1. (c)

Sol. $[F] = \frac{[A-x]}{[B][t]}$

$[B] = \frac{[L]}{[MLT^{-2}][T]} = [M^{-1}T^{1}]$

2. (c)

Sol. Real depth = $x_3 - x_1$ = 13.895 – 12.324 = 1.571 cm

Apparent depth = $x_3 - x_2$ = 13.895 – 12.802
= 1.093 cm

Refractive index = $\frac{1.571}{1.093} = 1.437$

3. (a)

Sol. $t = \frac{u}{g\sin\theta} = \frac{5\sqrt{2}\times\sqrt{2}}{10}$ = 1 sec. Hence (A) is correct.

4. (a)

Sol. For the given velocity – displacement graph,

Intercept = v_0 and slope $= -\frac{V_0}{x_0}$

Thus, the equations of given lien of velocity-displacement graph is

$$v = -\frac{v_0}{x_0}x + v_0$$

Accelerations, $a = \frac{dv}{dt} = \frac{dv}{dx}\frac{dx}{dt} = \frac{dv}{dx}v$

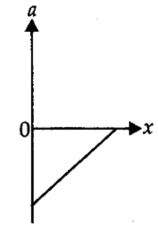
$\because \quad \frac{dv}{dx} = -\frac{v_0}{x_0}$

$\therefore \quad a = -\frac{v_0}{x_0}\left(-\frac{v_0}{x_0}x + v_0\right)$ (Using (i))

$= \frac{v_0^2}{x_0^2}x0\frac{v_0^2}{x_0}$

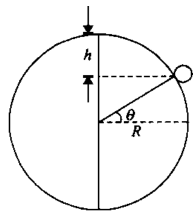
In is a straight line with positions slope and a negative intercept.

The variation of a with x is as shown in the figure.



5. (c)

Sol. Using $\frac{mv^2}{R} = mg\sin\theta$



where $v = \sqrt{2gh}$

and $\sin\theta = \frac{R-h}{R}$, we get

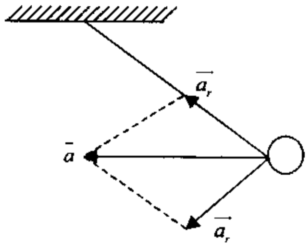
$\frac{m\times 2gh}{R} = mg\sin\theta = mg\frac{R-h}{R}$

or h = R/3 and sin θ = 2/3

or θ = 42^0

6. (c)

Sol. Motion of a simple pendulum is an example of non uniform circular motion. The bob has some tangential as well as radial acceleration.



Thus, total acceleration (A) will be vectorial sum of radial acceleration $(\vec{a}_R)$ and tangential acceleration $(\vec{a}_T)$.

7. (a)

Sol. The mass of water reaching the wall per second = v Ad.

the momentum transferred per second = (vAd)v

$\Rightarrow \vec{p}$ per unit time = v^2 Ad.

The flow of water , tangential to the wall does not contribute to the force.

Therefore, force = rate of change of momentum $= v^2 Ad$.

8. (a)

Sol. When pulley is clamped (or masses are stationary)

$W_1 = (m_1 + m_2)g$ ....(i)

When clamp is removed,

$W_2 = 2T = \frac{4m_1m_2}{m_1+m_2}g$ ....(ii)

$\therefore \Delta W = W_1 - W_2 = \frac{(m_1-m_2)^2}{m_1+m_2}g$

9. (d)

Sol. Momentum of hydrogen atom = momentum of emitted photon

i.e. $mv = \frac{E}{c}$

or $v = \frac{E}{mc}$

$= \frac{(0.73+1.82)1.6\times10^{-19}}{1.67\times10^{-27}\times3\times10^{8}} = 0.81\ ms^{-1}$

10. (a)

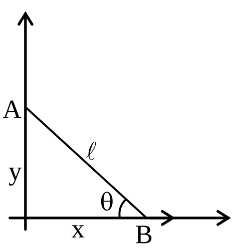
Sol. Potential energy

$$U = \frac{1}{2}kx^2 = \frac{1}{2}k\left(\frac{F}{k}\right)^2 = \frac{F^2}{2k}$$

$$U_1\times k_1 = U_2\times k_2 \quad \text{or} \quad \frac{U_1}{U_2} = \frac{k_2}{k_1} = \frac{2000}{1000} = \frac{2}{1}$$

11. (a)

Sol.



