

Structured Essay

Part - A

01. (a) i. Ne ii. Cl iii. C
iv. Na v. F vi. S

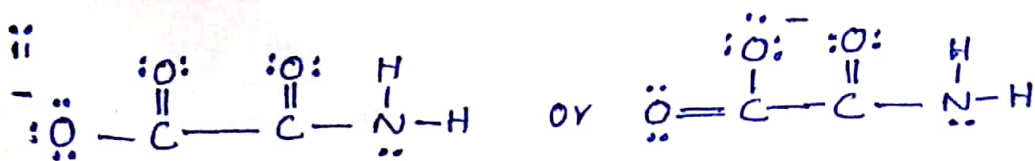
Marks

(03 x 6)

(a) - 18

- (b) i. x: C y: N

(02 + 02)



(05)

- iii. I X_2 : Trigonal planar

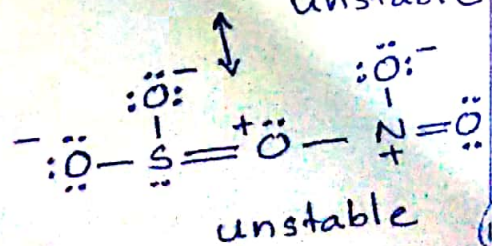
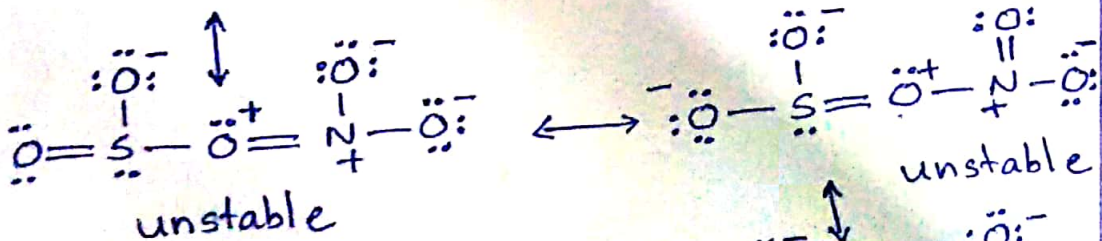
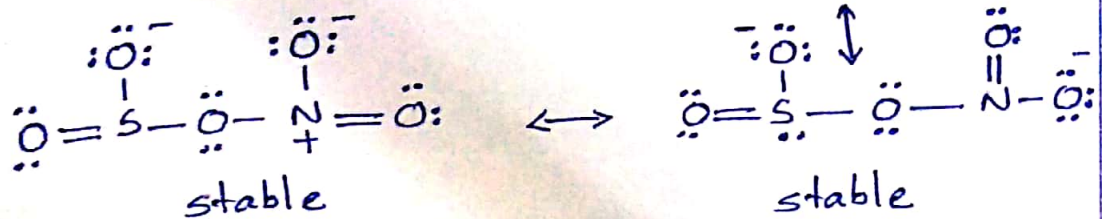
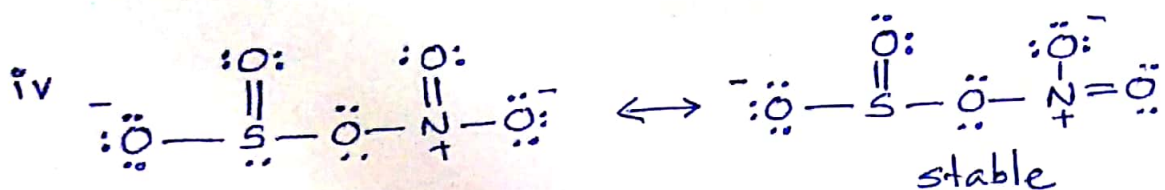
Y: Pyramidal

(01 + 01)

- II X_2 : +3

Y: -3

(01 + 01)



for structure

(03 x 4)

any 04 structures (03 x 4)

stability

(01 x 04)

(01)

(02)

v.

	N^1	C^2	N^3	N^4
I the number of VSEPR Pairs around the atom	4	3	3	2
II electron pair geometry around the atom	tetrahedral	trigonal Planar	trigonal Planar	linear
III shape around the atom	Pyramidal	trigonal Planar	angular/ v	linear
IV hybridization of the atom	sp^3	sp^2	sp^2	sp

(01 x 16)

- vi. I $H-N^1$: $H-1s$ N^1-sp^3
 II N^1-C^2 : N^1-sp^3 C^2-sp^2
 III C^2-O : C^2-sp^2 $O-2p$ or sp^2
 IV C^2-N^3 : C^2-sp^2 N^3-sp^2
 V N^3-N^4 : N^3-sp^2 N^4-sp
 VI N^4-N^5 : N^4-sp N^5-sp^2 or $2p$

(01 x 12)

- vii I C^2-O : C^2-2p $O-2p$
 II N^3-N^4 : N^3-2p N^4-2p
 III N^4-N^5 : N^4-2p N^5-2p

(01 x 6)

viii $N^1: 107^\circ \pm 1$ $C^2: 120^\circ \pm 1$ $N^3: 118^\circ \pm 1$ $N^4: 180^\circ \pm 1$

(01 x 4)

ix $C^2 < N^1 < N^3 < N^4 < N^5$

(03)

(c) i. I $SOCl_2 < SOF_2 < SO_4^{2-} < SO_2 < SO_3$

(b) 70

II $NO_4^{3-} < NO_2^- < NO_3^- < NO_2 < NO_2^+$

(03 x 2)

ii I $\lambda = \frac{h}{mv}$ h - plank constant (02)

$$\text{II } \lambda = \frac{6.626 \times 10^{-34} \text{ Js}}{9.1 \times 10^{-28} \times 10^{-3} \text{ kg} \times 2.5 \times 10^7 \text{ ms}^{-1}}$$

(02)

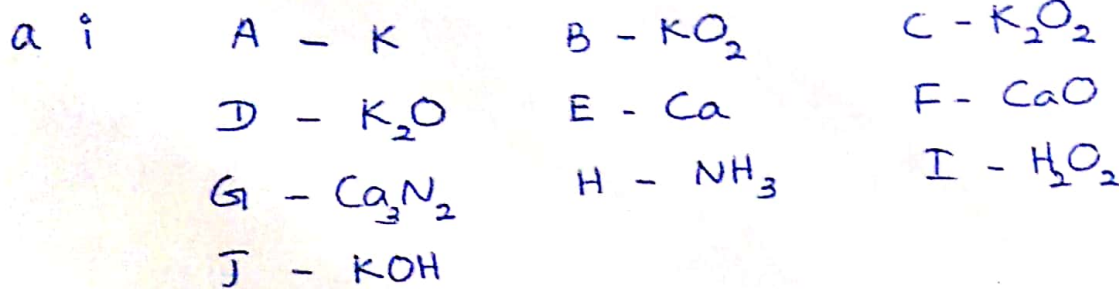
$$= 2.912 \times 10^{-11} \text{ m} = 2.912 \times 10^{-2} \text{ nm}$$

(02)

