(3)** Real object and real image has to be there so (3) is correct graph.

20. **(2)** Let $\nu_{\max}$ be the maximum frequency of oscillation at which the block does not leave the platform. Then centrifugal force at extreme position is equal to weight of block

i.e., $M\omega^2 a = Mg$

or $4\pi^2\nu_{\max}^2 a = g$ or $\nu_{\max} = \frac{1}{2\pi}\sqrt{\frac{g}{a}}.$

21. **(1)** Gauss's theorem in magnetism establishes that magnetic monopoles do not exist.

22. **(1)** For no force on wire C, force on wire C due to wire D = force on wire C due to wire B

$\Rightarrow \frac{\mu_0}{4\pi}\times\frac{2\times15\times5}{x} = l = \frac{\mu_0}{4\pi}\times\frac{2\times5\times10}{(15-x)}\times l$

$\Rightarrow x = 9$ cm

23. **(1)** $\rho = \frac{M}{V} = \frac{M}{L^3}$

Relative error in the measurement of density is

$\frac{\Delta\rho}{\rho} = \frac{\Delta M}{M} + 3\frac{\Delta L}{3}$

$= \frac{0.1}{10} + 3\times\frac{0.01}{0.1} = 0.01 + 0.3 = 0.31$

24. **(4)** $\frac{Y_A}{Y_B} = \frac{\tan\theta_A}{\tan\theta_B} = \frac{\tan 60°}{\tan 30°}$

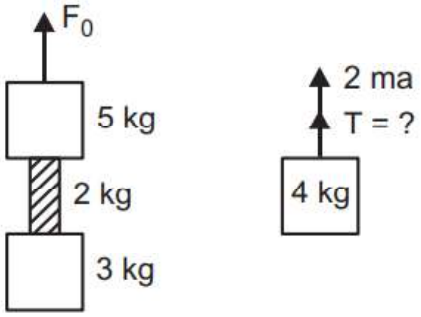
$= \frac{\sqrt{3}}{1/\sqrt{3}} = 3$ or $Y_A = 3Y_B$.

25. **(3)**

26. **(2)** $U = -\frac{GMm}{r}; K = \frac{GMm}{r}$ and $E = -\frac{GMm}{2r}$.

27. **(2)**

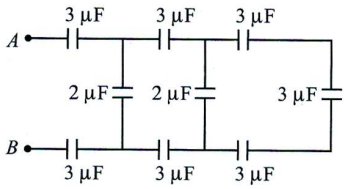
28. **(4)**



29. **(2)** $(i_d)_{net} = i_c = i$

$i_d = \left[\frac{(i_d)_{net}}{A}\right]\frac{A}{2} = \frac{i}{2}$

30. **(1)** Starting from right end of figure.



$\frac{1}{C_S} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{3}{3} = 1$ or $C_S = 1\mu\text{F}$

$C_P = 1 + 2 = 3\ \mu$F and so on.

Finally, the equivalent resistance between A and B is C_{AB}

or $\frac{1}{C_{AB}} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = 1$ or $C_{AB} = 1\mu\text{F}$

31. **(3)** $W = Fs\cos\theta$

$100 = 5(4)\cos\theta$

$\cos\theta = \frac{1}{2} \Rightarrow \theta = 60^0$

32. **(1)** $f = 300 \text{ rpm} = \frac{300}{60}\text{rps} = 5 \text{ rps}$

Hence, angular speed will be

$\omega = 2\pi f = 2\pi \times 5 = 10\pi \text{ rad s}^{-1}$

As we know that

$\upsilon = \omega R = (10\pi s^{-1})(1m) = 10\pi \text{ ms}^{-1}$

Kinetic energy,

$K = \frac{1}{2}mv^2 = \frac{1}{2} \times (5kg)(10\pi ms^{-1})^2$

33. **(1)**

34. **(3)** $\frac{2 \times M(L\sin 45)^2}{12} = \frac{ML^2}{12}$

35. **(1)**

SECTION - B (Attempt Any 10 Questions)

