WEEKLY TEST OYM TEST - 16 R & B
SOLUTION Date 04-08-2019

[PHYSICS]

1. Given $E = \frac{q}{4\pi\varepsilon_0 x^2}$. Hence the magnitude of the electric intensity at a distance $2x$ from charge q is

$$E' = \frac{q}{4\pi\varepsilon_0 (2x)^2} = \frac{q}{4\pi\varepsilon_0 x^2} \times \frac{1}{4} = \frac{E}{4}$$

Therefore, the force experienced by a similar charge q at a distance $2x$ is

$$F = qE' = \frac{qE}{4}$$

Hence the correct choice is (d).

2. The system will be in equilibrium if the net force on charge q at one vertex due to charges q at the other two vertices is equal and opposite to the force due to charge Q at the centroid, i.e. (here a is the side of the triangle)

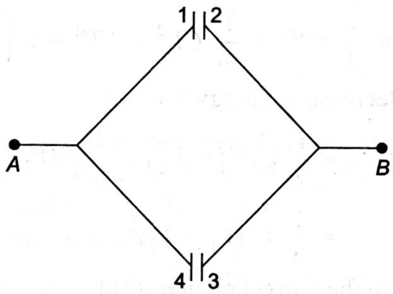
$$\frac{\sqrt{3}\, q^2}{4\pi\varepsilon_0 a^2} = -\frac{Qq}{4\pi\varepsilon_0 \left(\frac{a}{\sqrt{3}}\right)^2}$$

which gives $Q = -\frac{q}{\sqrt{3}}$. Hence the correct choice is (b).

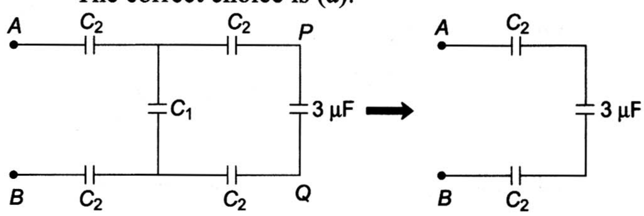
The inner plates 2 and 3 are connected together. Hence they act as a single conductor. Since the outer plates 1 and 4 are connected together, there are effectively two capacitors (between plates 1 and 2 and plates 3 and 4) in parallel, each of capacitance $C = \varepsilon_0 A/d$ as shown in Fig. 21.41. Thus the equivalent capacitance is

$$C' = 2C = \frac{2\varepsilon_0 A}{d}$$, which is choice (b).

3.



4. The network reduces to that shown in Fig. 21.42. The correct choice is (a).



5. . To find the force between the charged capacitor plates we will use a method called the *method of virtual displacement.* We simply equate the work ΔW required to make a small change Δd in the plate separation d to the resulting change ΔU in the stored energy, i.e.

$$\Delta W = \Delta U \qquad \text{(i)}$$

If F is the magnitude of the force between the plates, then the work ΔW done to increase the plate separation by Δd is given by

$$\Delta W = F\,\Delta d \qquad \text{(ii)}$$

Now we know that the energy U of a parallel-plate capacitor of plate area A and capacitance C is

$$U = \frac{Q^2}{2C} = \frac{Q^2 d}{2\varepsilon_0 A}$$

where Q is the charge on the capacitor plates. The increase ΔU in U due to an increase Δd in d is, therefore, given by

$$\Delta U = \frac{Q^2 \Delta d}{2\varepsilon_0 A} \qquad \text{(iii)}$$

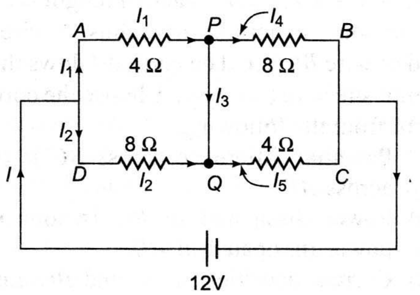
Equating Eqs. (ii) and (iii) we get

$$F = \frac{Q^2}{2\varepsilon_0 A}$$, which is choice (c).