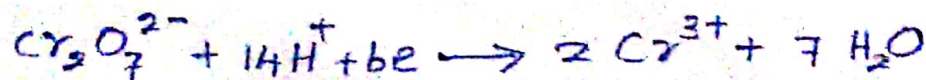
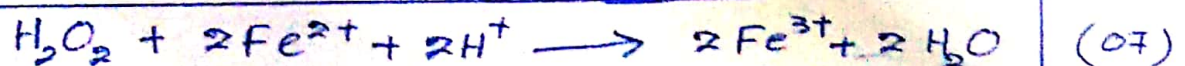
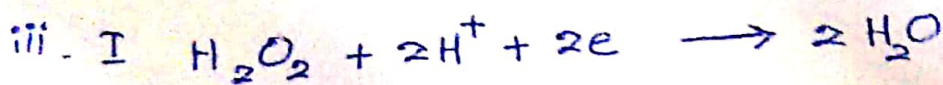
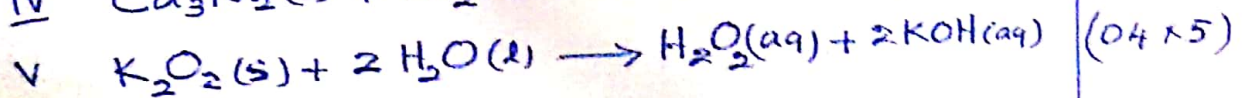
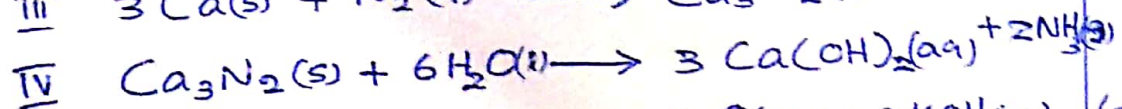
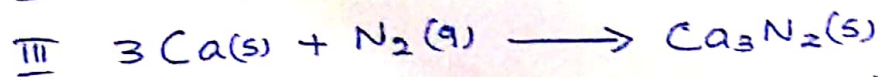
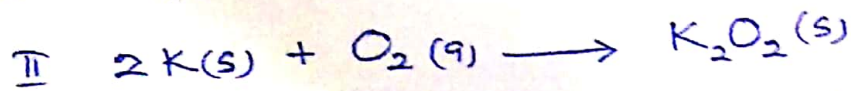
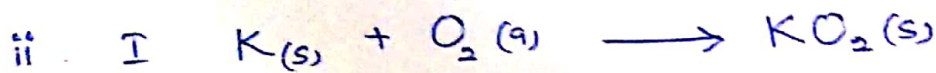
(c) + 12

01-100

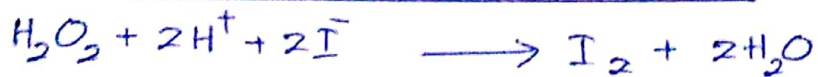
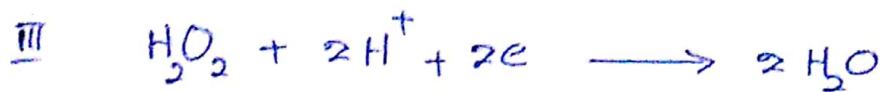
(02)



(04 x 10)



(03)

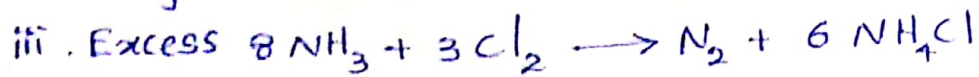
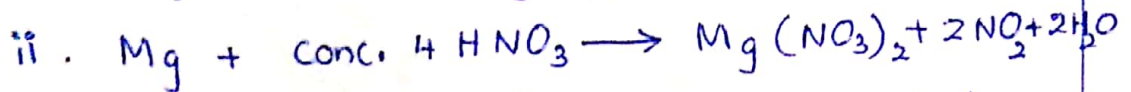
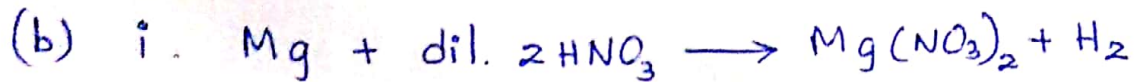


(06)

Note: * For complete reaction 06 marks

* For only half reaction 02 marks each

(a) - 80

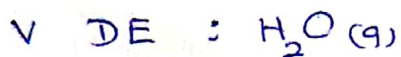
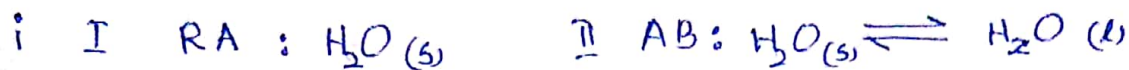


b - 20

02 → 100

(04)

3. (a)



(0.2 x 5)

ii A : solid (ice) starts to dissolve

B : solid (ice) completely dissolved

C : Liquid (liquid water) starts to boil

D : Liquids (water) are completely evaporated

(0.2 x 4)

iii The plateaus in the graph indicate the phase transitions occur.

$\text{H}_2\text{O (s)} \rightleftharpoons \text{H}_2\text{O (l)}$ to the plateau obtained (0.2)

$\text{H}_2\text{O (l)} \rightleftharpoons \text{H}_2\text{O (g)}$ The plateau obtained this is the longest)

Reason : $\Delta H_{\text{fus}} < \Delta H_{\text{vap}}$

(0.2)

iv Heat required to convert ice existing at -40°C to ice at 0°C is } $q_1 = ms\Delta T$ (0.2)

$$q_1 = m \cdot s \cdot \Delta T$$

$$q_1 = 90.0 \text{ g} \times 2.09 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1} \times 40^\circ\text{C} \quad (0.2)$$

$$= 7.524 \times 10^3 \text{ J} = 7.524 \text{ kJ} \quad (0.2)$$

ice at 0°C and liquid water at 0°C

Heat required to convert ice at 0°C to liquid water at 0°C is } $q_2 = n \times \Delta H_{\text{fus}}$ (0.2)

$$q_2 = \frac{90.0}{18 \text{ g mol}^{-1}} \times 6.0 \text{ kJ mol}^{-1} \quad (0.2)$$

$$= 30.0 \text{ kJ} \quad (0.2)$$

Heat required to convert liquid water at 0° to liquid water at 0° is } = $q_3 = ms \Delta t$ (02)

$$q_3 = 90.0 \text{ g} \times 4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1} \times 60^\circ\text{C} \quad (02)$$

$$= 22680 \text{ J} = 22.68 \text{ kJ} \quad (02)$$

Total amount of heat required is } = $q_1 + q_2 + q_3$ (02)

$$= 7.524 \text{ kJ} + 30.0 \text{ kJ} + 22.68 \text{ kJ} \quad (02)$$

$$= 60.204 = 60.20 \text{ kJ} \quad (02)$$

a-46

(b) i: $P_A = P_A^\circ X_A$ P_A and P_B are partial (02)

$P_B = P_B^\circ X_B$ Pressures of A and B at vapour phase (02)

$$P_{\text{Tot}} = P_A + P_B = P_A^\circ X_A + P_B^\circ X_B \quad (02)$$

$$P_A = Y_A P_{\text{Tot}} \quad (02)$$

$$Y_A = \frac{P_A}{P_{\text{Tot}}} \quad (02)$$

$$= \frac{P_A^\circ X_A}{P_A^\circ X_A + P_B^\circ X_B} \quad (02)$$

(b) i → 12

ii Raoult's Law (02)

Dalton's Law of partial pressures (02)

(b) ii → 04

(06)

$$X_A = \frac{n_A}{n_A + n_B} = \frac{1.0 \text{ mol}}{1.0 \text{ mol} + 4.0 \text{ mol}}$$

(02)

$$= \frac{1}{5}$$

(02)

$$X_B = \frac{n_B}{n_A + n_B} = \frac{4.0 \text{ mol}}{1.0 \text{ mol} + 4.0 \text{ mol}}$$

(02)

$$= \frac{4}{5}$$

(02)

$$Y_A = \frac{P_A^0 X_A}{P_A^0 X_A + P_B^0 X_B} = \frac{50 \text{ kPa} \times \frac{1}{5}}{50 \text{ kPa} \times \frac{1}{5} + 75 \text{ kPa} \times \frac{4}{5}}$$

(02)

$$= \frac{10}{10 + 60} = \frac{1}{7}$$

$$Y_B = 1 - Y_A \quad (Y_A + Y_B = 1)$$

(02)

$$= 1 - \frac{1}{7}$$

(02)

$$= \frac{6}{7}$$

(02)

iv I S_1 : solid S_2 : liquid S_3 : Gas

(b) ii → 18

(02 × 3)

ii The point where all three phases of solid liquid and gases are at equilibrium called Triple point

(03)

(02)

iii Critical temperature : Maximum temperature at which a gas can be liquified

(03)

iv. solid → gas (solid is sublimized)