36. **(1)** $t = \alpha x^2 + \beta x$ (differentiating w.r.t. time)

$\frac{dt}{dx} = 2\alpha x + \beta$

$\frac{1}{v} = 2\alpha x + \beta$ (differentiating w.r.t time)

$-\frac{1}{v^2}\frac{dv}{dt} = 2\alpha\frac{dx}{dt}$

$\frac{dv}{dt} = -2\alpha v^3$

37. **(4)**

$P = \frac{V^2}{R} = \text{so R} = \frac{V^2}{P} \Rightarrow R_1 = \frac{V^2}{100}$ and $R_2 = R_3 = \frac{V^2}{60}$

Now $W_1 = \frac{(250)^2}{(R_1 + R_2)^2}.R_1, W_2 = \frac{(250)^2}{(R_1 + R_2)^2} \cdot R_2$ and

$W_3 = \frac{(250)^2}{R_3}$

$W_1 : W_2 : W_3 = 15 : 25 : 64$ or $W_1 < W_2 < W_3$

38. **(1)** Velocity of transverse wave $v = \sqrt{\frac{T}{\mu}}$

T = tension in string

μ = linear mass density

At the time when car is at rest

$60 = \sqrt{\frac{Mg}{\mu}}$

In case when car is accelerating

$60.5 = \sqrt{\frac{M(g^2 + a^2)^{1/2}}{\mu}}$

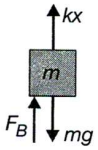
$\Rightarrow \frac{60.5}{60} = \sqrt{\frac{\sqrt{g^2 + a^2}}{g}}$

$\left(1 + \frac{0.5}{60}\right)^4 = \frac{g^2 + a^2}{g^2} = 1 + \frac{2}{60}$

$\Rightarrow g^2 + a^2 = g^2 + g^2 \times \frac{2}{60}$

$a = g\sqrt{\frac{2}{60}} = \frac{g}{\sqrt{30}}$

39. **(1)** The cube is in equilibrium under the following three forces:



(a) Spring force kx, where x = elongation of the spring

(b) Gravitational force

W = weight of the cube = mg

(c) Buoyant force F_B (or upward thrust) imparted by the liquid on the cube given as

$F_B = Vdg$

where V = Volume of immersed portion of the cube

For complete immersion

V = Volume of cube

For equilibrium of the cube

$kx + F_B = mg$

$\therefore x = \frac{mg - F_B}{K} = \frac{mg - Vdg}{K}$

where $v = m/D$

$\therefore x = \frac{mg}{K}\left[1 - \frac{d}{D}\right]$

Hence, the correct answer is option (1).

40. **(1)** [E] = Energy = $[ML^2T^{-2}]$ [m] = mass = [M],

[L] = Angular momentum = $[ML^2T^{-1}]$

[G] = Gravitational constant = $[M^{-1}L^3T^{-2}]$

Now substituting dimensions of above quantities

in $\frac{EL^2}{m^5G^2} = \frac{[ML^2T^{-2}] \times [ML^2T^{-1}]^2}{[M^5] \times [M^{-1}L^3T^{-2}]^2} = [M^0L^0T^0]$

i.e., the quantity should be angle.

41. **(1)**

42. **(3)** When a charged particle of charge q, mass m enters perpendicular to the magnetic induction $\vec{B}$ of a magnetic field, it will experience a magnetic force

$\vec{F} = q(\vec{v} \times \vec{B}) = qvB \sin 90° = qvB$

that provides a centripetal acceleration v^2/r.