6. Refer to Fig. 22.81. The equivalent resistance is

$$R = \frac{12\times 12}{(12+12)} = 6\ \Omega$$

$$\therefore \quad I = \frac{12\text{ V}}{6\Omega} = 2\text{ A}$$



From Kirchhoff's junction rule,

$$I_1 + I_2 = I \qquad (1)$$

Using Kirchhoff's loop rule to loop $APQDA$, we have

$$4I_1 - 8I_2 = 0 \quad \Rightarrow I_1 = 2I_2 \qquad (2)$$

Equations (1) and (2) give $I_1 = \frac{4}{3}$ A and $I_2 = \frac{2}{3}$ A.

Similarly $I_4 = \frac{2}{3}$ A and $I_5 = \frac{4}{3}$ A.

Applying junction rule at P,

$$I_1 = I_3 + I_4$$

$$\therefore \quad I_3 = I_1 - I_4 = \frac{4}{3} - \frac{2}{3} = \frac{2}{3} \text{ A}$$

The positive sign shows that current I_3 flows from P to Q. Hence the correct choice is (c).

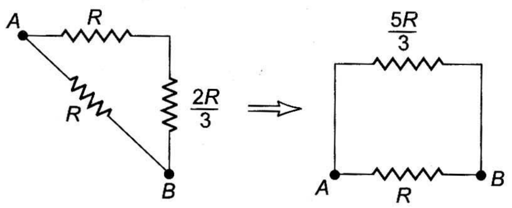
7. $I_1 = \frac{12 \text{ V}}{4\Omega} = 3$ A

Applying Kirchhoff's loop rule to loop $ABCDE$,

$$2I_2 + E - 4I_1 = 0$$

Putting $I_1 = 3$ A and $I_2 = 0$, we get $E = 12$ V

8. The circuit shown in Fig. can be redrawn as shown in Fig.



$\therefore \quad R_{AB} = \frac{5R}{8}$, which is choice (c).

9. Since the cells are in opposition, the effective emf = 6 – 2 = 4 V. Since the current is taken to flow from the positive to the negative terminal of the battery, a current of

$$\frac{4}{5+3} = 0.5 \text{ A}$$

flows from B to C. Hence the correct choice is (b).

10. The correct choice is (b).

11. The emfs of cells connected in reverse polarity cancel each other. Hence cells marked 2, 3 and 4 together cancel the effect of cells marked 5, 6 and 7 and the circuit reduces to that shown in Fig. 22.91. Now cells 1 and 8 are in reverse polarity. Hence the voltmeter reading = 5 – 5 = 0 V. Hence the correct choice is (d).

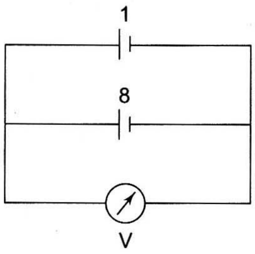


Fig. 22.91

12. The potential at Q with respect to R is 15 V and R is at 25 V higher potential than S. Thus Q is 40 V higher than S. When Q is grounded, its potential becomes zero. thus, $V_s = -40$ V. Hence the correct choice is (d).

13. The two sub circuits are closed loops. They cannot send any current through the 3 Ω resistor. Hence the potential difference across the 3 Ω resistor is zero, which is choice (a).

14. $R = \dfrac{\rho l}{\pi r^2}$. Since the two wires are made of the same material, resistivity ρ is the same for wires AB and BC. Since the wires have equal lengths, it follows that $R \propto 1/r^2$. Hence

$$\frac{R_{AB}}{R_{BC}} = \frac{1}{4}, \text{ i.e } R_{BC} = 4R_{AB}$$

Since the current, is the same in the two wires, it follows from Ohm's law ($V = IR$) that $V_{BC} = 4\ V_{AB}$. Hence choice (a) is wrong. Now power dissipated is $P = I^2 R$. Since I is the same, $P \propto R$. Hence

$$\frac{P_{BC}}{P_{AB}} = \frac{R_{AB}}{R_{BC}} = 4$$

Hence chioce (b) is correct. Choice (c) is wrong because current density (i.e. current per unit area) is different in wires AB and BC because their cross-sectional areas are different. The electric field in a wire is $E = V/l$. Since the two wires have the same length (l), E is proportional to potential difference (V). Since $V_{BC} = 4\ V_{AB}$, $E_{BC} = 4E_{AB}$. Hence choice (d) is also incorrect.