(03)

v. solid → liquid

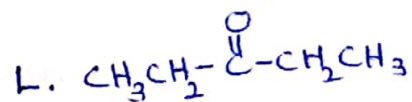
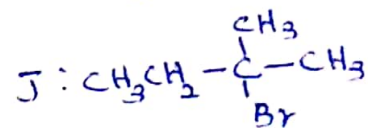
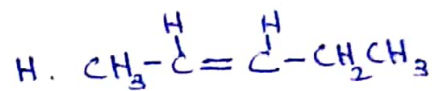
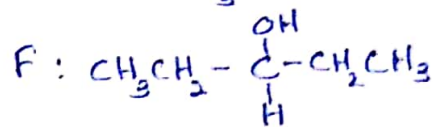
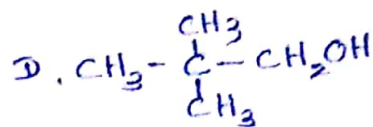
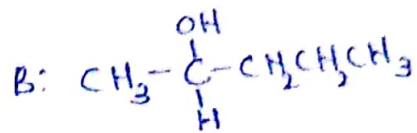
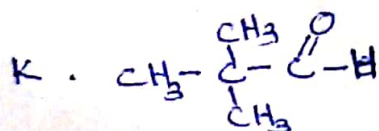
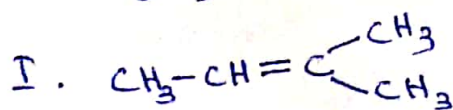
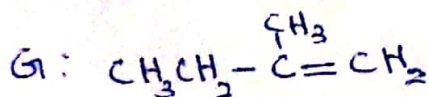
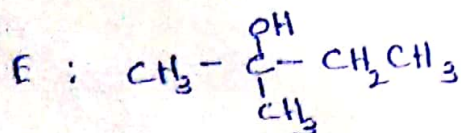
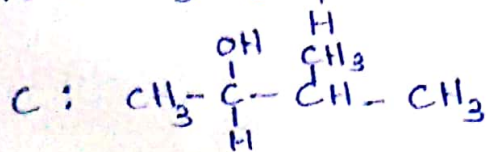
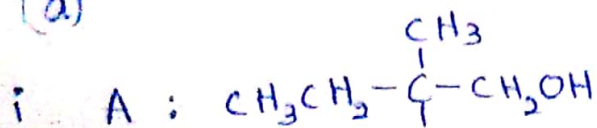
(03)

(07)

03 → 100

(b) → iv → 20

04. (a)



(04 x 12)

(ii) When $\text{NH}_3/\text{AgNO}_3$ is added : silver mirror is given by K but not from

(04) marks for the experiment

or Fehling solution is added

K gives brick-red precipitate

L is not

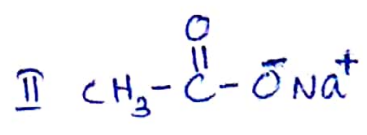
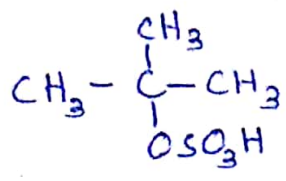
(01 + 01 for observations)

a → 54

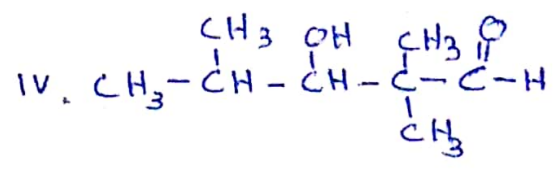
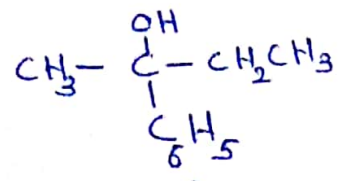
(b)

i

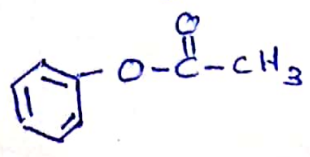
I



III



v

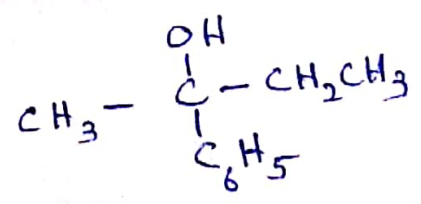
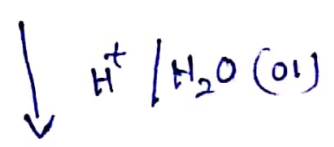
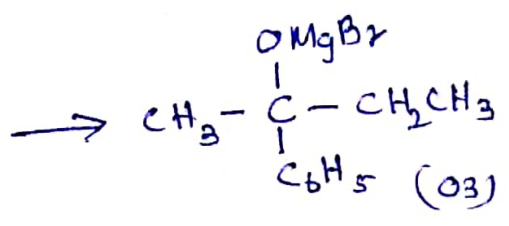
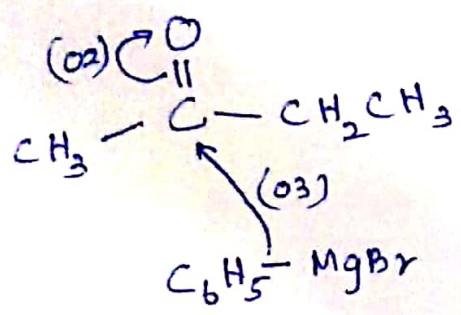


(05x5) 3

- ii 3rd Reaction I : Electrophilic addition
 Reaction II : Nucleophilic substitution
 Reaction III : Nucleophilic addition

(04x3)

iii



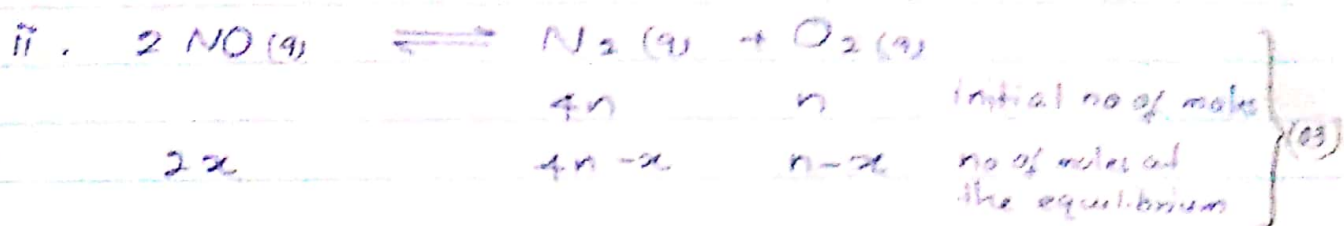
(09)

(b) → 46

04 → 100

(09)

(05) a) i. $K_p = \frac{(P_{N_2(g)}) (P_{O_2(g)})}{(P_{NO(g)})^2}$ (05)



Total no. of moles at the equilibrium = $5n$

no. of $NO(g)$ moles at the equilibrium ($2x$) = $5n \times \frac{2}{100} = 0.1n$ (02)

$x = 0.05n$ (02)

no. of moles of $N_2(g)$ at the equilibrium = $4n - 0.05n$
 $= 3.95n$ (02)

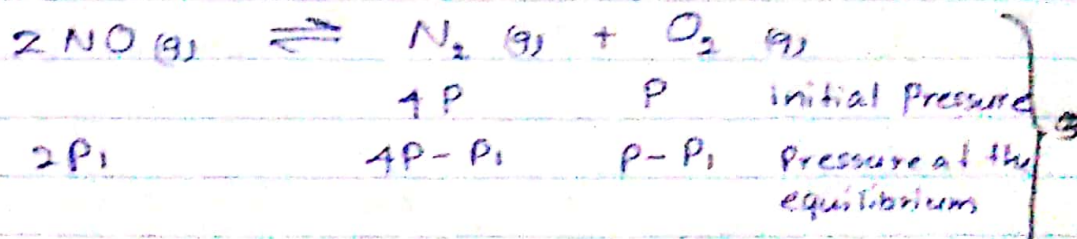
no. of moles of $O_2(g)$ at the equilibrium = $n - 0.05n$
 $= 0.95n$ (02)

Total Pressure = P

$$K_p = \frac{\left(\frac{3.95n}{5n} \times P\right) \left(\frac{0.95n}{5n} \times P\right)}{\left(\frac{0.1n}{5n} \times P\right)^2} \quad (4+1)$$

$= 3.75 \times 10^2 //$ (04)