So, $qvB = \frac{mv^2}{r} \Rightarrow mv = qBr$

The de Broglie wavelength

$\lambda = \frac{h}{mv} = \frac{h}{qBr}$

$\frac{\lambda_\alpha}{\lambda_p} = \frac{q_p r_p}{q_\alpha r_\alpha}$

Since, $\frac{r_\alpha}{r_p} = 1$ *and* $\frac{q_\alpha}{q_p} = 2$

$\therefore \frac{\lambda_\alpha}{\lambda_p} = \frac{1}{2}.$

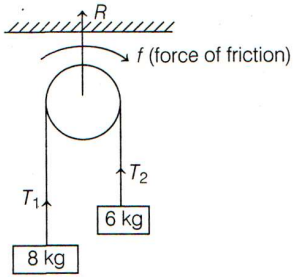
43. **(3)** Resonant frequency, $f_r = \frac{1}{2\pi\sqrt{LC}}$

$f_r \times \frac{1}{\sqrt{C}}$

When another capacitor is added in series, C_{eq} decreases. So f_r increases.

44. **(1)**

45. **(1)** Due to friction, tension at all points on the thread is not alike its shown below.



Here, $T_1 - T_2 = f$, also $R = T_1 + T_2$
Given, $T_1 = 8g$, $T_2 = 6$ g
$\Rightarrow$ R = (8 + 6)g = 14 g
As, $f = T_1 - T_2 = 8g - 6g = 2g = 20$ N
So statement I si correct but II is incorrect

46. **(3)** The rolling sphere has rotational as well as translational kinetic energy.

$\therefore$ Kinetic energy $= \frac{1}{2}mu^2 + \frac{1}{2}I\omega^2$

$= \frac{1}{2}mu^2 + \frac{1}{2}\left(\frac{2}{5}mr^2\right)\omega^2 = \frac{1}{2}mu^2 + \frac{mu^2}{5} = \frac{7}{10}mu^2$

Potential energy = kinetic energy

$\therefore\ mgh = \frac{7}{10}mu^2$ or $h = \frac{7u^2}{10g}.$

47. **(1)** $F_1 = \frac{1}{4\pi\varepsilon_0}\frac{q^2}{r^2}$ or $F_2 = \frac{1}{4\pi\varepsilon_0 K}\frac{q^2}{R^2}$

As $F_2 = F_2$, hence $\frac{q^2}{r^2} = \frac{1}{K}\frac{q^2}{R^2}$ $\therefore\ R = r/\sqrt{K}$

48. **(2)**

49. **(3)** Bulb B_1 dies out promptly, but bulb B_2 does out with some delay. This is because of self induced emf across L, during decay.

50. **(3)** Binding energy of the electron in the innermost orbit = 40 keV. To dislodge the electron from this orbit, the bombarding electron must have an energy greater than 40 keV. Hence, the potential difference between cathode and the anticathode must be more than 40,000 volt to impart to the electron of the cathode ray an energy greater than 40 keV.

CHEMISTRY

SECTION - A (35 Questions)

51. **(1)** PBr_3, KCN, H_3O^+

52. **(2)** A-P, B-R, C-Q, D-S

53. **(2)** Read boron hydrides in our text book.

54. **(1)** For the reaction, $H_2S \rightleftharpoons H^+ + HS^-$

$$K_{a_1} = \frac{[H^+][HS^-]}{[H_2S]}$$

For the reaction, $HS^- \rightleftharpoons H^+ + S^{2-}$

$$K_{a_2} = \frac{[H^+][S^{2-}]}{[HS^-]}$$

When, the above two reactions are added, their equilibrium constants are multiplied, thus

$$K_{a_3} = \frac{[H^+]^2[S^{2-}]}{[H_2S]} = K_{a_1} \times K_{a_2}$$

Hence, $K_{a_3} = K_{a_1} \times K_{a_2}$

55. **(1)** (A)-(q); (B)-(t); (C)-(r); (D)-(s)

56. **(3)** If Assertion is True but the Reason is False

$CH \equiv CH \xrightarrow[NH_2OH]{Cu2Cl2} CH \equiv C - Cu$

57. **(1)** Alkene gives less stable carbocation

58. **(2)** Silicic acid

59. **(4)** X gave depression corresponding to 2 mol of particles.