15. Since resistances G and S are connected in parallel, the potential difference across G = potential difference across $S = V$ (say). Heat dissipated in time t is

$$H = \frac{V^2 t}{R}. \text{ Hence } H \propto \frac{1}{R}$$

$$\therefore \quad \frac{H_G}{H_S} = \frac{S}{G}$$

$$\Rightarrow \quad \frac{2}{3} = \frac{S}{G} \Rightarrow S = \frac{2}{3} G$$

16. When the two heaters are connected in parallel, the resistance of the combination is given by

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$$

Now $$\frac{1}{t_1} = \frac{V^2}{QR_1} \text{ and } \frac{1}{t_2} = \frac{V^2}{QR_2}$$

Also $$\frac{1}{t} = \frac{V^2}{Q}\left(\frac{1}{R_1} + \frac{1}{R_2}\right) = \frac{1}{t_1} + \frac{1}{t_2}$$

or $$t = \frac{t_1 t_2}{(t_1 + t_2)}$$

Hence the correct choice is (c).

17. Let I be the current in the 5 Ω resistor. Then the current in the 4 Ω resistor and 6 Ω resistor will be $I/2$. Therefore, the rates of production of heat in the 5 Ω and 4 Ω resistors respectively are

$$P_1 = I^2 \times 5 \text{ and } P_2 = \left(\frac{I}{2}\right)^2 \times 4 = I^2$$

$$\therefore \quad \frac{P_2}{P_1} = \frac{1}{5} \text{ or } P_2 = \frac{P_1}{5} = \frac{10}{5} = 2 \text{ cal s}^{-1}$$

18. Let R be the value of each resistance. The resistances of combinations I, II, III and IV are $3R$, $R/3$, $2R/3$ and $3R/2$ respectively. Now, power dissipation is inversely proportional to resistance. Hence the correct choice is (b).

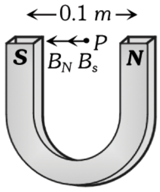
19. (c) Net magnetic field at mid point P, $B = B_N + B_S$

where $B_N =$ magnetic field due to N- pole

$B_S =$ magnetic field due to S- pole

$$B_N = B_S = \frac{\mu_0}{4\pi}\frac{m}{r^2}$$

$$= 10^{-7} \times \frac{0.01}{\left(\frac{0.1}{2}\right)^2} = 4 \times 10^{-7}\,T$$



$$\therefore B_{net} = 8 \times 10^{-7}\,T.$$

20. (c) For short bar magnet in tan A-position

$$\frac{\mu_0}{4\pi}\frac{2M}{d^3} = H\tan\theta \quad .....(i)$$

When distance is doubled, then new deflection θ' is given by

$$\frac{\mu_0}{4\pi}\frac{2M}{(2d)^3} = H\tan\theta' \quad .....(ii)$$

$$\therefore \frac{\tan\theta'}{\tan\theta} = \frac{1}{8} \Rightarrow \tan\theta' = \frac{\tan\theta}{8} = \frac{\tan 60^\circ}{8} = \frac{\sqrt{3}}{8}$$

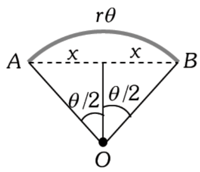
$$\Rightarrow \theta' = \tan^{-1}\left(\frac{\sqrt{3}}{8}\right)$$

21. (a) $E = nAVt = nA\frac{m}{d}t = \frac{50 \times 250 \times 10 \times 3600}{7.5 \times 10^3} = 6 \times 10^4\,J$

22. (d) From figure

$$\sin\frac{\theta}{2} = \frac{x}{r}$$

$$\Rightarrow x = r\sin\frac{\theta}{2}$$



$r\theta = l$

$r = \frac{l}{\theta}$

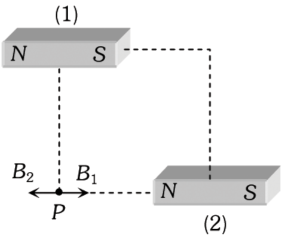
Hence new magnetic moment $M' = m(2x) = m.2r\sin\frac{\theta}{2}$

$$= m.\frac{2l}{\theta}\sin\frac{\theta}{2} = \frac{2ml\sin\theta/2}{\theta} = \frac{2M\sin(\pi/6)}{\pi/3} = \frac{3M}{\pi}$$

23. (d) Due to wood moment of inertia of the system becomes twice but there is no change in magnetic moment of the system.