Alternative Answer



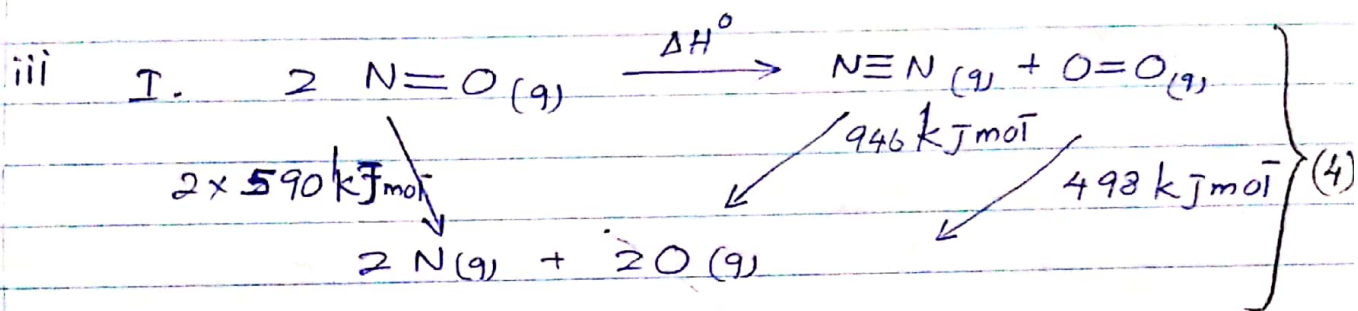
$P_{NO} = \frac{2}{100} \times 5P$

$2P_1 = \frac{2}{100} \times 5P$

$$\begin{aligned}
 P_1 &= 0.05P \quad (02) \\
 P_{N_2} &= 4P - 0.05P = 3.95P \quad (02) \\
 P_{O_2} &= P - 0.05P = 0.95P \quad (02) \\
 P_{NO} &= 0.05P \times 2 = 0.1P \quad (02)
 \end{aligned}$$

$$K_p = \frac{3.95P \times 0.95P}{(0.1P)^2} = 3.75 \times 10^2 \quad // \quad (04)$$

(4+1)



According to Hess's Law,

$$\begin{aligned}
 \Delta H^\circ &= (2 \times 590) - (946 + 498) \text{ kJ mol}^{-1} \quad (2+1) \\
 &= -264 \text{ kJ mol}^{-1} \quad (2+1)
 \end{aligned}$$

Alternative Answer,

$$\begin{aligned}
 \Delta H^\circ &= \sum \text{Dissociation enthalpy of bonds breaking} - \sum \text{Dissociation enthalpy of bond forming} \quad (04) \\
 &= (590 \times 2 - 946 + 498) \text{ kJ mol}^{-1} \quad (2+1) \\
 &= -264 \text{ kJ mol}^{-1} \quad (2+1)
 \end{aligned}$$

ii. • percentage of O_2 moles at $T_1 = \frac{0.95n \times 100}{5n} = 19\%$ (03)

• percentage of moles of O_2 at $T_2 = 10\%$.

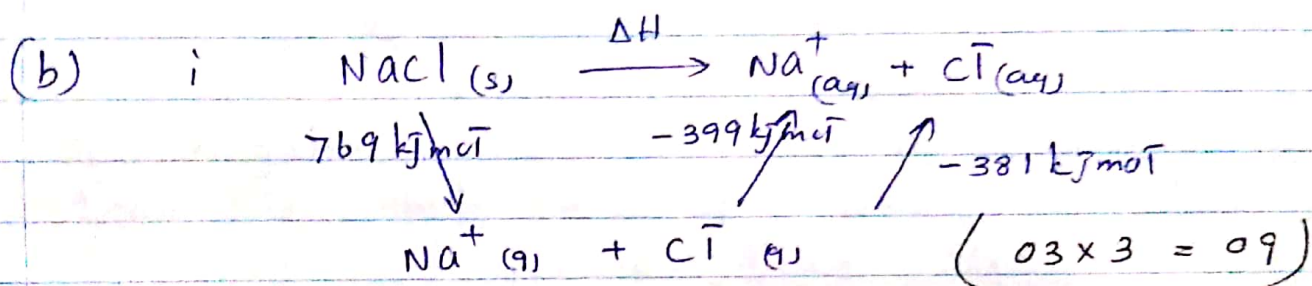
equilibrium is shifted to left when the temperature T_1 changes to T_2 (03)

• sign of the ΔH in forward reaction is (-) (03)

$\therefore T_1 < T_2$ (03)

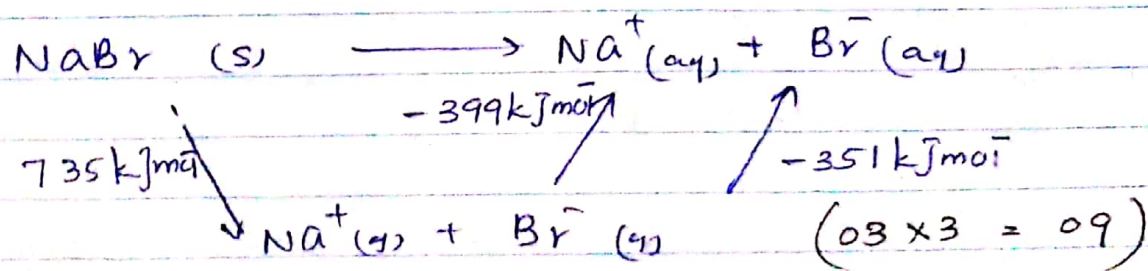
III The system is reached to the equilibrium at the temperature T_2 within less time than T_1 (03)

5a - 50



According to the Hess's Law

$$\Delta H = 769 + (-399 - 381) \text{ kJ mol}^{-1} \quad (3+1)$$
$$= -11 \text{ kJ mol}^{-1} \quad (3+1)$$



According to Hess's Law,

$$\Delta H = 735 + (-399 - 351) \text{ kJ mol}^{-1} \quad (3+1)$$
$$= -15 \text{ kJ mol}^{-1} \quad (3+1)$$

(ii) For NaCl

$$\begin{aligned}\Delta G &= \Delta H - T\Delta S && (05) \\ &= -11 \text{ kJmol}^{-1} - \left(\frac{+13 \text{ kJmol}^{-1}}{1000} \right) && (3+1) \\ &= -11.013 \text{ kJmol}^{-1} && (3+1)\end{aligned}$$

For NaBr

$$\begin{aligned}\Delta G &= -15 \text{ kJmol}^{-1} - \left(\frac{15 \text{ kJmol}^{-1}}{1000} \right) && (3+1) \\ &= -15.018 \text{ kJmol}^{-1} \quad // && (3+1)\end{aligned}$$

iii. negative value of ΔG of NaCl is less than the ~~that~~ value of NaBr, the solubility of NaBr is greater than NaCl (05)

5b - 60

c) i. $n_{\text{HCl}} = 0.05 \times \frac{20}{1000}$ (3+1)

$$n_{\text{HCl}} = n_{\text{OH}^-} \quad (2)$$

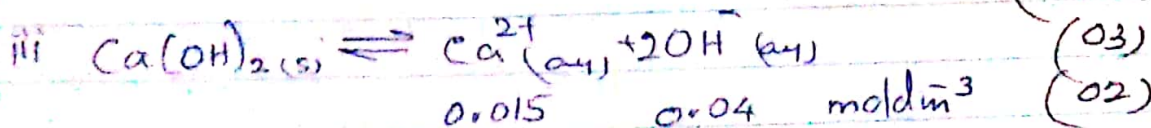
$$\text{Total } [\text{OH}^-] = \frac{0.05 \times 20 \times 10^{-3} \text{ mol}}{25 \times 10^{-3} \text{ dm}^3} \quad (3+1)$$

(3+1)

ii $[\text{OH}^-]$ from NaOH = 0.01 mol dm^{-3}

$$[\text{OH}^-] \text{ from } \text{Ca(OH)}_2 = 0.04 - 0.01 \text{ mol dm}^{-3} = 0.03 \text{ mol dm}^{-3} \quad (2+1)$$

$$[\text{Ca}^{2+}] = \frac{0.03}{2} = 0.015 \text{ mol dm}^{-3} \quad (2+1)$$



(4)

No. _____ Date _____

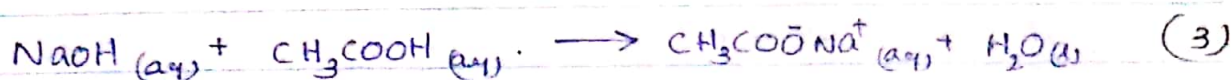
$$\begin{aligned}K_{sp} &= [Ca^{2+}] [OH^-]^2 && (05) \\&= 0.015 \text{ mol dm}^{-3} \times (0.04 \text{ mol dm}^{-3})^2 && (4+1) \\&= 2.4 \times 10^{-5} \text{ mol}^3 \text{ dm}^{-9} && (4+1)\end{aligned}$$