$X = [Cr(H_2O)_4Br_2]Cl.H_2O \rightleftharpoons [Cr(H_2O)_4Br_2]^+Cl^-$

Y gave depression corresponding to 3 mol of particles.

$Y = [Cr(H_2O)_5Cl]Br_2 \rightleftharpoons [Cr(H_2O)_5Cl]^{2+} + 2Br^-$

60. **(1)** As we know from elevation in boiling point that

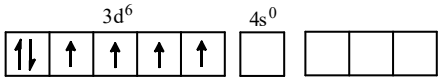
$\Delta T_b = K_b m$

$K_b = \frac{\Delta T_b}{m}$

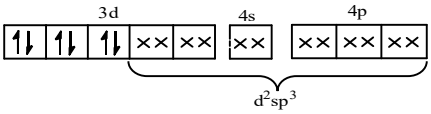
$\text{Unit of } K_b = \frac{\text{unit of } \Delta T_b}{\text{unit of m}} = \frac{K}{\text{molality}}$

$= \frac{K}{\text{mol kg}^{-1}} = K \text{ mol}^{-1} \text{ kg}$

61. **(4)** All of these

62. **(4)** Co^{3+} 

In presence of strong ethylenediamine ligand the electrons get paired.

$[Co(en)_3]^{3+}$ 

Thus inner orbital complex with no unpaired electrons.

63. **(1)** Amphoteric oxides react with alkalies as well as acids.

$V_2O_5 \xrightarrow{\text{alkali}} VO_4^{3-}$

$V_2O_5 \xrightarrow{\text{acid}} VO_4^{+}$

$Cr_2O_3 \xrightarrow{\text{acid}} [Cr(H_2O)_6]^{3+}$

$Cr_2O_3 \xrightarrow{\text{alkali}} [CrO_2]^-$

64. **(1)** When primary amine is treated with chloroform and alkali, a very bad smelling compound, called isocyanide or carbylamine is obtained. On the basis of the name of the product, the reaction is called carbylamines reaction.

$R - NH_2 + CHCl_3 + KOH \rightarrow RNC + KCl + H_2O$

1° amine chloroform alkali isocyanide or carbylamine

65. **(2)** $\text{Rate} = k[A][B]^2$

66. **(2)** Characteristics of catalyst

(1) It catalyses the forward and backward reaction to the same extent as it decreases energy of activation hence, increases the rate of both the reactions.

(2) ΔG is a state function, hence it will depend on the initial reactants and final products only

(3) It doesn't alter equilibrium of reaction

(4) It provides an alternate mechanism by reducing activation energy between reactants and products.

67. **(4)** All the above

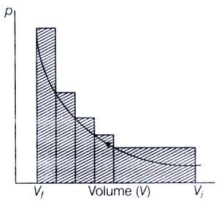
68. **(2)** Here, oxidation states of Fe changes from +2 to +3. So, n-factor is 1.

69. **(3)** Number of angular nodes = l

For 4th orbital (n = 4) and $l = 2$ for d-orbitals

$\therefore$ Number of angular nodes = 2.

70. **(2)** The correct option is W (reversible) < W (irreversible). This is because are under the curve is always more in irreversible compression as can be seen from given figure.



pV-plot when presure is not constant and changes in finite steps during compression from initial volume, Vi, to final volume, V_f. Work done on the gas is represented by the shaded area.

PV-plot when pressure is not constant and changes in infinite steps (reversible conditions) during compression from initial volume, V_i to final volume, V_f. Work done on the gas is represented by the shaded area.

71. **(4)** For comparing number of atoms, first we calculate the moles as all are monoatomic and hence, moles $\times N_A$ = number of atoms.

$\text{Moles of 4 g He} = \frac{4}{4} = 1 \text{ mol}$

$46 \text{ g Na} = \frac{46}{23} = 2 \text{ mol}$

$0.40 \text{ g Ca} = \frac{0.40}{40} = 0.1 \text{ mol}$

$12 \text{ g He} = \frac{12}{4} = 3 \text{ mol}$

Hence, 12 g He contains greatest number of atoms as it possesses maximum number of moles.