$x^2 + y^2 = \ell^2$

$\Rightarrow \frac{dy}{dt} = -\left(\frac{x}{y}\right)\frac{dx}{dt}$

$\therefore\ v_A = -\frac{4}{3}v_0$

Now, $x = \ell \cos\theta$

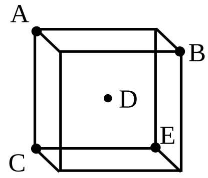
$\frac{dx}{dt} = -\ell\sin\theta\frac{d\theta}{dt} \Rightarrow \omega = -\frac{5}{3}\left(\frac{v_0}{\ell}\right)$

12. (d)

Sol. Conceptual

13. (d)

Sol.



Let us put identical mass at E.

Due to symmetry net force on mass at 'D' is eq ual to zero.

$\therefore$ Required force = Force due to mass placed at E

$= \frac{Gm^2}{\left(\sqrt{3}a/2\right)^2} = \frac{4\,Gm^2}{3a^2}$

14. (a)

Sol. The gravitational forces are mutually equal and opposite.

15. (d)

Sol. $Y = \frac{Stress}{Strain}$ $\quad\therefore$ Stress = Y × Strain

$= 2\times10^{11}\times0.15 = 0.3\times10^{11} = 3\times10^{10}\ N/m^2$

16. (d)

Sol. It is proportional limit so OA is correct

17. (c)

Sol. Upthrust on ball = weight of displaced water

$= V\sigma g = \left(\frac{m}{\rho}\right)\sigma g = \frac{40}{0.8}\times1\times g = 50g$ Dyne or 50 gm

As the ball is sunk into the water with a pin by applying downward force equal to upthrust on it.

So reading of weighing pan = weight of water + downward force against upthrust

= 600 + 50 = 650 gm.

18. (d)

Sol. Liner of low do not intersect each other.

19. (d)

Sol. $dQ = \int_{T_1}^{T_2} nC_v\, dT = 2.33 \times 10^4$ J

20. (a)

Sol. Plastic tube expanded because of heat and then when one stopped applying heat, it contracted by cooling.

21. (c)

Sol. $\because$ $V_2 > V_1$ $\left[\frac{P}{T} \propto \frac{1}{V} \propto \tan\theta\right]$ $\therefore$ (1) to (2)

↑

22. (b)

Sol. As the quantity of gas remains constant

$\mu_A + \mu_B = \mu$

$\frac{P_A V_A}{RT} + \frac{P_B V_B}{RT} = \frac{P(V_A + V_B)}{RT}$

$\Rightarrow P = \frac{P_A V_A + P_B V_B}{V_A + V_B} = \frac{1.4 \times 0.1 + 0.7 \times 0.15}{0.1 + 0.15}$

$\Rightarrow P = 0.98\ MPa$.

23. (a)

Sol. In equilibrium, kx = mg

$\therefore x = \frac{mg}{k} = \frac{20 \times 9.8}{4000}$

$= 0.049\,\text{m} = 4.9\,\text{cm}$

24. (b)

Sol. $\omega = 15\pi = 2\pi/T$, $k = 10\pi = \frac{2\pi}{\lambda}$

$v = \frac{\omega}{k} = \frac{15\pi}{10\pi} = 1.5$ m/s

25. (d)

$E = \frac{dq}{4\pi\varepsilon_0 r^2}$; $dq = \frac{Qd\ell}{2\pi r}$

26. (a)