5C - 40

(06)

a)

$$\text{Initial no of moles of } \text{CH}_3\text{COOH} = \frac{0.225}{1000} \times 25 \text{ mol} \quad (2+1)$$



$$n \text{ CH}_3\text{COOH} = n \text{ NaOH} = \frac{0.125}{1000} \times 20 \text{ mol} \quad (2+1)$$

$$n \text{ HA in } 25 \text{ cm}^3 \text{ of butanol} = \left(\frac{0.225}{1000} \times 25 - \frac{0.125}{1000} \times 20 \right) \text{ mol} \quad (3)$$

$$(2+1)$$

$$= \frac{5.625 - 2.5}{1000} \text{ mol}$$

$$= 3.125 \times 10^{-3} \text{ mol} \quad (3+1)$$

$$K_D = \frac{[\text{CH}_3\text{COOH}]_{\text{H}_2\text{O}}}{[\text{CH}_3\text{COOH}]_{\text{but}}} \quad (4)$$

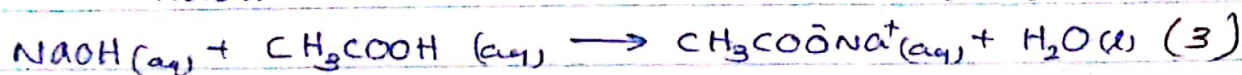
$$\frac{2.5 \times 10^{-3} \text{ mol}}{25 \times 10^{-3} \text{ dm}^3} \quad (2+1)$$

$$= \frac{3.125 \times 10^{-3} \text{ mol}}{25 \times 10^{-3} \text{ dm}^3} = 0.8 \quad (2+1)$$

5 marks for the division

Alternative Answer

$$n \text{ NaOH} = 0.125 \times 20 \times 10^{-3} \text{ mol} \quad (2+1)$$



$$\text{rest of } n \text{ CH}_3\text{COOH} = 0.125 \times 20 \times 10^{-3} \text{ mol} \quad (2+1)$$

$$\text{rest of } [\text{CH}_3\text{COOH}] = \frac{0.125 \times 20 \times 10^{-3}}{25 \times 10^{-3}} \text{ mol dm}^{-3} \quad (2+1)$$

$$= 0.1 \text{ mol dm}^{-3} \quad (2+1)$$

$$\text{Initial } n \text{ CH}_3\text{COOH} = 0.225 \times 25 \times 10^{-3} \text{ mol} \quad (2+1)$$

$$n \text{ CH}_3\text{COOH (but)} = (0.225 \times 25 \times 10^{-3} - 0.125 \times 20 \times 10^{-3}) \text{ mol} \quad (2+1)$$

$$= 3.125 \text{ mol} \quad (2+1)$$

$$[\text{CH}_3\text{COOH}]_{\text{but}} = \frac{3.125 \times 10^{-3} \text{ mol}}{25 \times 10^{-3} \text{ dm}^3} \quad (2+1)$$

$$= 0.125 \text{ mol dm}^{-3} \quad (2+1)$$

$$K_D = \frac{[\text{CH}_3\text{COOH}]_{\text{H}_2\text{O}}}{[\text{CH}_3\text{COOH}]_{\text{but}}} \text{ or } \frac{[\text{CH}_3\text{COOH}]_{\text{but}}}{[\text{CH}_3\text{COOH}]_{\text{H}_2\text{O}}} \quad (4)$$

$$= \frac{0.1 \text{ mol dm}^{-3}}{0.125 \text{ mol dm}^{-3}} \quad (2+1) \quad \frac{0.125 \text{ mol dm}^{-3}}{0.1 \text{ mol dm}^{-3}}$$

$$= 0.8 \quad (2+1) \quad 1.25 \quad (2+1)$$

(without units)

6a-40

6 (b) 1) $[\text{H}_2\text{O}_2] = \frac{n_{\text{H}_2\text{O}_2}}{V_{\text{H}_2\text{O}_2}} \quad (2)$

$$n_{\text{H}_2\text{O}_2} = [\text{H}_2\text{O}_2] V_{\text{H}_2\text{O}_2} \quad (2)$$

$$n_{\text{H}_2\text{O}_2} = \frac{2}{5} n_{\text{MnO}_4^-} \quad (2)$$

$$\frac{2}{5} n_{\text{MnO}_4^-} = [\text{H}_2\text{O}_2] V_{\text{H}_2\text{O}_2} \quad (2)$$

$$n_{\text{MnO}_4^-} = C_{\text{MnO}_4^-} \times V_{\text{MnO}_4^-} \quad (2)$$

$$\frac{2}{5} C_{\text{MnO}_4^-} \times V_{\text{MnO}_4^-} = [\text{H}_2\text{O}_2] \underbrace{V_{\text{H}_2\text{O}_2}}_{\text{constant}} \quad (2)$$

$$V_{\text{MnO}_4^-} \propto [\text{H}_2\text{O}_2]$$

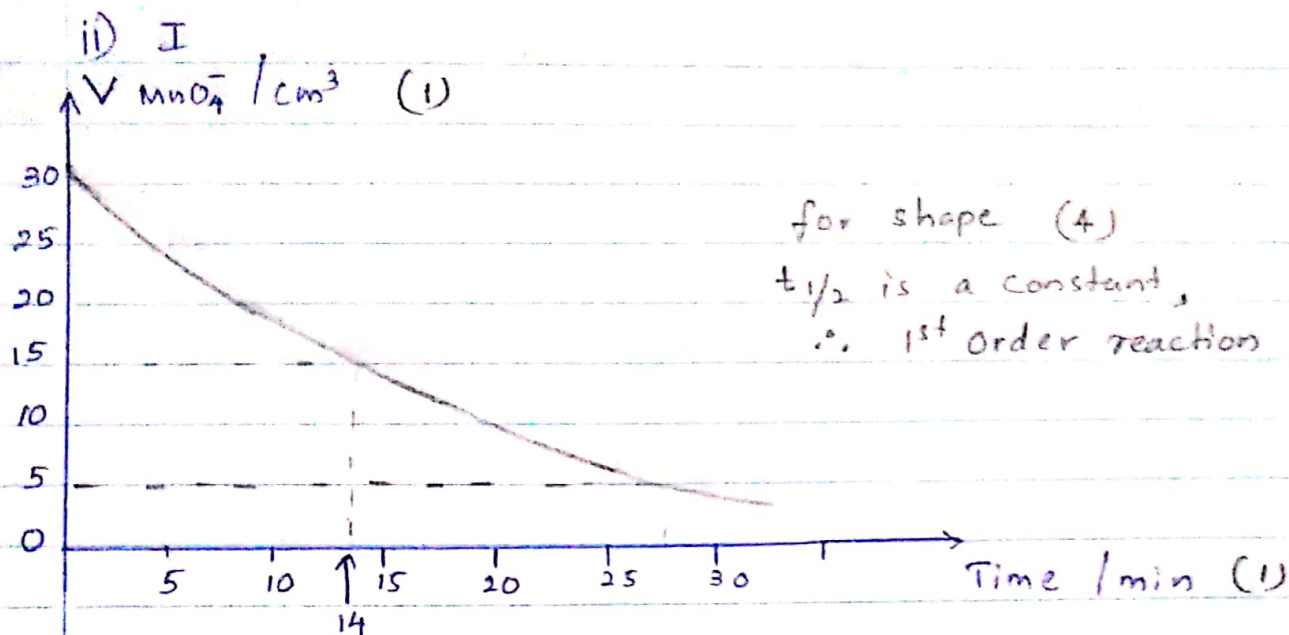
Alternative Answer

$$[\text{H}_2\text{O}_2] = \frac{n_{\text{H}_2\text{O}_2}}{10 \times 10^{-3}} \text{ mol dm}^{-3} \quad (3+1)$$

$$n_{\text{H}_2\text{O}_2} = 0.1 \times 10^{-3} \times V_{\text{MnO}_4^-} \times \frac{2}{5} \quad (4)$$

$$[\text{H}_2\text{O}_2] = \frac{0.1 \times 10^{-3} \times V_{\text{MnO}_4^-} \times \frac{2}{5}}{10 \times 10^{-3}} \quad (4)$$

$$[\text{H}_2\text{O}_2] \propto V_{\text{MnO}_4^-} \quad (2)$$



II for marking three points (3+3)