Hence by using $T = 2\pi\sqrt{\frac{I}{MB_H}} \Rightarrow T \propto \sqrt{I} \Rightarrow T' = \sqrt{2}\,T$

24. (a) Point P lies on equatorial line of magnet (1) and axial line of magnet (2) as shown



$$B_1 = \frac{\mu_0}{4\pi}\cdot\frac{M}{d^3} = 10^{-7} \times \frac{1000}{(0.1)^3} = 0.1\,T$$

$$B_2 = \frac{\mu_0}{4\pi}\cdot\frac{2M}{d^3} = 10^{-7} \times \frac{2\times 1000}{(0.1)^3} = 0.2\,T$$

$$\therefore\ B_{net} = B_2 - B_1 = 0.1\,T$$

25. (a) Both points A and B lying on the axis of the magnet and on axial position

$$B \propto \frac{1}{d^3} \Rightarrow \frac{B_A}{B_B} = \left(\frac{d_B}{d_A}\right)^3 = \left(\frac{48}{24}\right)^3 = \frac{8}{1}$$

26. (b) $W = MB(1-\cos\theta) = 2\times 0.1\times(1-\cos 90^o) = 0.2J$

27. (a) $M = mL = 4\times 10\times 10^{-2} = 0.4A\times m^2$

28. (d) Magnetic potential at a distance d from the bar magnet on it's axial line is given by

$$V = \frac{\mu_0}{4\pi}.\frac{M}{d^2} \Rightarrow V \propto M \Rightarrow \frac{V_1}{V_2} = \frac{M_1}{M_2}$$

$$\Rightarrow \frac{V}{V_2} = \frac{M}{M/4} \Rightarrow V_2 = \frac{V}{4}$$

29. A

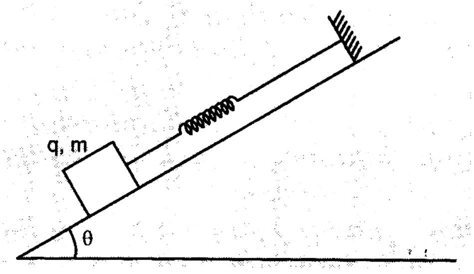
30. (d) $B_H = \sqrt{3}\,B_V$, also $\tan\theta = \frac{B_V}{B_H} = \frac{1}{\sqrt{3}} \Rightarrow \theta = 30^o$

31. **(d)** $R_1 < R_2$

and $R = \frac{mv}{qB}$ of $\left(\frac{m}{q}\right)_1 < \left(\frac{m}{q}\right)_2$

32. A

33. **(b)** There will be no effect of magnetic force on time period because the magnetic force will be perpendicular to the inclined plane.



34. **(b)** If n be the number of turns and r, the radius of each turn then $n(2\pi r) = L =$ constant

Also, for n turns, each turn of radius r, the torque on the total coil, when carrying the current I and placed in a magnetic field B is

$$\tau = nI\left(\vec{\mathbf{A}} \times \vec{\mathbf{B}}\right) = nI\,(\pi r^2)B = (\pi IB)\,nr^2$$

We have to maximise τ with respect to n and r subject to condition (1), treating n and r as variables substituting for nr from (1),

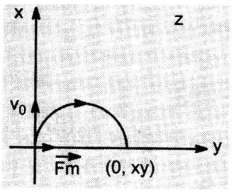
$$\tau = (\pi IB)\left(\frac{L}{2\pi}\right)r = \frac{IBL}{2}r$$

Hence, τ will be maximum when r will be maximum and the r maximumn $n = 1\,(i.e.)$ there is only one single turn of coil.