$V_A - V_B = -\int_B^A \vec{E}.\vec{dr}$

$V_A - V_B = -\int_{2r}^{r} \frac{2\lambda}{4\pi\varepsilon_0 r} dr$

$V_A - V_B = \frac{2\lambda}{4\pi\varepsilon_0 r} \int_r^{2r} \frac{1}{r} dr$

$= \frac{2\lambda}{4\pi\varepsilon_0} \ln \frac{2r}{r}$

$= \frac{2\lambda}{4\pi\varepsilon_0} \ln 2$

27. (d)

Sol. Here, $R_0 = 99\Omega$, $T_0 = 27^o C$

$R_T = 116\Omega$

$\alpha = 1.710^{-4}\ {}^oC^{-1}$

$\therefore R_T = R_0[(1 + \alpha(T - T_0)]$

$\therefore \frac{R_T}{R_0} - 1 = \alpha(T - T_0) \Rightarrow \frac{116}{99} - 1 = \alpha(T - T_0)$

$T - T_0 = \frac{1}{\alpha}\left[\frac{116 - 99}{99}\right] = \frac{17}{99\,o} = \frac{1}{1.7 \times 10^{-4}} \times \frac{17}{99}$

$\therefore T - T_0 = \frac{10^5}{99} = 1010.10\ {}^oC$

$\Rightarrow T = 1010.1 + T_0 = 1010.1 + 27 = 1037.1\ {}^oC$

28. (b)

Sol. W (qE) = $\frac{1}{2}mv_x^2 + \frac{1}{2}mv_y^2 - 0$

$\Rightarrow 4 \times 10^{-6} \times 4x = \frac{1}{2} m\,(4^2 + 3^2)$ $4 \times 10^{-6} \times 4 \times x$

$= \frac{1}{2} \times 10 \times 10^{-6} \times 25\ x$

$= \frac{250}{32} m = \frac{125}{16} m$

29. (c)

Sol. Here, $\theta = 30^o, B = 0.35T$

$\tau = 4.5 \times 10^{-2}$ J

then, $m = \frac{\tau}{B\sin\theta} = \frac{4.5 \times 10^{-2}}{0.35 \times \sin 30^o}$

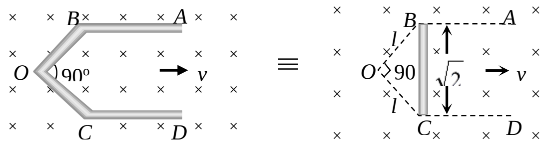
$m = \frac{4.5 \times 10^{-2}}{0.35 \times \frac{1}{2}} = \frac{2 \times 4.5 \times 10^{-2}}{0.35}$

$m = 0.26\,JT^{-1}$

30. (b)

Sol. There is no induced emf in the part AB and CD because they are moving along their length while emf induces between B and C i.e. between A and D can be calculated as follows

Induced emf between B and C = Induced emf between A and B = $Bv(\sqrt{2}\,l) = 1 \times 1 \times 1 \times \sqrt{2} = 1.41\,volt.$



31. (b)

Sol. r.m.s. value of wattless current $= \frac{i_0}{\sqrt{2}} \sin\phi$ In this question $i_0 = 1$ A and $\phi = \frac{\pi}{2}$. So r.m.s. value of wattless current $= \frac{1}{\sqrt{2}} A$

32. (b)

Sol. Total average energy density of electromagnetic wave is

$$\upsilon_{av} = \frac{1}{2}\varepsilon_0 E_{rms}^2 + \frac{1}{2\mu_0} B_{rms}^{B^2}$$

$$= \frac{1}{2}\varepsilon_0 E_{rms}^2 + \frac{1}{2\mu_0}\left(\frac{E_{rms}^2}{c^2}\right)\left(\because B_{rms} = \frac{E_{rms}}{c}\right)$$

$$= \frac{1}{2}\varepsilon_0 E_{rms}^2 + \frac{1}{2\mu_0} E_{rms}^2 \varepsilon_0 \mu_0 \left(\because c = \frac{1}{\sqrt{\mu_0 \varepsilon_0}}\right)$$

$$= \frac{1}{2}\varepsilon_0 E_{rms}^2 + \frac{1}{2}\varepsilon_0 E_{rms}^2 = \varepsilon_0 E_{rms}^2$$

$$= 8.85 \times 10^{-12} \times (720)^2$$

$$= 4.58 \times 10^{-6}\ \text{J m}^{-3}$$

33. (a)