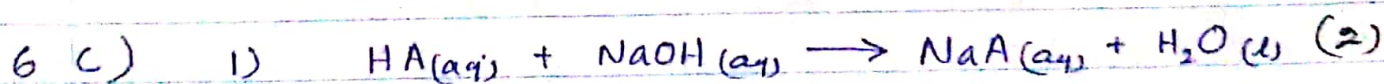
III $t_{1/2} = \frac{0.693}{k}$ (4)

$$k = \frac{0.693}{14\text{ s}} \quad (3+1)$$

$$= 0.0495 \text{ s}^{-1} \quad \parallel \quad (3+1)$$

award marks for the half life ranging 12-15 min

6b - 10

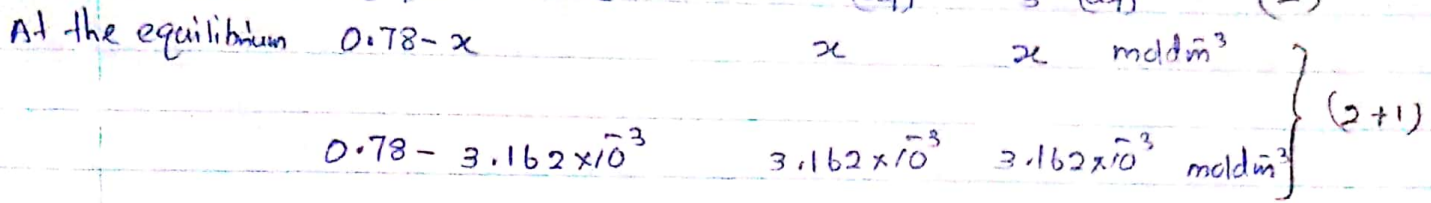


$$[\text{HA}] = \frac{0.5 \times 15.6 \times 10^{-3} \text{ mol dm}^{-3}}{10 \times 10^{-3}} = 0.78 \text{ mol dm}^{-3} \quad (2+1)$$

ii) $\text{pH} = -\log_{10} [\text{H}_3\text{O}^+(\text{aq})]$ (2)

$$2.5 = -\log_{10} [\text{H}_3\text{O}^+(\text{aq})]$$

$$[\text{H}_3\text{O}^+(\text{aq})] = 3.162 \times 10^{-3} \text{ mol dm}^{-3} \quad (2+1)$$



$$K_a = \frac{[\text{A}^- \text{(aq)}][\text{H}_3\text{O}^+ \text{(aq)}]}{[\text{HA (aq)}]} \quad (5) = \frac{(3.162 \times 10^{-3} \text{ mol dm}^{-3})^2}{0.78 - 3.162 \times 10^{-3} \text{ mol dm}^{-3}} \quad (2+1)$$

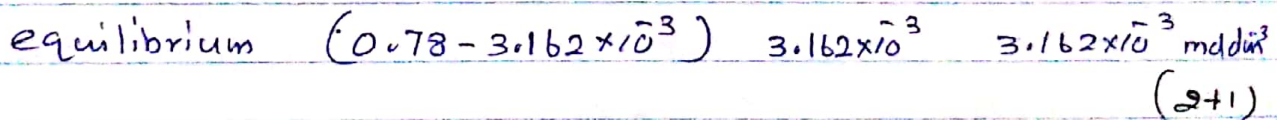
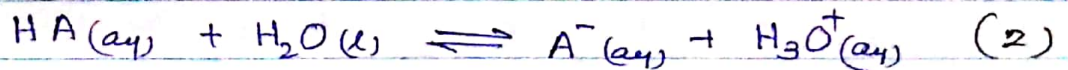
$$0.78 \gg 3.162 \times 10^{-3} \quad (1)$$

$$= \frac{(3.162 \times 10^{-3})^2}{0.78} = 1.28 \times 10^{-5} \text{ mol dm}^{-3} \quad (2+1)$$

Alternative Answer

$$\text{pH} = -\log_{10} [\text{H}_3\text{O}^+ \text{(aq)}] = 2.5 \quad (2)$$

$$[\text{H}_3\text{O}^+] = 3.162 \times 10^{-3} \text{ mol dm}^{-3} \quad // \quad (2+1)$$



$$K_a = \frac{[\text{A}^- \text{(aq)}][\text{H}_3\text{O}^+ \text{(aq)}]}{[\text{HA (aq)}]} \quad (5) = \frac{(3.162 \times 10^{-3} \text{ mol dm}^{-3})^2}{(0.78 - 3.162 \times 10^{-3} \text{ mol dm}^{-3})} \quad (2+1)$$

$$0.78 \gg 3.162 \times 10^{-3} \quad (1)$$

$$= \frac{(3.162 \times 10^{-3})^2}{0.78} = 1.28 \times 10^{-5} \text{ mol dm}^{-3} \quad (2+1)$$



$$[\text{A}^{-}] = \frac{0.5 \times 15.6 \times 10^{-3}}{25.6 \times 10^{-3} (2+1)} = 0.304 \approx 0.3 \text{ mol dm}^{-3} \quad (2+1)$$

$$K_b = \frac{[\text{HA}(\text{aq})][\text{OH}^{-}(\text{aq})]}{[\text{A}^{-}(\text{aq})]} = \frac{y^2}{0.3 - y} \quad (2+1)$$

$$0.3 \gg y \quad (1)$$

$$K_b = \frac{k_w}{k_a} = \frac{1 \times 10^{-14}}{1.28 \times 10^{-5}} \text{ mol dm}^{-3} = \frac{y^2}{0.3} \quad (2)$$

$$[\text{OH}^{-}] = y = \sqrt{\frac{3 \times 10^{-15}}{1.28 \times 10^{-5}}} = \sqrt{2.34 \times 10^{-10}}$$

$$= 1.53 \times 10^{-5} \text{ mol dm}^{-3} \quad (2+1)$$

$$\text{pOH} = -\log_{10} [\text{OH}^{-}] = -\log_{10} 1.53 \times 10^{-5}$$

$$= 4.82$$

$$\text{pH} = 14 - 4.82 = 9.18 \quad // \quad (3)$$

IV A (3)

V A buffer solution (4)

It contains weak acid HA and its salt A^{-} (3)

07) (a)

i) I standard electrode with a constant potential which can be used to determine the electrode potential of a given electrode (05 marks)

II primary reference electrode

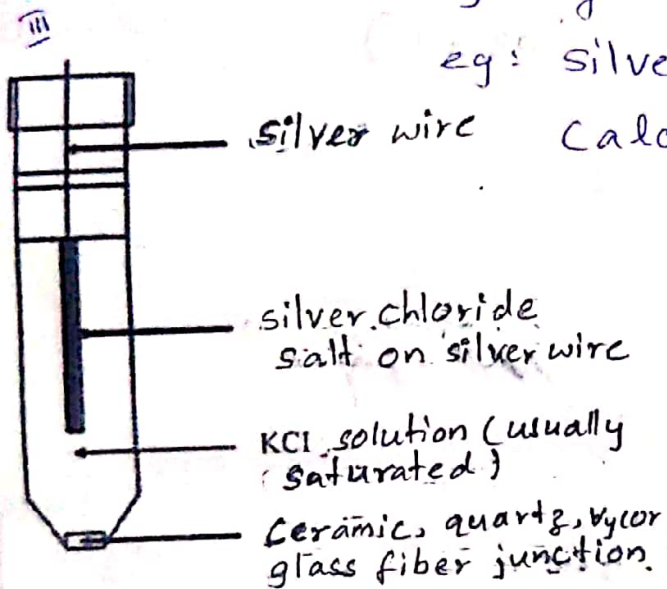
eg: standard hydrogen electrode (03 marks)

secondary reference electrode

eg: silver-silver chloride electrode

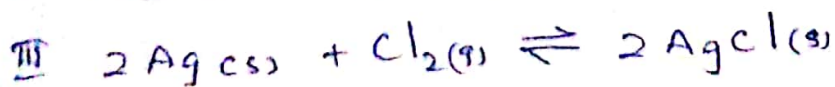
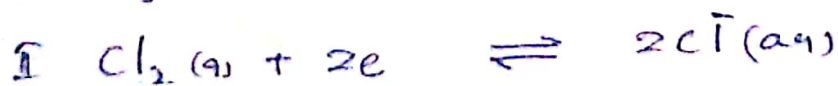
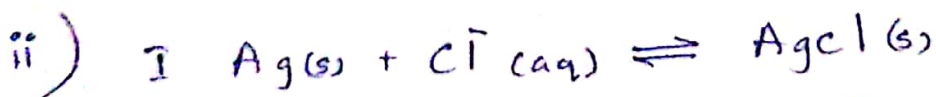
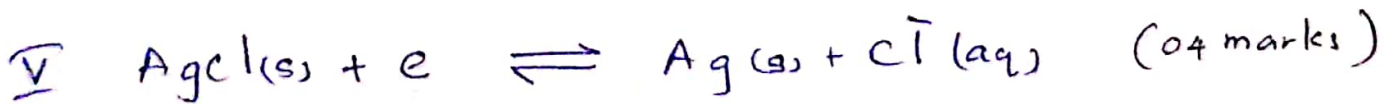
Calomel electrode (03 marks)