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

$$\tau_{max} = \frac{IBL}{2}\cdot\frac{L}{2\pi} = \frac{L^2 IB}{4\pi}$$

35. (c) $y = 2r = \dfrac{2mv_0}{B_0 q} = \dfrac{2v_0}{B_0 \alpha}$



Here, $\dfrac{q}{m} = \alpha$

36. (b)

37. C

38.
(b) e.m.f. induced across the rod PQ is

$$\mathcal{E} = \vec{\mathbf{B}} \cdot (\vec{\mathbf{l}} \times \vec{\mathbf{v}})$$
$$= Blv \sin\theta$$
$$= 2 \times 2 \times 2 \times \sin 30$$
$$\mathcal{E} = 4\text{V}$$

Free electrons of the rod shift towards right due to force $q(\vec{\mathbf{v}} \times \vec{\mathbf{B}})$

Thus end P is at higher potential

or $V_P - V_Q = 4\text{V}$

39. (d) Potential difference across capacitor

$$V = Bvl = \text{constant}$$

Therefore, change stored in the capacitor is also constant. Thus, current through the capacitor is zero.

40. C

41. D

42. **(c)** When the rod rotates, there will be an induced current in the rod. The given situation can be treated as if a rod A of length $3l$ is rotating in clockwise direction, while another rod B of length $2l$ is rotating in the anticlockwise direction with the same angular speed ω

As $\mathcal{E} = \frac{1}{2}B\omega l^2$

For A : $\mathcal{E}_A = \frac{1}{2}B\omega(3l)^2$

and $\mathcal{E}_B = \frac{1}{2}B(-\omega)(2l)^2$

Resultant induced e.m.f. will be :

$$\mathcal{E} = \mathcal{E}_A + \mathcal{E}_B = \frac{1}{2}B\omega l^2(9-4)$$

$$\mathcal{E} = \frac{5}{2}B\omega l^2$$

43. D

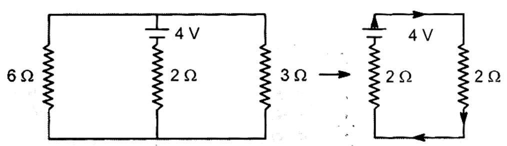
44. **(c)** Current in the YY' direction is from Y' to Y but the current is constant and hence the magnetic flux through the coil is constant. Therefore the current in the coil is zero.

45. **(c)** Motional e.m.f.

$$\mathcal{E} = Bvl$$

$$\mathcal{E} = (2)(2)(1) = 4\text{V}$$

This acts as a cell of e.m.f. $\mathcal{E} = 4\text{V}$ and internal resistance $r = 2\Omega$. The simple circuit can be drawn as follows :



∴ Current through the connector

$$I = \frac{4}{2+2} = 1\text{A}$$

Magnetic force on connector

$$F_m = IlB$$

$$= (1)(1)(2)$$

$$= 2\text{N} \quad \text{(towards left)}$$

Therefore, to keep the connector moving with a constant velocity, a force of 2N will have to be applied towards right.

[CHEMISTRY]

46. Cast iron contains about 3% carbon.

47. **(a)** $Cu_2S + 2Cu_2O \xrightarrow{\Delta} SO_2 + 6Cu$

48. **(b)** Associated colloids or micelles are formed by macro ions

49. D

50. **(a)** $E_a = \frac{2.303RT_1T_2}{T_2 - T_1}\log\frac{k_2}{k_1}$

$$= \frac{2.303 \times 8.314 \times 293 \times 308}{15}\log 2$$

$$= \mathbf{34.67\ kJ\ mol^{-1}}.$$

51. **(c)** $t_{1/4} = \frac{2.303}{k}\log\frac{[A]_0}{3[A]_0/4}$

$$= \frac{2.303}{k}[\log 4 - \log 3]$$

$$= \frac{2.303}{k}[0.6021 - 0.4771]$$

$$= \frac{2.303 \times 0.125}{k}$$

$$= \frac{0.2878}{k} \approx \frac{\mathbf{0.29}}{\boldsymbol{k}}$$

52. **(c)** When the volume of vessel is halved, the concentrations go doubled up.

$$\frac{r_{new}}{r} = \frac{k[2A][2B]^2}{k[A][B]^2} = 2 \times 2^2 = \mathbf{8}$$

