231/2 CHEMISTRY (2013)
KCSE *Trial Exam*
MARKING SCHEME

1.a)i) –Scale ½

-Each spot ½.

ii) A and C (both 2)

b) Heat the mixture NH_4Cl-SUBLIMES ½ $Cacl_2$ is left behind ½

(Penalize ½ mk if NH_4Cl Condenses)

c) (i) Distillation /Fractional Distillation.

ii) shake the mixture in a separating funnel.

Allow the layers to separate ½ Drain the bottom Layer ½

2. a) Mass number// total number of protons and neutrons.

b)(i) NP_2 ; accept $Cacl_2$

(ii) P, R, S; All have three energy levels (all ½ mark)

(iii)S: It has the larger atomic Radius 1mk

(iv) P and U (both) 1mk

c)(i) 1-Ionic // Electrovalent

11-Metalic

(ii) IV- It has the lowest melting point//boiling point OR The melting point of sulphur is 113^oC

3(a) A-Carbon (iv)oxide rej. CO_2

B-Ammonia rej NH_3

b) i)Ammonium Chloride

ii) Sodium Hydrogen Carbonate

c) P: NH_4HCO_3 (aq) + $NaHCO_3$ (aq) ——————$NaHCO_3$ (aq) + NH_4Cl (aq).

R : $Ca(OH)_2$(aq) + $2NH_4Cl$(aq)_____$CaCl_2$(aq)+$2NH_3$(g)

d) Calcium chloride-Drying Agent

e) –Making glass

-Softening hard water

-Making sodium silicate used in making detergents.

-Paper industry

ii) a) -Thistle funnel should be dipped into the reactants

-The delivery tube from flask with H2So4 should not dip into the acid

- The acid should be arranged last near the gas jar.

b) $2CO(g) + O_2(g) \longrightarrow 2CO_2(g)$

2Vol 1Vol 2Vol.

20 10 20

CO excess by 30-20 =10 cm^3

4 a) Zinc blende ZnS

b) II froth flotation

VII electrolysis

c) III $2ZnO_{(s)} + 3O_{2(g)} \longrightarrow 2ZnO + 2SO_2$

IV $ZnO_{(s)} + CO_{(g)} \longrightarrow Zn_{(s)} + CO_{2(g)}$

d) sulphuric acid manufacture because production of sulphuric (IV) Oxide (SO_2)

e) $Zn_{(s)} + H_2SO_{4(aq)} \longrightarrow ZnSO_{4(aq)} + H_{2(g)}$

moles of $H_2 = \frac{1.2}{24} = 0.05$ moles

Mole ratio $Zn:H_2$

1:1

Moles of Zn = 0.05 moles

R.A.M Zn $= \frac{3.27}{0.05} = 65.4$

5. a. i) $N_{2(g)} + 3H_{2(g)} \longrightarrow 2NH_{3(g)}$ pressure 200atm Temp 500^oC

ii) Exothermic, as temperature increases yield decreases

iii) Yield increases as forward reaction is favoured where molecules are few

b. catalyst lowers the activation energy and minimum energy is used

c. $(NH_4)_2SO_{4(aq)} + Ca(OH)_{2(aq)} \longrightarrow CaSO_{4(s)} + 2NH_4OH_{(aq)}$

6.a) i) collection over water.

ii) I-Displace air inside the aspirator

iii) II-Absorb /Remove water (co2)

iv) $2Zn_{(s)} + O_{2(g)} \longrightarrow 2ZnO_{(s)}$

v) Argon

b) i) I-Fractional distillation

ii- U-Argon/oxygen

V-Oxygen/Argon

ii) Air subjected to rapid compression and expansion repeatedly of a pressure of 200 atmospheres and allowed to cool to a temperature of 200 c.

c) Manufacture of ammonia

7. i) Cu^{2+}

ii) blue precipitate insoluble in excess

iii) $Cu^{2+}(aq) + 2OH^-(aq) \longrightarrow Cu(OH)_{2(s)}$ blue ppt

$Cu^{2}{}_{+(aq)} + 2OH^-_{(aq)} \longrightarrow Cu(OH)_{2\,(s)} + 2OH_{(aq)}$ blue ppt insoluble

b. i) B Zinc Chloride

C Copper

ii) $Zn_{(s)} + 2H^+_{(aq)} \longrightarrow Zn^{2+}_{(aq)} + H_{2(g)}$