(any one)



(12 marks)

IV By using a saturated solution of Cl^- which is in contact with solid $\text{AgCl}(s)$ coated on Ag wire (04 marks)

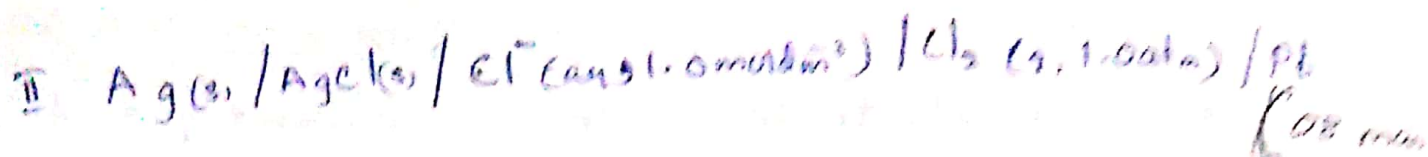


(03 x 3)

iii) I $E_{\text{cell}}^{\ominus} = E_{\text{cathode}}^{\ominus} - E_{\text{anode}}^{\ominus}$ (03 marks)

$= +1.36\text{V} - 0.22\text{V}$ (3 + 1)

$= +1.14\text{V}$ (3 + 1)



III No (02 marks)
 KCl(aq) (or $\text{Cl}^-(\text{aq})$) does not involve in the cell reaction (02 marks)

IV $Q = It$

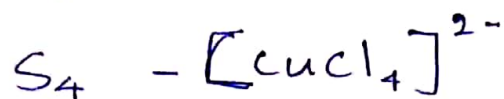
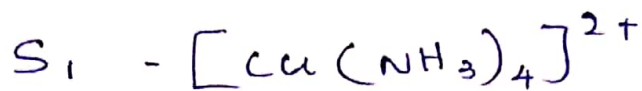
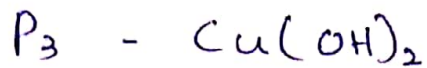
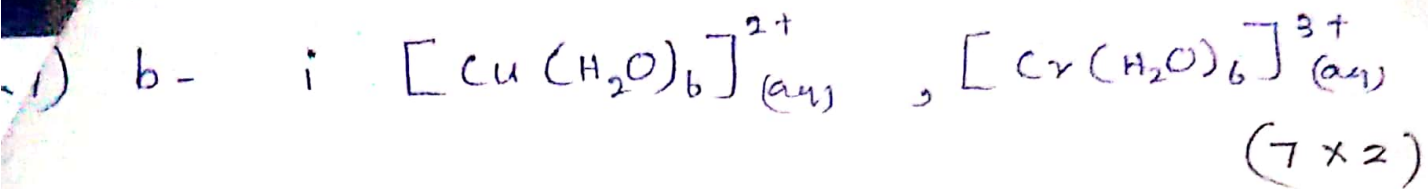
$Q = 0.15 \text{ A} \times (20 \times 60) \text{ s}$ (03 + 1)

moles of e^- 's passed = $\frac{(0.15 \times 20 \times 60) \text{ C}}{96500 \text{ C mol}^{-1}}$

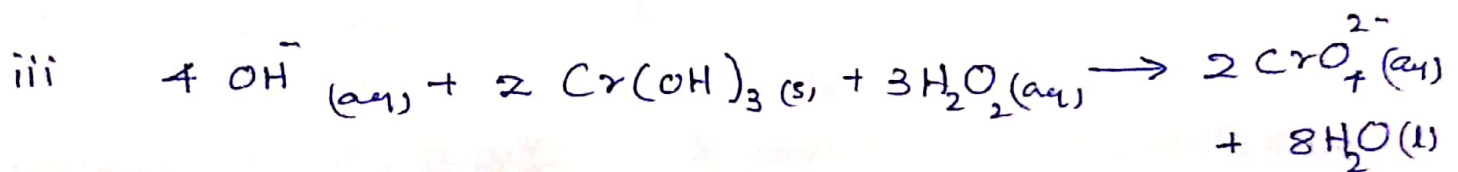
moles of AgCl formed = $\left(\frac{0.15 \times 20 \times 60}{96500} \right) \text{ mol}$ (02 marks)

m AgCl formed (changed) = $\left(\frac{0.15 \times 20 \times 60}{96500} \right) \text{ mol} \times 143.5 \text{ g mol}^{-1}$

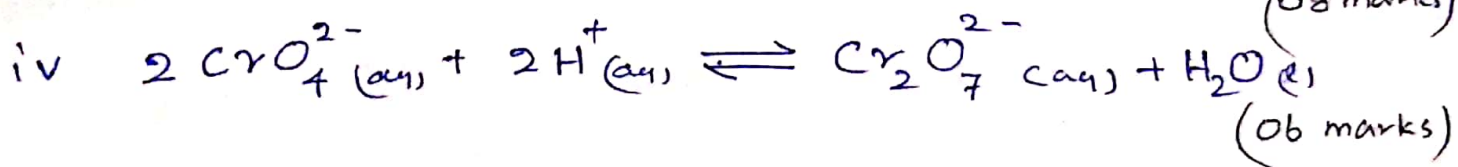
(02 + 1)
 $= 1.07 \text{ g}$ (02 + 1)



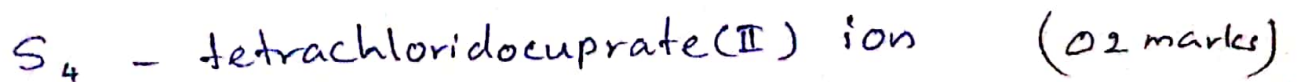
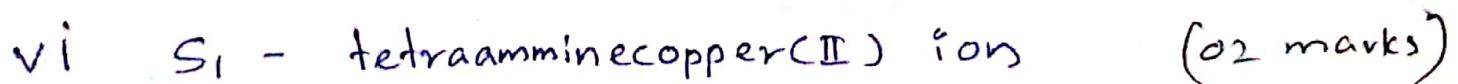
$5 \times 8 = 40$



(08 marks)

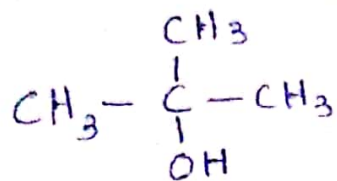


(06 marks)



b - 75

(a)



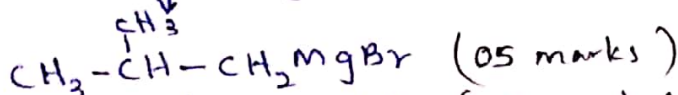
conc. H_2SO_4 Δ (05 marks)



HBr / Peroxides (05 marks)

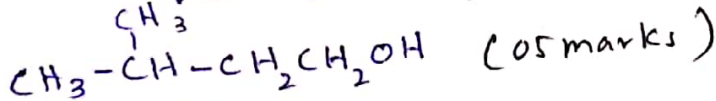


Mg / Dry Ether (05 marks)