Sol. By using $m = \frac{f}{f-u}$

Here $m = +\frac{1}{n}$, $f \to +f$

So, $+\frac{1}{n} = \frac{+f}{+f-u} \Rightarrow u = -(n-1)f$

34. (a)

Sol. By using $\frac{f_l}{f_a} = \frac{{}_a\mu_g - 1}{{}_l\mu_g - 1}$;

where ${}_l\mu_g = \frac{\mu_g}{\mu_l} = \frac{1.5}{\mu_l}$ and

$$f_a = \frac{1}{P} = \frac{1}{5} m = 20\ cm$$

$$\Rightarrow \frac{-100}{20} = \frac{1.5 - 1}{\frac{1.5}{\mu_l} - 1} \Rightarrow \mu_l = 5/3$$

35. (a)

Sol. Path different

$\sqrt{2}$ d – d = (μ – 1) t

d ($\sqrt{2}$ – 1) = (1.5 – 1) t

t = 2($\sqrt{2}$ – 1) d

36. (d)

Sol. For P point difference = Δ = PA – PB = for second bright

$$\boxed{PA - PB = 2\lambda}$$

37. (c)

Sol. Moseley's law

$\sqrt{\nu} \propto Z - 1$

$\nu \propto (Z-1)^2$

$$\frac{\lambda_C}{\lambda_M} = \frac{(Z_M - 1)^2}{(Z_C - 1)^2}$$

$$\lambda_C = 0.71 \times \frac{41^2}{28^2} = 1.52\ \text{Å}$$

38. (a)

Sol. Here $\Delta x = 1\text{nm} = 10^{-9} m$

By Heisenberg uncertainty principle

$\Delta x \Delta p = \hbar$

$$\therefore \Delta p = \frac{\hbar}{\Delta x} = \frac{h}{2\pi\Delta x} \quad \left(\therefore \hbar = \frac{h}{2\pi}\right)$$

$$= \frac{6.63 \times 10^{-34}}{2 \times \pi \times 10^{-9}} = 1.05 \times 10^{-25}\ kgms^{-1}$$

39. (d)

Sol. $2E - E = E = \frac{hc}{\lambda}$

$$\frac{4E}{3} - E = \frac{E}{3} = \frac{hc}{\lambda'}$$

$\lambda' = 3\lambda$

40. (c)

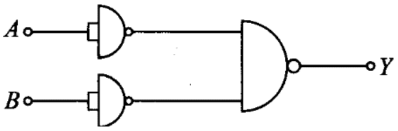
Sol. $N = \frac{kZ^2}{\sin^4(\theta/2)}$

41. (b)

Sol. Initial rate of decay of A is twice the initial rate of decay of B and $\lambda_A > \lambda_B$

42. (c)

Sol. Boolean expression from figure



$Y = \overline{\overline{A}.\overline{B}} = \overline{\overline{A}} + \overline{\overline{B}} = A + B$

This combination of gates represent OR gate.

43. (a)

Sol. Remote sensing is the technique to collect information about an object in respect of its size, colour nature, location, temperature etc. without physically touching it. There are some areas or location which are inaccessible. So to explore these areas or location, a technique known as remote sensing is used. Remote sensing is done through a satellite

44. (d)

Sol. $\vec{A}.\vec{B} = 15 + 2 - 2\ell = 0$

$2\ell = 17 \Rightarrow \ell = \frac{17}{2} = 8.5$

45. (c)

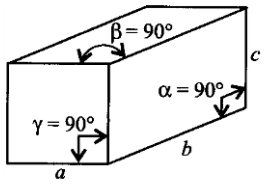
Sol. A become A/4 so radius become just half of its present value and h $\propto \frac{1}{r}$ so h become just double so h = 40 cm.

