1.

(a) (i). $2NaNO_{3(s)} \longrightarrow 2KNO2_{(s)} + O_{2(g)}$. √ 1

(ii). $2\ cu\ (NO3)_2 \longrightarrow 2\ CuO_{(s)} + 4NO_{2(g)} + O2_{(g}$ √ 1

b. (i). 2√ 1 . Has two energy levels √ 1 2

ii. I.Q has greater nuclear charge than P.O.R. Atomic number of Q THAT OF p.1 exerting greater pull /attraction.

S gains an electronic. The incoming election is repelled by other elections in the atom or election cloud increases.

iii Q √

iv.

2. a. The molar heat of neutralization is the enthalpy change that occurs when one mole of hydrogen ion from an acid is completely neutralized by an alkali. √ 1

b. $NaOH_{aq} + Hcl_{aq} \longrightarrow Nacl_{aq} + H_2O_{(l)}$ √ 1

c. (i). $DT = 34.0^0C - \frac{(25.0+25.0)}{2}$

$= 9^0C$√ 1

ii. Heat change = MCDT

$= \frac{150 \times 42 \times 9}{1000}$ √1 √2

= 5.67KJ √ 1

Moles of NGO used $= \frac{2 \times 50}{}$

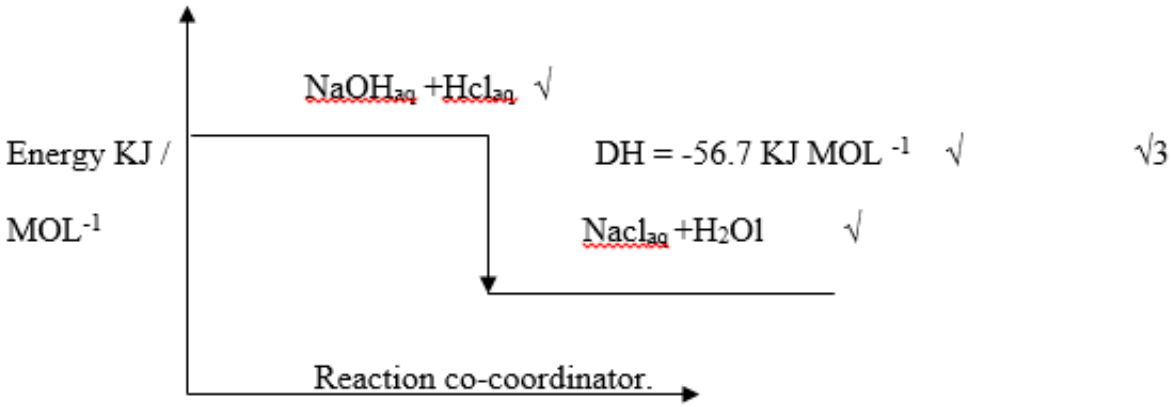
$$\frac{1000}{}$$

$= 0.1$ √ ½

DH heat $= \frac{1}{0.1} \times 5.67$ √ 1

$= 56.7 KJ\ MOI^{-1}$ √ ½ √2

$NaOH_{aq} + HCl_{aq} \longrightarrow NaCl_{aq} + H_2O_l$ √ 1. $DH = 56.7\ KJmol^{-1}$



√3

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3. (i). Dilute sulphuric (vi) acid / hydrochloric acid. √ 1

ii. It is highly soluble in water. √ 1

iii. It would be bleached / turns to while. √ 1

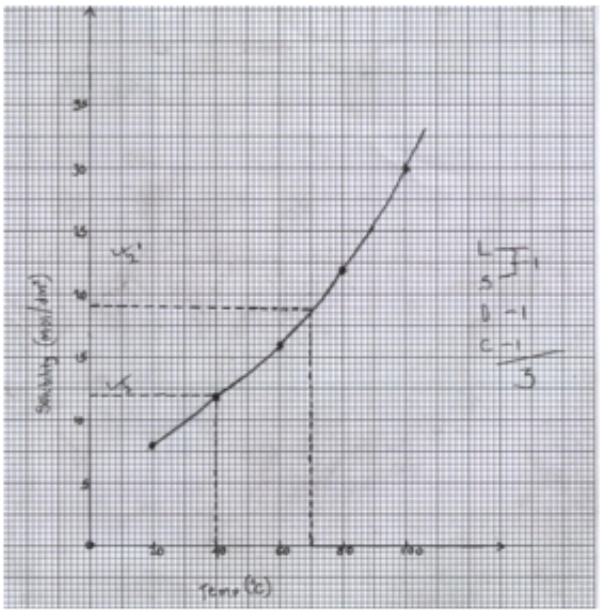
iv. Sulphur (iv) oxide, √ it loses oxygen or oxidation number of sulphur in SO_2 decrease from +4 to zero. √ 2

b. Exothermic √ –as the temperature increases the equilibrium moves to the left hence the yield of sulphur trioxide decreases.√ 2