72. **(2)** Molecular mass of $CO_2 = 1 \times 12 + 2 \times 16 = 44$g

1 g molecule of CO_2 contains 1g atoms of carbon

$\because$ 44 g of CO_2 contain C = 12 g atoms of carbon

$\therefore \%$ of C in $CO_2 = \frac{12}{44} \times 100 = 27.27\%$

Hence, the mass per cent of carbon in CO_2 is 27.27%.

73. **(2)** As a tertiary carbocation will be formed i.e., $(CH_3)_3C^+$ here.

74. **(3)** 3 > 2 > 1 > 4

75. **(1)** HF

76. **(3)** AlF_3, Be_2C

77. **(3)** Assertion is false but Reason is true.
Combustion of 16 g of methane gives 36 g of water.

$$\underset{\substack{1\text{ mol}\\=16\text{g}}}{CH_4} + 2O_2 \longrightarrow CO_2 + \underset{\substack{2\text{ mol}\\=36\text{g}}}{2H_2O}$$

78. **(2)** The mass of electron is very small as compared to the mass of the neutron.
Mass of electron = 9.1×10^{-31} kg
Mass of neutron = 1.67×10^{-27} kg.

79. **(1)** i and ii

80. **(1)** $C_2H_5Br \xrightarrow{KCN} C_2H_5CN \xrightarrow[\text{Reduction}]{LiAlH_4} C_3H_7NH_2$ i.e. $CH_3CH_2CH_2NH_2$
$\therefore$ X = KCN
Y = $LiAlH_4$

81. **(4)** XeF_2, ICl_3

82. **(2)** Statement-1 is false, Statement-2 is true

83. **(3)** Cr (Z = 24) = $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$
= [Ar] $3d^5 4s^1$
Fe^{2+} (Z = 26) = $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^0$
= [Ar] $3d^6 4s^0$
Ni^{2+} (Z = 28) = $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^0$
= [Ar]$3d^8 4s^0$
Cu (Z = 29) = $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$
= [Ar]$3d^{10} 4s^1$

84. **(3)** Both statements are true. When a liquid crystallises, entropy decreases because in crystalline form the molecules are more ordered as compared to the liquid.

85. **(2)** Organic compound containing nitrogen is fused with a small piece of sodium metal to form NaCN.

$$Na + \underbrace{C + N}_{\substack{\text{from organic}\\\text{compound}}} \rightarrow NaCN$$

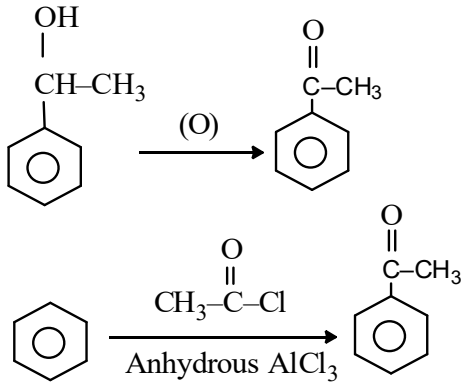
SECTION - B (Attempt Any 10 Questions)

86. **(2)** $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-CH_2-Br \xrightarrow[\Delta]{\text{alc.KOH}} \underset{\underset{CH_3}{|}}{CH_3-CH}-CH=CH_2$ (A)

$\xrightarrow[H_2O\ \Delta]{conc.H_2SO_4}$ $CH_3-\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2-CH_3$ (B) (Major product) + $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-OH$ (C) (Minor product)

$\xrightarrow[-H_2O]{HI,\ \Delta}$ $CH_3-\underset{\underset{I}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2-CH_3$ (D) + $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-CH_2-I$ (E)

87. **(1)**



88. **(4)** Correct A: The bond enthalpies of the two O – H bonds in H – O – H are not equal.
Correct R: This is because electronic environment around O is not same after breaking one O – H bond.