46. (b)
Sol. In ccp pattern, fourth layer id identical to first layer.

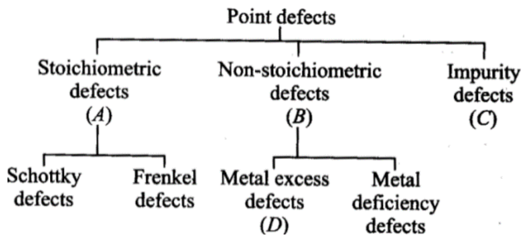
47. (c)
Sol. For fcc, radius of the atom $= \frac{a}{2\sqrt{2}}$

48. (c)
Sol. $a = 2(r_+ + r_-) = 2(95 + 181) = 552\,pm$

49. (d)
Sol. For monoclinic crystal system,
$a \neq b \neq c, \alpha = \gamma = 90°, \beta \neq 90°$



50. (b)
Sol.



51. (a)
Sol. (A) $\rightarrow$(iii), (B) $\rightarrow$ (i), (C) $\rightarrow$(ii), (D) $\rightarrow$ (iv), (E) $\rightarrow$ (v)

52. (a)
Sol. For bcc, Z = 2

$$d = \frac{Z \times M}{a^3 \times N_A}$$

$$d = \frac{2 \times 50}{(300 \times 10^{-10})^3 \times 6.023 \times 10^{23}} = 6.2\,g\,cm^{-3}$$

53. (c)
Sol. Initially $P_m = P^0_X.X_X + P^0_Y.X_Y$

$$550 = P^0_X\left(\frac{1}{1+3}\right) + P^0_Y\left(\frac{3}{1+3}\right)$$

or $P^0_X + 3P^0_Y = 2200$ ...(i)
When 1 mole of Y is further added to it
$P_m = P^0_X.X_X + P^0_Y.X_Y$

$$560 = P^0_X\left(\frac{1}{1+4}\right) + P^o_Y\left(\frac{4}{1+4}\right)$$

$\therefore P^0_X + 4P^0_Y = 2800$ ...(ii)
By eqs. (i) and (ii)
$P^0_X = 400$ mm and $P^0_Y = 600$ mm.

54. (a)
Sol. Elevation in boiling point is a colligative property which depends upon the number of solute particles. Greater the number of solute particles in a solution, higher the extent of elevation in boiling point.
$Na_2SO_4 \rightarrow 2Na^+ + SO_4^{2-}$

55. (c)
Sol. $Na_2SO_4 \rightleftharpoons 2Na^+ + SO_4^{2-}$

1	0	0
1 – a	2a	a

Vant Hoff factor (i) $= \frac{1 - \alpha + 2\alpha + \alpha}{1} 1 + 2\alpha$

56. (a)
Sol. Mass of solution = Mass of C_6H_6 + Mass of CCl_4
$= 22 + 122 = 144\,g$

Mass % of $CCl_4 = \frac{122}{144} \times 100 = 84.72\%$

57. (d)
Sol. Solute in 200 g of 30% solution = 60 g
Solute in 300 g of 20% solution = 60 g
Total grams of solute = 120 g
Total grams of solution = 200+300 =500 g
% of solute in the final solution $= \frac{120}{500} \times 100 = 24\%$

58. (d)
Sol. Morality of Na_2CO_3 solution

$$= \frac{2.65}{106} \times \frac{1000}{250} = 0.1M$$

10 mL of this solution is diluted to 500 mL
$M_1V_1 = M_2V_2$
$0.1 \times 10 = M_2 \times 500 \Rightarrow M_2 = 0.002\,M$

59. (a)
Sol. According to Henry's law
$p = k_H x$

$x=\frac{p}{k_H}=\frac{760}{4.27\times10^5}=1.78\times10^{-3}$

60. (b)

Sol. Hypertonic solution has high osmotic pressure. When a plant cell is placed in hypertonic solution water will diffuse out of the cell resulting in shrinking of the cell.

