1.

(1) (a, c) molar mass of H_2 & CO is less than that of CO_2 so rate of diffusion out of the balloon will be greater

2.

(a, b) moles = $\frac{448}{22400} = 0.02$

mass = 2 g

$\Rightarrow$ molar mass = $\frac{2}{.02} = 100$

$\Rightarrow$ 3x At. mass = 100 $\Rightarrow$ At. mass = 33.33 u

Cr = $33.33 \times 1.6 \times 10^{-24}$ g

3.

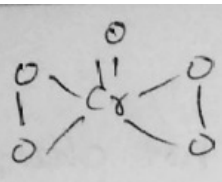
(b, c) $BaF_2 + H_2SO_4 \rightarrow BaSO_4 + 2HF$

1 : 2

0 : 1 : 1 : 2

On the resulting mixture 2 mole HF & 1 mol H_2SO_4 is present.

4.



O.N of Cr = +6

$+1 \; x \; -2 \; -1$

$KCrO_3Cl$

$x = +6$

$FeCr_2O_4$

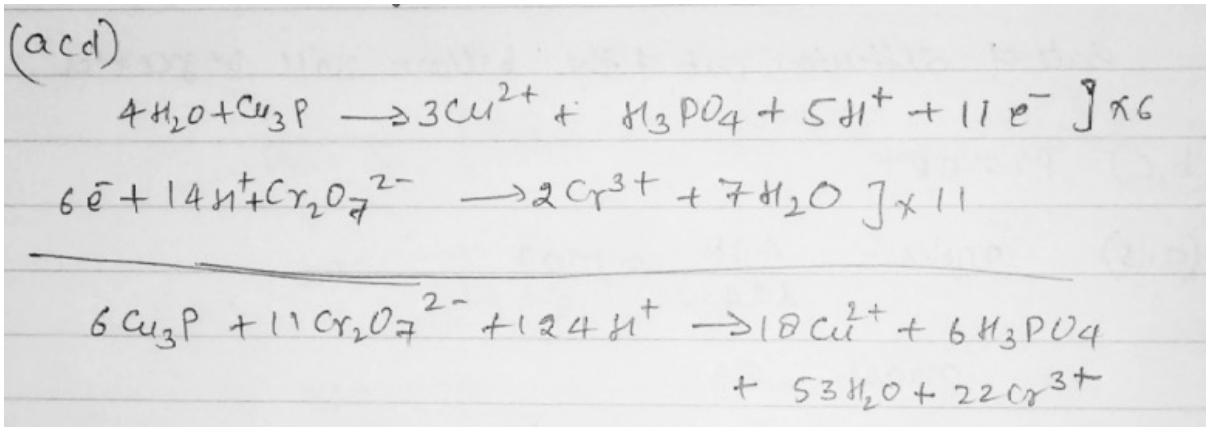
$= Fe^{2+}$ & $Cr_2O_4^{2-}$

O.N of Cr = +6

5.

no change in ON of any element.

6.



7.

a) $S_2O_3^{2-}$ gets oxidised to $S_4O_6^{2-}$

c) I_2 gets reduced to I^-

Here, $S_2O_3^{2-}$ gets oxidised to $S_4O_6^{2-}$ while I_2 is reduced to I^- ions.

8.

a) HNO_2

b) SO_2

c) H_2O_2

HNO_2, SO_2 and H_2O_2 act both as oxidising as well as reducing agents.

9. b) M

$$2e + \left(C^{3+}\right)_2 \longrightarrow 2C^{2+}$$
$$\left(C^{3+}\right)_2 \longrightarrow 2C^{4+} + 2e$$
$$\left(C^{3+}\right)_2 \longrightarrow 2C^{2+} + 2C^{4+}$$

$$2(CN)_2 + 2H_2O \longrightarrow 2HCN + 2HOCN$$

2 mol $(CN)_2$ = 2 mole HCN
= 2 × leq. HCN (V. f for HCN = 1)
2 eq. $(CN)_2$

∴ 1 mole of $(CN)_2$ = 1 eq. $(CN)_2$

or V.f. for $(CN)_2$ = 1

∴ E = M

10. a) $\frac{M}{6}$

$$6e + Cl^{5+} \longrightarrow C^{-1}$$
$$2\left(O^{-2}\right)_3 \longrightarrow 3\left(O_2^0\right) + 12e$$
$$\therefore\ 2KClO_3 \longrightarrow 2KCl + 3O_2$$

2 mole $KClO_3$ ≡ 2 mole KCl
≡ 2 × 6 eq. KCl
≡ 12 eq. $KClO_3$

∴ 1 mole $KClO_3$ ≡ 6 eq. $KClO_3$

∴ V.F. for $KClO_3$ ≡ 6

$$\therefore\ E_{KClO_3} = \frac{M}{6}$$

1.