89. **(4)** Only 4

90. **(4)** Highest oxidation number of any transition element = (n –1)d electrons + ns electrons. Therefore, large the number of electrons in the 3d-orbitals, higher is the maximum oxidation number.
(1) $3d^1 4s^2 = 3$
(2) $3d^3 4s^2 = 3 + 2 = 5$
(3) $3d^5 4s^1 = 5 + 1 = 6$ and
(4) $3d^5 4s^2 = 5 + 2 = 7$
This option (4) is correct.

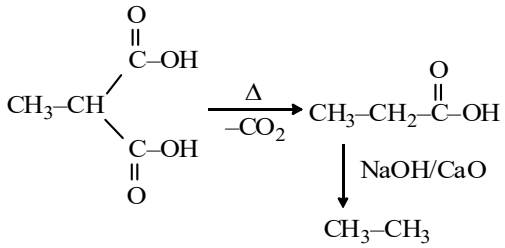
91. **(1)** For the reaction, $\frac{1}{2}H_2(g) + \frac{1}{2}I_2(g) \rightleftharpoons HI(g)$

$$K_c = \frac{[HI]}{[H_2]^{1/2}[I_2]^{1/2}} = 5$$

Thus, for the reaction, $2HI(g) \rightleftharpoons H_2(g) + I_2(g)$

$$K_{c_1} = \frac{[H_2][I_2]}{[HI]^2} = \left(\frac{1}{K_c}\right)^2 = \left(\frac{1}{5}\right)^2 = \frac{1}{25} = 0.04$$

92. **(1)**



93. **(1)** A – 3 – c; B - 4 - b; C - 2 - d; D - 1 - a

94. **(1)** When salt is added to water to make the solution the vapour pressure of solution get decreases. This is due to decrease in surface covered by solvent molecule which lead to decrease in number of solvent molecule escaping from the surface corresponding to pure solvent.
Hence, vapour pressure also get reduces.

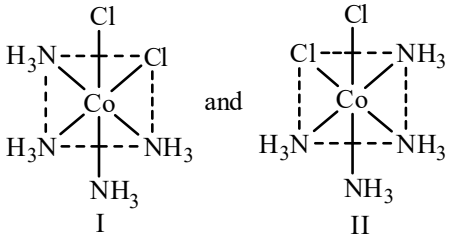
95. **(1)** While charging the lead storage battery the reaction occurring on cell is reversed and $PbSO_4$ (s) on anode and cathode is converted into Pb and PbO_2 respectively.
Hence, option (1) is the correct choice.

96. **(2)** Linear polymerisation: Under suitable conditions, linear polymerisation of ethyne takes place to produce polyacetylene or polyethyne which is a high molecular weight polyene containing repeating units of (CH = CH – CH = CH) and can be represented as —(CH = CH – CH = CH)n— Under special conditions, this polymer conducts electricity.
Thin film of polyacetylene can be used as electrodes in batteries. These films are good conductors, lighter and cheaper than the metal conductors.

97. **(1)** (i)-(d), (ii)-(a), (iii)-(f), (iv)-(e), (v)-(c), (vi)-(b)

98. **(4)** Vitamin B5 is also called as nicotinic acid. Nicotinic acid in the form of nicotinamide is found usually in all living cells in small amounts.

99. **(1)**



These are not enantiomers.

100. **(2)** As a result of lanthanoid contraction change in ionic raddii, on going from elements of 4d to 5d transition series, is very small. Thus chemical properties of 4d and 5 d series of transition elements are similar.