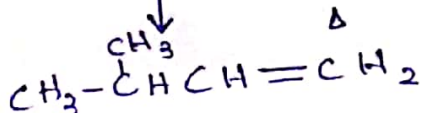


(1) HCHO (05 marks)

(2) H_3O^+ (03 marks)



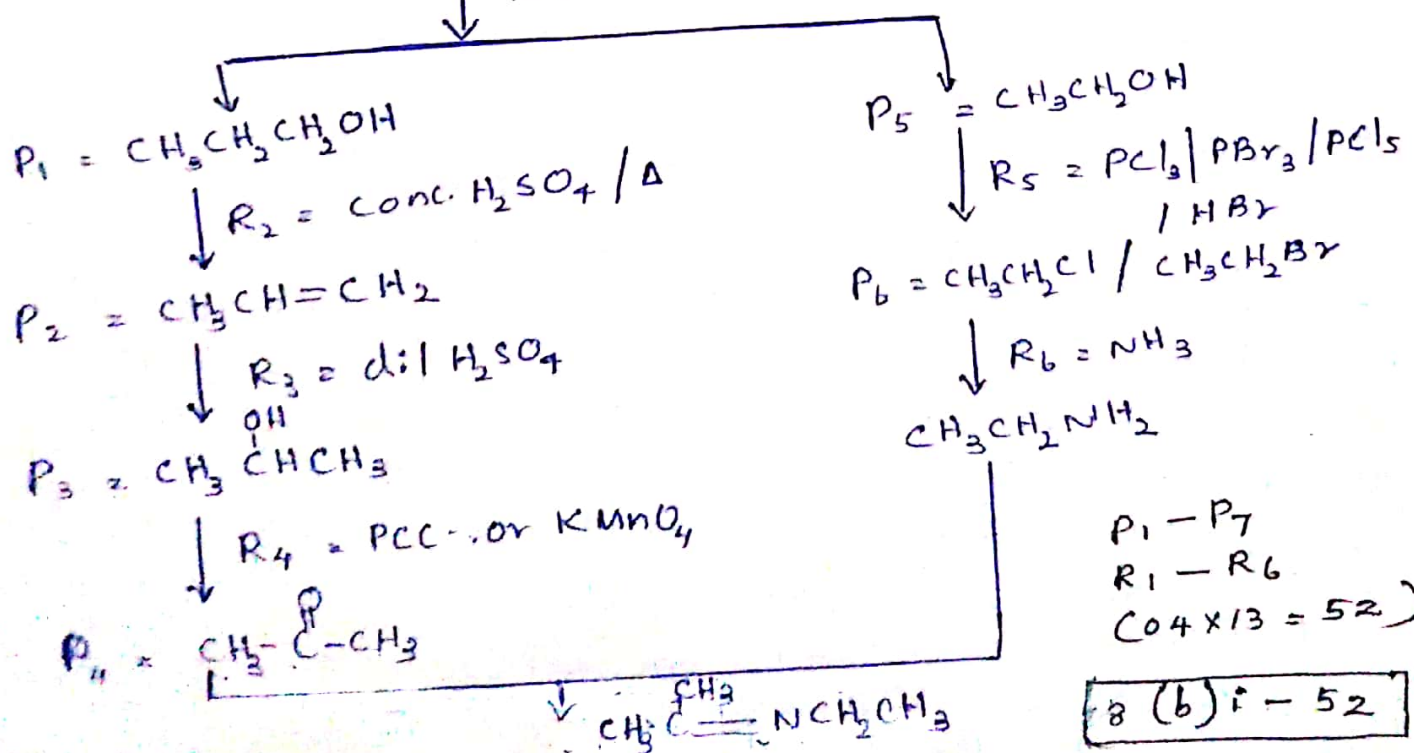
conc. H_2SO_4 Δ (05 marks)



Q8 (a) - 48

(b) (i) $\text{CH}_3\text{CH}_2\overset{\text{O}}{\parallel}{\text{C}} - \text{O} - \text{CH}_2\text{CH}_3$

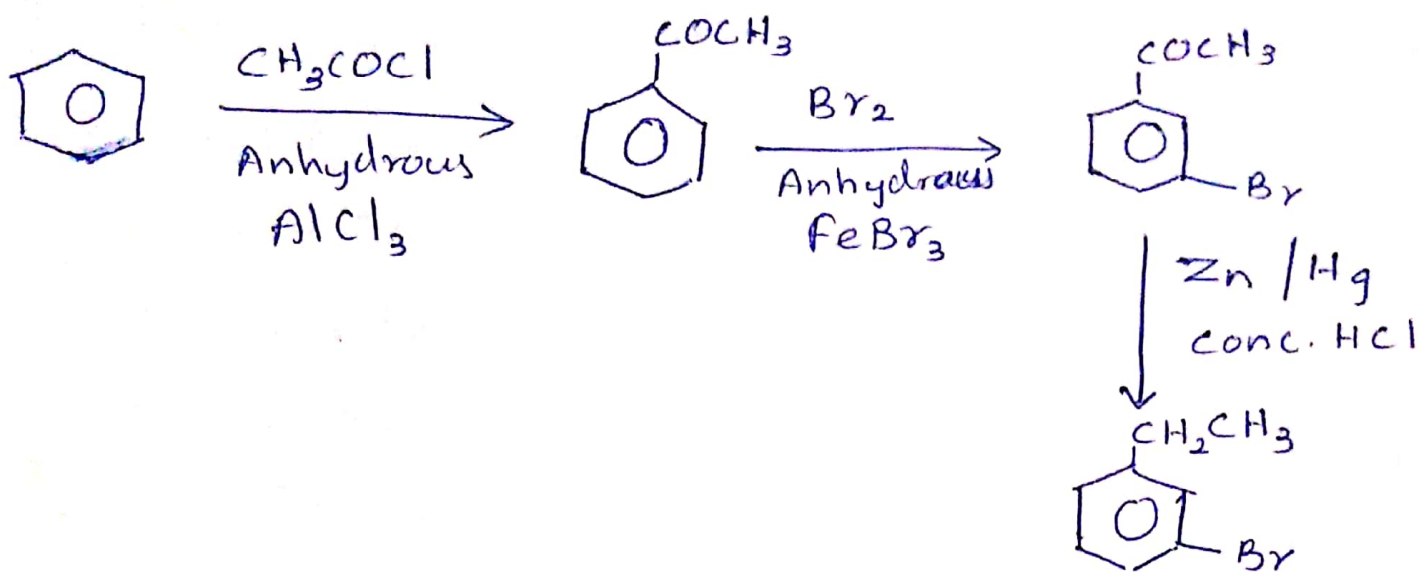
$\text{R} = \text{i. LiAlH}_4 \quad \text{ii) H}_3\text{O}^+$



$\text{P}_1 - \text{P}_7$
 $\text{R}_1 - \text{R}_6$
(04 x 13 = 52)

Q8 (b) i - 52

(b) (ii)



(03 x 5 = 15)

8(b) ii - 15

carbocation formed by $\text{CH}_3\text{-}\overset{\text{Cl}}{\text{C}}\text{-CH}_3$ is

with single bond character, therefore
dissociates easily.

reaction mechanism is occurred through one

step mechanism.

carbocation which is formed by $\text{CH}_3\text{-CH}_2\text{Cl}$ is

i. $\text{CH}_3\overset{+}{\text{C}}\text{HCH}_3$ Carbocation formed by $\text{CH}_3\overset{\text{Cl}}{\text{C}}\text{HCH}_3$ is stable (04)

• C-Cl is with single bond character, therefore it can be dissociated easily (03)

• The reaction is occurred through one step or two step mechanism (3+3)

• $\text{CH}_2=\overset{+}{\text{C}}\text{H}$ carbocation which is formed by $\text{CH}_2=\text{CHCl}$ is unstable

• $\text{CH}_2=\text{CHCl}$ shows resonance structures as given below $\text{CH}_2=\overset{\text{H}}{\text{C}}-\ddot{\text{Cl}}: \longleftrightarrow \overset{+}{\text{C}}\text{H}_2-\overset{\text{H}}{\text{C}}=\ddot{\text{Cl}}$ (2x2)

• C-Cl bond is with the double bond characters (3)

• Nucleophilic substitution reaction do not occur via one or two step mechanism in $\text{CH}_2=\text{CHCl}$ (3+3)

ii $\text{CH}_2=\text{CHCl}$ (5)