(2) $Cu \longrightarrow Cu^{2+} + 2e^-$]×2

$4e^- + 6H^+ + 2NO_3^- \longrightarrow NO_2 + NO + 3H_2O$

$2Cu + 6HNO_3 \longrightarrow NO_2 + NO + 2Cu(NO_3)_2 + 3H_2O$

$2I^- \longrightarrow I_2 + 2e^-$]×3

$3e^- + 8H^+ + CrO_4^{2-} \longrightarrow Cr^{3+} + 4H_2O$]×2

$6I^- + 2CrO_4^{2-} + 16H^+ \longrightarrow 3I_2 + 2Cr^{3+} + 8H_2O$

$As_2S_3 \longrightarrow 2AsO_4^{3-} + 3SO_4^{2-} + 40H^+ + 28e^-$]×3

$20H_2O +$

$3e^- + 4H^+ + NO_3^- \longrightarrow NO + 2H_2O$]×28

$3As_2S_3 + 28NO_3^-$

$3OH^- + P \longrightarrow PH_3 + 3H_2O + 3e^-$

$2OH^- + P \longrightarrow H_2PO_2^- + e^-$]1

$3e^- + 3H_2O + P \longrightarrow PH_3 + 3OH^-$

$2OH^- + P \longrightarrow H_2PO_2^- + e^-$]×3

$4P + 3OH^- + 3H_2O \longrightarrow PH_3 + 3H_2PO_2^-$

A → Q , B → P , C → R , D → S

section II

(1) (5) $M_1V_1 + M_2V_2 = M(V_1+V_2)$

$7 \times 5 + 20 \times 2 = 2.6 \times (20+x)$

$x = 5$

(2) (7) $n_{ethanol} = 0.125$, $n_{H_2O} = 0.875$

n_{H_2O} for 1 mol of ethanol $= \frac{0.875}{0.125} = 7$

(3) (2) $\frac{V_{He}/t_{He}}{V_{CH_4}/t_{CH_4}} = \sqrt{\frac{M_{CH_4}}{M_{He}}}$

$\Rightarrow \frac{10/5}{V/2} = \sqrt{\frac{16}{4}} = 2$

$\Rightarrow V = 2\ ml$

(4) (3) $6e^- + 14H^+ + Cr_2O_7^{2-} \longrightarrow 2Cr^{3+} + 7H_2O$

$Ni \longrightarrow Ni^{2+} + 2e \quad \times 3$

$3Ni + 14H^+ + Cr_2O_7^{2-} \rightarrow 2Cr^{3+} + 3Ni^{2+} + 7H_2O$

(5) (1) $e^- + 2H^+ + NO_2^- \longrightarrow NO + H_2O$

(6) $\overset{+1\ -2}{Cu_2S} \longrightarrow Cu^{2+} + \overset{+4}{SO_2}$

(4) $V_f = 2(2-1) + 4+(-2)$

$= 6$

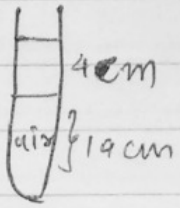
eq of $KMnO_4$ = eq of Cu_2S

$mole \times 5 = 1.25 \times 8$

$mole = 2$

(7) $P_{air} = P_{atm} + P_{Hg}$

$= 76 + 4 = 80$



$P_1V_1 = P_2V_2$

$76 \times (l \times A) = 80 \times (19 \times A)$

$\Rightarrow l = 20$

decrease in length = $20 - 19 = 1cm$

(8) $P \propto T \Rightarrow \frac{P_1}{T_1} = \frac{P_2}{T_2} \Rightarrow P_2 = \frac{T_2}{T_1} \times P_1 = \frac{109}{100} \times P_1$

$\Rightarrow \frac{P_2 - P_1}{P_1} = \frac{9}{100}$

% increase = 9%.