BOTANY

Section - A (35 Questions)

101. **(2)** (NCERT XII, Pg 122, Para 2)
102. **(2)** (NCERT XII, Pg 120, 6.9.1 Salient Features of Human Genome)
103. **(4)** (11th Para 10.2.5, Page no.166)
104. **(4)** (NCERT XII, Pg 90, Para 1, Line 4)
105. **(2)** (NCERT XII, Pg 83, Based on Linkage and Recombination Frequency)
106. **(2)** (NCERT XII, Pg 85- based on Sex determination)
107. **(4)** (NCERT XII, Pg 97, Based on Chargaff's rule)
108. **(3)** (NCERT XII, Page No. 101, Sub topic 6.2.1, line 1)
109. **(3)** [NCERT XI; Page No.72; Sub-topic 5.5]
110. **(2)** [NCERT XI; Page No.68; Sub-topic 5.2]
111. **(4)** [NCERT XI; Page No. 79; Sub-topic 5.9.1]
112. **(3)** (NCERT XII, Concept-Cytoplasmic inheritance)
113. **(3)** (NCERT XII, Pg 85, 5.4 POLYGENIC INHERITANCE)
114. **(3)** (NCERT XII, Pg 116, Para 1, Based on Last sentence)
115. **(3)** (NCERT 11th, Page no- 24, Paragraph-2.3.3, Line no- 1-3)
116. **(4)** [NCERT class XI, Page no. 92 (Figure 6.7) 93 (Point 6.3.1)]
117. **(1)** [NCERT class XI, Page no. 91, Point 6.3.2]
118. **(1)** (NCERT XI page no. 217, point 2 – last two lines)
119. **(3)** (NCERT XI page no. 218, sub-topic 13.8, 4th paragraph and table 13.1, page no. 221)
120. **(4)** (12Th NCERT Page no.242 to 243, concept.)
121. **(1)** (NCERT 11th, Page no- 8, 3rd paragraph, Line no- 8,9)
122. **(4)** (NCERT 11th, Page no- 27, Paragraph- 1, Line no- 6,7)
123. **(1)** (NCERT 12th, Page no- 36, Paragraph-2.4.3, Line no- 4,5)
124. **(3)** (NCERT 12th, Page no-26, Last paragraph, Line no- 9,10)
125. **(1)** [NCERT class XI, Page 239, 1st paragraph]
126. **(4)** [NCERT class XI, Page 249 and 250, point 15.4.3.3]
127. **(1)** (NCERT XI Pg.232, fig. 14.3)
128. **(4)** (NCERT XI Pg.231, 3rd Para, 1st line)
129. **(4)** (11th Para 8.5.3, 8.5.11, Page no.132, 133, 134,)
130. **(2)** (11th Para 8.5.2, Page no. 132)
131. **(2)** (11th Para 8.5.3.2, Page no.134)
132. **(2)** (11th Para 10.4.1, Page no.169)
133. **(4)** (NCERT 12th, Page no- 35, 2nd paragraph, Line no- 14,15)
134. **(4)** (NCERT 11th PK. Conceptual, bryo to gymnosperm.)
135. **(3)** (12thNCERT Page no.245 conceptual,14.4)

SECTION - B (Attempt Any 10 Questions)

136. **(2)** [NCERT class XI, Page no. 86, Point no. 6.1.2.1 (First paragraph)]
137. **(3)** (NCERT XI Pg.234, fig. 14.5)
138. **(1)** (11th Para 8.5.6 based, Page no. 136)

139. **(2)** (11th Para 10.4, Page no.167)
140. **(2)** (NCERT 11th, Page no- 24, Paragraph-2.3.3, Line no- 5-10)
141. **(3)** (NCERT 11th, Page no- 11, Table-1.1)
142. **(2)** (NCERT 11th, Page no- 26, 2nd paragraph, line no- 7,8)
143. **(3)** [NCERT XI; Page No. 75; Sub-topic 5.5.1.3 & 5.5.1.4]
144. **(3)** (NCERT XII, Based on Mutation)
145. **(2)** (NCERT XI page no. 216, 1st paragraph and 13.7.1 2nd paragraph)
146. **(3)** (NCERT 12th, Page no- 28, 1st paragraph, Line no- 15-17)
147. **(4)** (NCERT P.K. Page no.39)
148. **(2)** (11Th NCERT PK conceptual)
149. **(3)** (NCERT 11th PK, page no.34 to 39, conceptual)
150. **(1)** (NCERT XII, Pg 91, Para 1, Line 4)