53. **(b)** $r = k[A]^x$, $2r = k[4A]^x$

$$\frac{2r}{r} = \frac{k[4A]^x}{k[A]^x} \Rightarrow 4^x = 2$$

$$\Rightarrow \quad 2^{2x} = 2^1 \Rightarrow x = \frac{1}{2}$$

$$\frac{r'}{r} = \frac{k[9A]^{\frac{1}{2}}}{k[A]^{\frac{1}{2}}} \Rightarrow \frac{r'}{r} = (9)^{\frac{1}{2}}$$

$$\Rightarrow \quad r' = 3r$$

54. **(d)** **w. r. t. P :**

$t_{75\%} = 2t_{50\%} \Rightarrow 1^{st}$ order kinetics

w. r. t. Q :

Graph between concentration and time is straight line with $-ve$ slope $\Rightarrow$ Zero order kinetics

Overall order = 1 + 0 = **1**.

55. **(b)** $\pi = cRT$

$$\Rightarrow \quad c = \frac{\pi}{RT} = \frac{7.8 \text{ bar}}{0.083 \text{ L bar K}^{-1} \text{mol}^{-1} \times 310 \text{ K}} = \mathbf{0.31 \text{ mol L}^{-1}}$$

56. D

57. **(c)** Isotonic solutions have equal molarities or moles in equal volumes.

$$\frac{x}{60}(\text{urea}) = \frac{10}{342}(\text{sucrose})$$

$x = 1.754$ g in 100 mL

Wt. of urea in 1 L = **17.54 g**

58. **(d)** For weak acid, $\alpha = \dfrac{i-1}{n-1}$

$$\Rightarrow \quad 0.3 = \frac{i-1}{2-1} \Rightarrow i = 1.3$$

$\Delta T_f = iK_f m = 1.3 \times 1.86 \times 0.1 = 0.24°\text{C}$

Freezing point of solution = 0 – 0.24 = **– 0.24°C**

59. **(a)** $4r = \sqrt{2}a$

$$2r = \frac{\sqrt{2}}{2} \times 408 = \mathbf{288.5 \text{ pm}}$$

60. **(b)** One Sr^{2+} creates one vacancy at site of $Na^{\oplus}$.

100 moles of $Na^{\oplus} = 10^{-4}$ mole vacancies (= moles of $Sr^{2\oplus}$)

$$1 \text{ mol of } Na^{\oplus} = \frac{10^{-4}}{100} \times 6.02 \times 10^{23} = \mathbf{6.02 \times 10^{17} \text{ mol}^{-1}}.$$

61. **(b)** Let $Fe^{3+} = x$ number

so, $Fe^{2+} = 0.93 - x$

Balancing charge, $3x + 2(0.93 - x) = 2 \quad \Rightarrow \quad x = 0.14$

$$Fe^{3+}\% \text{ by weight} = \frac{(0.14 \times 56) \times 100}{(0.93 \times 56) + 16} = \frac{784}{68.08} = \mathbf{11.52\%}$$

62. **(a)** One unit cell in NaCl lattice has 4 NaCl formula units.

4×58.5 g NaCl $= 6.02 \times 10^{23}$ unit cells

$$1 \text{ g NaCl} = \frac{6.02 \times 10^{23}}{4 \times 58.5} = \mathbf{2.57 \times 10^{21} \text{ unit cells}}$$

63. **(d)** No. of equivalent of hydrogen = No. of equivalent of Al $= \dfrac{4.5}{9} = 0.5$

2 gram H_2 = 22.4 L at STP

$$0.5 \text{ equivalent hydrogen, } i.e., 1 \text{ g} = \frac{0.5 \times 22.4}{2} = \mathbf{5.6 \text{ L}}$$

64. **(d)** Higher the reduction potential, easier is the gain of electrons.

65. A
66. A
67. A
68. B

69. **(d)** Debye-Huckel-Onsager equation is applicable to strong electrolytes with high accuracy.