C(i). Vanadium pentaoxide is cheaper than platinum is easily be poisoned by impurities.√ 1.

ii. $Ca(OH)_{2(g)}$ (s + $SO_{2(g)} \longrightarrow CaSO3_{(s)} + H_2O_{(l)}$ √ 1

$Ca(OH)_{2(aq)} + SO2 \longrightarrow CaSO3_{(aq)} + H_2O_{(l)}$



4. a

i. 0.188 -0.12 =0.068 √ 1
Mass of hydrated copper (II) sulphate
=0.068 x 250 √
179g √ 22

b. i. $\frac{24.1 \times 0.1}{1000} = 0.00241$

ii. $\frac{0.00241}{25} \times 25 = 0.241 \times 10^{-2}$ √ 1

Or moles of Nacl = moles of $AgNO_3$ = 0.00241

iii. Moles of Nacl = $0.00241 \times \frac{250}{25}$ =0.0241 √ 1

iv. Mass of Nacl is 5.0. cm^3 = 0.0241 x 58.5 =1.41g √ 1

v. 5.35 – 1.41 = 3.94g √ 1

vi. $\frac{100}{3.94} \times 1.41$ √ = 35.79g/100g water 2

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5.

a. F. its ions have the greatest tendency (+0.34) to accept electrons/ os the strongest oxidisng agent.

bi. F $F^{2+}_{aq} + 2e \longrightarrow F_{(s)}$ √ 1

$y_{(s)} \longrightarrow y^{2+} + 2e$ √ 1 2

ci. The blue- green colour √ 1 of the solution fades –Cu^{2+} ions are removed from the solutions. √ 1

ii. The two gases are chlorine and oxygen. Initially Cl^{-2} ions are at much higher concentration hence preferentially discharged with time att are discharged accept equs.

6.

(a)i. Yeast√½

ii. Distillation /fractional distillation.√½

iii. Sodium / Potassium/Lithum √½

iv. Ethane gas

v. Polythene /polythene √½ 2½

b. Addition polymerization. √½

c. It pollutes environment /produce poisonous gas on burning. √ 1

d(i). $C_6H_{12}O_{6(l)} \longrightarrow 2C_2H_5OH_{(l)} + 2CO_{2(g)}$

ii. Rfm $(C_6H_{12}O_6)$ $= 6x12 + 12 X 1 + 6 x 16$

$= 72+12+96$

$= 180$ √ ½

Moles of sugar $= \frac{144}{180}$ √ ½ 2

$= 0.8$ √ 1

iii. Moles of C_2H_5OH $= 2 X 0.8$ √ ½ 1

$= 1.6$ √ ½

IV. Rfm (C_2H_5OH) = (2x12+5x1+16H) = 46 √ ½

Mass o C_2H_5OH = 46 x 1.6√ 1 2

= 73.6g √ ½

e. Further fractional distallion √ 1

f. Manufacture of aleoholic drink as a fuel

As a solvent any two 2 12

7.

(a)i. lower mpt of sodium √chloride hence lower temp from 800^0c to 600^0c hence reducing cost of production of $Na_{(s)}$ √ 2

ii. Steel would react with chloride unlike graphite.√ 1

iii. Its mpts is lower than that of the electrolyte /molten sodium chloride.√

-It is less dense than the electrolyte.√ 2

-To prevent products (Na & Cl_2) from reacting.√ 1

v. (i). $Na^+_{(l)} + e \longrightarrow Na_{(l)}$ √ 1

(ii). $2Cl^-_{(l)} \longrightarrow Cl_{2(g)} + 2e$ √ 1

vi. Manufacture NaCN, Na_2O_2 (any one) √

-Sodium vapour used in sodium lamps.

-Extration of Gtanium.

b. To prevent it from reacting with air. 10