ZOOLOGY

Section - A (35 Questions)

151. **(3)** (NCERT XI Page no. 290; 2nd paragraph 4th line)
152. **(3)** (NCERT XIth Page No. 337, 6th line of 3rd paragraph)
153. **(2)** (NCERT XIPage No. 57, Class - osteichthyes)
154. **(2)** [NCERT P.No.311, Pelvic Girdle NCERT applied]
155. **(2)** (NCERT Pg. No. 194 to 195)
156. **(4)** [NCERT P.No.316 last Para and p317 First Para]
157. **(4)** (NCERT Page No. 201)
158. **(3)** (NCERT 11th, Page no- 151, Paragraph-9.8, Line no- 1-4)
159. **(2)** (NCERT 11th, Page no- 152, Paragraph-9.9, Line no- 26,27)
160. **(3)** (NCERT 12th, Page no 135, 1st paragraph, Line no- 1-5)
161. **(3)** (NCERT 12th, Page no-134, Figure- 7.7)
162. **(1)** (NCERT 12th, Page no- 140, Paragraph-7.9, Line no- 7,8)
163. **(4)** [NCERT P.No.212, 2nd para]
164. **(3)** [NCERT P.No.310 2nd para 5th Line]
165. **(1)** [NCERT P.No.309 Para Below Diagram]
166. **(4)** [NCERT P.No.321 Forebrain Para]
167. **(3)** (NCERT XI Page No. 335, first lines.)
168. **(4)** (NCERT XI Page No. 334 (pineal gland), 335 (Thymus), 336 (Adrenal)
169. **(2)** [NCERT P.No.213, Biological Products and Vaccin Safety]
170. **(4)** [NCERT P.No.213, Biological Products , Last 4 lines]
171. **(3)** (NCERT 12th page no.264)
172. **(3)** (NCERT page no 59, para3)
173. **(2)** (NCERT11th page no 115, fig no.7.18-a)
174. **(3)** (NCERT12th page no 54, para3)
175. **(3)** (NCERT12th page no 47, para 1)
176. **(2)** (NCERT11th page no120, para 1, line2)
177. **(3)** (12th NCERT Page no.233 to 238)
178. **(4)** (NCERT11th page no 104, 7.1.3 Muscle Tissue)
179. **(3)** (NCERT11th page no 112, para1)
180. **(2)** (12th Para10.3 , 10.4 , 10.5, 10.6 Page no.184,185,186)
181. **(3)** (12th Para10.3 , 10.4 Page no.184,185)
182. **(3)** (NCERT Pg. No. 150 to 151)
183. **(1)** (NCERT Pg. No. 160)
184. **(3)** (NCERT Pg. No.147)
185. **(2)** (NCERT Based applied-cardiac cycle)

SECTION - B (Attempt Any 10 Questions)

186. **(4)** (12th NCERT Page no.233,13.2.4(i))
187. **(3)** (12th NCERT Page no.267 last para)
188. **(1)** (NCERT12th page no.65, para3, line5)
189. **(3)** (NCERT12th page no 58, first line)
190. **(2)** [NCERT P.No.311, Fig.20.9]
191. **(4)** [NCERT Applied]
192. **(1)** [NCERT P.No.321 Forbrain Para, 17th & 18th line]
193. **(3)** (NCERT XI Page No. 54; Phylum - echinodermata)
194. **(1)** (NCERT XI Page No. 290; 12th line of 2nd paragraph)
195. **(1)** (12th Para10.2.3 ,10.4 Page no.183)
196. **(3)** (NCERT 11th, Page no-144, 3rd paragraph, Line no- 16,17)
197. **(3)** (NCERT 12th, Page no- 130, Figure 7.2 NCERT 12th, Page no- 141, last paragraph, concept based)
198. **(3)** (NCERT Pg. No. 186-187)
199. **(4)** (NCERT Pg. No. 153)
200. **(2)** (NCERT Page No. 186-187)