**SET 6**

**CHEMISTRY PAPER 2**

**MARKING SCHEME**

1. (a) In boiling tube there is excess 1 mk or sufficient oxygen than in boiling tube A. This is due to

decomposition of KClO3 and CuO.

(b) (i)

Extinguished candle (1) If burning candle penalize fully (0) – candle ½

1. Dilute Sodium Hydroxide

(ii) Nitrogen 1 mk

Argon 1 mk

(iii) To absorb carbon (IV) oxide in air. 1mk

(iv) To investigate the active part of air/To determine part of air that supports burning 1mk

(c) (i) Amphoteric oxides. 1mk

(ii) ZnO ½ mk

PbO ½ mk

2. (a) (i) 2 KMn4 (s) + HCl (aq) 2KCl (aq) + 2 MnCl2 (aq) + 5Cl2(g) +8H2O(l) (1mk)

(ii) MnO2, SnO2, PbO2, CaOCl2 (1 mk)

(iii) Pass the gas through water/sodium hydrogen carbonate to remove✓1 traces of hydrogen chloride

gas then pass gas through concentrated sulphuric (VI) acid ✓1 or anhydrous calcium chloride in a

U tube, collect the gas by downward delivery method.

(b) (i) Aluminium Chloride AlCl3✓1

(ii) 2Al (s) + 3Cl2 2AlCl3 (s) ✓1

(iii) Moles of aluminium = 0.84

27

= 0.0311 ½

Mole ratio Aluminium: Chlorine = 2:3 ½

Therefore moles of Cl2 = 3/2 x moles of Al

:.Moles of = 3/2 (0.0311) ½

= 0.04665 moles. ½

1 mole of Cl2 occupies 24 dm3

0.04665 moles “ “ ?

0.04665 x 24dm3 ½

1 mole

= 1.1196

≈ 1.12 dm3 ½

(iv) – To prevent entry of moisture to the apparatus.

- To absorb any unreacted chlorine gas hence preventing environment pollution.

- To absorb any moisture from the apparatus hence preventing hydrolysis of aluminium.

(1 mk)

3. (a)

(i) L ✓1

(ii) They below to group II, they are found widely in the earth crust.

(b) The atomic radius of F is larger ½ than that of H, since across the period nuclear charge increase ½

hence added electron is more strongly ½ pulled towards the nucleus reducing ½ the size.

(c) C ½ and I ½

(d) D (s) D+ + 2e- ✓1

(e) (i) DBr2 ½

(ii) C2SO4 ½

(f) (i) Ionic bond

(ii) Covalent bond

(g) J has more number of Vander Waals forces than I owing to its big size.

4. (a) (i) A white precipitate is formed. ✓1

(ii) – The candle will stop burning ✓1 after some time.

- This is due to accumulation of Carbon (IV) Oxide✓1 which blankets the candle.

(iii) Place 2 or 3 drops of the product in a test tube containing anhydrous Copper (II) Sulphate✓1.

The solid turns blue ✓ ½ . The product is confirmed to be water. ✓ ½ . Alternatively use anhydrous Cobalt (II) Chloride.

(b) (i) – Sodium floats on water ½ - It is less dense than water ½

- Moves randomly on the surface ½ . - It is propelled by gas produced ½

(ii) 2Na(s) 2H2O(l) 2NaOH (aq) + H2 (g) ✓1

46g 24dm3

0.115g

x = 24 x 0.115 ½

46

= 0.06dm3

Volume of hydrogen produced = 0.06dm3 ½

(c) (i) H2(g) + CuO (s) Cu (s) + H2O ✓1

(ii) Carbon (II) oxide ✓1

**(**iii) – Determine the boiling✓1 point of the product at V.

- If it boils at 1000C✓ ½ at sea level it is confirmed to be pure water ½

5. (a) (i) Methane ✓1

(ii) CH3COONa (s) + NaOH (s) CH4 (g) + NaCO3 (s) ✓1

(b) (i) Concentrated Sulphuric (VI) acid

Aluminium Oxide (Any one correct ✓1 mk)

(ii) Polymerization ✓1 mk

(iii) Presence of nickel catalyst ½ mk

Temp of 1500C ½ mk

(iv) CH2 = CH2 (g) + HCl (g) Ch3CH2Cl (g)

(c) – Add to each separately in a test tube a solution of acidified dichromate (VI) ✓1

- The one with enthyne will the above solution to green solution✓1. The one with ethane has no such

effect. ✓1

Add to each separately in a test tube a solution of acidified Potassium Manganate (VII). The one with

ethyne will decolourise the above solution. The other one with ethane will not.

(d) (i) Compounds with the same molecular formula but different structural formulae. ✓1mk

H H H H H H H H

| | | | | | |

(ii) C = C – C – C - H ½ mk H – C – C= C – C - H ½ mk

| | | |

H H H H H

But – 1 – ene But – 2 – ene ½

H H

| |

C = C – C – H ½

| | |

| H- C-H H

H |

H

Methyl propene ½

or 2 – methyl propene

6. (a) (i) Heat exchanger ✓1

(ii) To avoid the formation of a mist of fine droplets of Sulphuric (VI) acid in air. ✓1

(iii) SO3 (g) + H2SO4 (l) H2S2O7 (l) ✓1 (**Note**: Penalize ½ for missing states)

(iv) Vanadium (V) Oxide or Platinum (Any one correct ✓1)

(b) 2NH3 (g) + H2SO4 (aq) (NH4)2SO4 (aq) ✓1

2 x 24dm3 132g RFM ✓1

x 25000g

x = 2 x 24 x 25000 ½ = 9090.9dm3 ½ Penalise ½ for wrong or missing units.

132

(c) A black ½ solid is formed – H2SO4 (l) is a dehydrating agent. ✓ ½

The test tube becomes warm ½ - reaction is exothermic. ½

(d) It causes acid rain ½

It is toxic ½

7. (a) (i) The existance of an element in more than one form in the same physical state.

(ii) Graphite has delocalised ✓1 (mobile) valence electrons while diamond does not. Its valence

electrons are all used in forming covalent bonds.

(iii) Fullerenes ✓1

(b) CaCO3 (s) + 2HCl (aq) CaCl2 (aq) + H2O (L) + CO2 (g) ✓1

(ii) CO2 (g)

✓1

H2SO4 (l) CO2 ✓1

Water ✓1

(c) (i) Ammonia ✓1

(ii) 2NaHCO3 (s) Na2CO3 (s) + CO2 (g) + H2O (l) ✓1

(iii) Filtration ✓1

(d) 2NaHCO3 (s) Na2CO3 (s) + CO2 (g) + H2O (l)

168g 24dm3

x 1dm3

x = 168 x 1 ½

24

= 7g ½

Mass of NaHCO3 = 7g

Mass of Na2CO3 = 12.3g – 7g

= 5.3g

% composition of Na2CO3 = 5.3 x 100 ½

12.3

= 43.09% ½