61. (b)

Sol. $\Delta T_f=k_f\times m=\frac{k_f\times W_2\times1000}{M_2\times W_1}$

$W_2=\frac{10\times92\times600}{1.86\times1000}=296.77g$

62. (b)

Sol. $Mg(NO_3)_2\rightarrow Mg^{2+}+2NO_3^-$

$\alpha=\frac{i-1}{n-1}=\frac{2.74-1}{3-1}=\frac{1.74}{2}=0.87$

Degree of dissociation $=0.87\times100=87\%$

63. (c)

Sol. Lower S.R.P. containing ion can displace higher S.R.P. containing ion

64 (a)

Sol. $E=E^0\frac{0.0591}{n}\log\frac{[Product]}{[Reactant]}$ if $\frac{[Product]}{[Reactant]}=1$ then $E=E^0$

65. (c)

Sol. equivalence of H_2 = equivalence of O $\frac{0.224}{22.4}\times2$

$=\frac{\text{volume of }O_2}{22.4}\times4$ 0.112 litre = volume of O_2.

66. (a)

Sol. H_2–O_2 fuel cell

At anode : $2OH^-+H_2\longrightarrow2H_2O+2e^-$

At cathode : $2H_2O+O_2+4e^-\longrightarrow4OH^-$

67. (d)

Sol. $1.53=\frac{1000\times3.06\times10^{-6}}{\text{Normality}}$

Normality = 2×10^{-3} M Molarity = $\frac{2\times10^{-3}}{2}=10^{-3}$ M

$K_{sp}=10^{-6}$ M

68. (a)

Sol. $E_{cell}=0.77-\frac{0.059}{1}\log\frac{1.5}{0.015}=0.652$ V

69. (c)

Sol. Eq. of Al $=\frac{13.5}{27/3}=1.5$; Thus 1.5 Faraday is needed.

70. (d)

Sol. Total charge passed in one second $'Q'=I\times t=1\times1=1c$

$\because$ 96500 current carried by 6.02×10^{23} electrons

$\therefore$ 1C current carried by $\frac{6.02\times10^{23}}{96500}=6.24\times10^{18}$

71. (a)

Sol. $\Lambda_m^0=57+73=130\,S\,cm^2mol^{-1}$.

72. (a)

Sol. $E_{cell}=E^0_{cell}-\frac{0.0591}{n}\log\frac{[Zn^{2+}]}{[Cu^{2+}]}$

$E_{cell}=1.10-\frac{0.0591}{2}\log\left[\frac{0.1}{0.1}\right]$

$E_{cell}=1.10V$ $(\because\log1=0)$

73. (a)

Sol. Increase in concentration of $B=5\times10^{-3}mol\,l^{-1}$, Time = 10 sec.

Rate of appearance of B $=\frac{\text{Increase of concentration of }B}{\text{Time taken}}$

$=\frac{5\times10^{-3}mol\,l^{-1}}{10\text{ sec}}=5\times10^{-4}mol\,l^{-1}\sec^{-1}$.

74. (b)

Sol. When $E_a=0$, the rate constant is independent of temperature so that rate constant $(k)=3.2\times10^6\sec^{-1}$.

75. (a)

Sol. $k=\frac{0.693}{t_{1/2}}=\frac{0.693}{100\sec}=6.93\times10^{-3}\sec^{-1}$

76. (b)

Sol. From 1 and 4, keeping [B] constant, [A] is made 4 times, rate also becomes 4 times. Hence rate $\propto [A]$. From 2 and 3 keeping [A] constant, [B] is doubled, rate becomes 4 times. Hence rate $\propto [B]^2$. Overall rate law will be : rate = $k[A][B]^2$

77. (b)

Sol. $k = \frac{2.303}{t}\log\left(\frac{a}{a-x}\right)$

When, a = 100, x = 75, t = 32

$k = \frac{2.303}{32}\log_{10}\left(\frac{100}{25}\right) = 0.0433\ \text{min}^{-1}$

Time for 50% completion ($t_{1/2}$) = $\frac{0.693}{k}$

$= \frac{0.693}{0.0433} \approx 16$ min

78. (d)

Sol. If volume is decreased by $\frac{1}{4}$ of initial then conc. of A and B Both are increased by 4 times of initial so rate increased 16 times.