70. **(c)** On adding equations (i) and (ii)

$$Cu^{2+} + e^- \longrightarrow Cu^+ \text{ or } \quad Cu^{2+} \xrightarrow{e^-_{(i)}} Cu^+ \xrightarrow{e^-_{(ii)}} Cu \quad (2e^-\text{(iii)})$$

$$\underline{Cu^+ + e^- \longrightarrow Cu}$$

$$\underline{Cu^{2+} + 2e^- \longrightarrow Cu}$$

$$(-nFE)_{iii} = (-nFE)_i + (-nFE)_{ii}$$

$$2 \times E^0_{iii} = 1 \times 0.15 + 1 \times 0.50$$

$$E^0_{iii} = \frac{0.65}{2} = \mathbf{0.325\ V}$$

71. D
72. C

73. **(a)** O.N. of Mn in MnO_4^{2-} and MnO_4^- are respectively +6 and +7 involving loss of $1e^-$.
1 mol of MnO_4^{2-} requires 1F or 96500C, 0.1 mol of MnO_4^{2-} requires 96500×0.1C or 9650 C.

74. B

75. **(d)** $\text{Molarity} = \dfrac{10 \times x\% \times d}{M_B} = \dfrac{10 \times 98 \times 1.8}{98} = 18$

$$V = \frac{M'V'\text{(dilute)}}{M\text{(conc.)}} = \frac{1000 \times 0.1}{18} = \mathbf{5.55\ mL}$$

76. A

77. **(c)** 1000 mL of 0.5 *M* $K_4[Fe(CN)_6]$ = 0.5 × 6 mole N atoms

$$= 3 \times 6.02 \times 10^{23} \text{ N atoms}$$

$$\text{100 mL of the same solution} = \frac{3 \times 6.02 \times 10^{23} \times 100}{1000}$$

$$= \mathbf{1.806 \times 10^{23}\ N\ atoms}$$

78. **(c)**

$$P_B = P_B^0 \chi_B = 400 \times \frac{3}{5} = 240$$

$$P_T = P_T^0 \chi_T = 150 \times \frac{2}{5} = 60$$

$$Y_B = \frac{P_B}{P_{Total}} = \frac{240}{300} = \mathbf{0.8}$$

$$Y_T = \frac{P_T}{P_{Total}} = \frac{60}{300} = 0.2 \quad \text{or} \quad Y_T = 1 - 0.8 = \mathbf{0.2}$$

79. D

80. **(a)** $k = Ae^{-\frac{E_a}{RT}}$

For $T_1 = T_2 = T$ and $k_1 = k_2$, we have

$$10^{15} e^{-\frac{1000}{T}} = 10^{16} e^{-\frac{2000}{T}}$$

$$e^{-\frac{1000}{T}} = 10 e^{-\frac{2000}{T}}$$

$$10 = (e^{-\frac{1000}{T}}) / (e^{-\frac{2000}{T}}) = [e]^{\left(-\frac{1000}{T}\right)+\left(\frac{2000}{T}\right)}$$

$$(e)^{2.303} = (e)^{\frac{1000}{T}} \Rightarrow T = \mathbf{\frac{1000}{2.303} K}$$

81. **(c)** $t_{99\%} = 6.64 \times t_{1/2} = 6.64 \times 15 = 99.6 \text{ min}$

or $t_{99\%} = \frac{2.303}{\lambda} \log \frac{100}{100-99} = \frac{2.303 \times 15}{0.693} \times 2$

$$= \frac{2 \times 2.303 \times 15}{0.693} = \mathbf{99.69 \text{ min}}$$

82. D

83. **(b)** 10 mL of 0.5 M NaCl

$= 10 \times 0.5$ millimoles of NaCl

$= 5$ millimoles of NaCl

100 mL of total sol requires NaCl $= 5$ millimoles

1000 mL (*i.e.*, 1 L) sol requires NaCl $= \frac{5 \times 1000}{100} =$ **50 millimoles**

84. **(a)** Coagulation of charged mud and sand particles by ions present in sea water, makes them settle and form the delta.

85. **(a)** Charged smoke particles are made to pass through charged plates (20,000 to 70,000V). Smoke particles get discharged here before coming out of the chimney.

86. C

87. C

88. **(a)** $FeCl_2$ and $SnCl_2$ do not react as both are reducing agents.

89. **(a)** $K = \mathbf{1 \times 10^{10}}$

F—CH(F)—C(=O)—O—H is the strongest among given acids and has highest degree of dissociation. So, its conductivity is the highest.

90. D