79. (c)

Sol. By slow step ; r = K × $[NO_2]$ $[F_2]$

80. (b)

Sol. Higher the gold number, lesser will be the protective power of colloid.

81. (c)

Sol. Catalyst provides new path to the chemical reaction which has lower value of activation energy. Reactant and product with not be affected, so there will not be any change in state parameter like enthalpy and internal energy.

82. (c)

Sol. Blood is a colloidal solution containing a –ve charge colloidal particle (Albuminoid), bleeding can be stopped by use of alum or $FeCl_3$ solution.

The addition of Al^{3+} or Fe^{3+} causes coagulation of blood, so bleeding stops.

83. (a)

Sol. Lower the gold number, higher the producting powe of lyophillic colloid.

84. (a)

Sol. PO_4^{3-} has maximum coagulating power for $Fe(OH)_3$, a positively charged sol.

85. (a)

Sol. $\log \frac{x}{M} = \log k + \frac{1}{n} \log P$

$\frac{1}{n} = \tan 45^0$

ln k = 0.69 n = 1

$k = 2\ \frac{x}{m} = 2 \times (0.5)^1\ x = 1$

86. (d)

Sol. The process is known as Van Arkel method.

87. (a)

Sol. Reduction of oxides of Mn, Cr etc., by electropositive aluminium metal is called as alumino thermite process

88. (b)

Sol. (Y) PbS reduces PbO to Pb ; it is called self reduction.

89. (a)

Sol. Conductivity α number of ions in the solution.

$K_4[Fe(CN)_6] \xrightleftharpoons{aq.} 4K^+ (aq) + [Fe(CN)_6]^{4-} (aq)$

4 : 1 electrolyte.

It contains maximum number of ions i.e. 5.

(B) $[Co(NH_3)_6] Cl_3 \xrightleftharpoons{aq.} [Co(NH_3)_6]^{3+} (aq) + 3Cl^- (aq)$

1 : 3 electrolyte.

$[Cu(NH_3)_4] Cl_2 \xrightleftharpoons{aq.} [Cu(NH_3)_4]^{2+} (aq) + 2Cl^- (aq)$

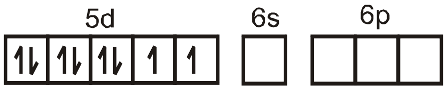
1 : 2 electrolyte.

$[Ni (CO)_4] \xrightleftharpoons{aq.} [Ni (CO)_4] (aq)$ (neutral).

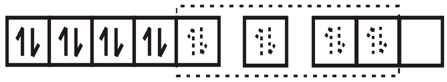
90. (a)

Sol. $5d^8$ configuration have higher CFSE and the complex is thus square planar and diamagnetic.

Pt^{2+}, $[Xe]4f^{14} 5d^8$



$[Pt(NH_3)_4]^{2-}$



dsp^2 hybrid orbitals

Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.
91	B	109	C	127	C	145	B	163	C
92	C	110	A	128	C	146	B	164	A
93	B	111	C	129	C	147	D	165	D
94	A	112	D	130	D	148	A	166	B
95	A	113	D	131	A	149	B	167	C
96	C	114	A	132	B	150	A	168	A
97	A	115	A	133	A	151	A	169	D
98	D	116	A	134	C	152	C	170	A
99	B	117	C	135	C	153	B	171	A
100	C	118	C	136	C	154	B	172	C
101	D	119	B	137	A	155	C	173	A
102	C	120	D	138	C	156	D	174	C
103	D	121	B	139	B	157	B	175	B
104	C	122	C	140	D	158	A	176	C
105	C	123	A	141	D	159	C	177	D
106	B	124	A	142	C	160	C	178	C
107	A	125	B	143	B	161	B	179	C
108	A	126	A	144	C	162	B	180	D