**SET 8**

CHEMISTRY PAPER 2

MARKING SCHEME

**Question 1**

1. 1. ZnCO3(s) + 2HCl(aq) → ZnCl2(aq) + Co2(g) + H2O(l) √1mk
	2. To remove traces of hydrogen chloride gas √1mk
	3. Some Co2 gas may dissolve in the water √1mk
	4. 2NaOH(aq) + H2O(l) → Na2CO3(aq) + H2O(l) √1mk

Na2CO3(aq) + H2O(l) + CO2(g)  → 2NaHCO3(s) √1mk

* 1. Heat the sodium hydrogen carbonate. √1mk
	2. 2NaHCO3(s) Heat Na2CO3(s) + H2O(l) + Co2(g) √1mk
1. 1. = $\frac{30 x 1}{1000} $√ ½ mk (moles of NaOH that reacted)

= 0.03 √ ½ mk

* 1. Intial moles of HCl = $\frac{50 x 1}{1000}$ √ ½ mk

= 0.05 √ ½ mk

 NaOH(aq) + HCl(aq) → NaCl(aq) + H2O(l)

Acid : base = 1 : 1

Therefore,

 . : Moles of HCl that reacted with NaOH = 0.03

 . : Moles of HCl that reacted with XCO3 = 0.05 – 0.03 √ ½ mk

 = 0.02 √ ½ mk

* 1. XCO3(s) + 2HCl(aq) → 2XCl(aq)  + CO2(g) + H2O(l)

Acid : carbonate = 2 : 1

Therefore,

Moles of XCO3 that reacted with HCl = ½ x 0.02 √ ½ mk

 = 0.01 √ ½ mk

* 1. moles contain 1g

1 mole has ?

= $\frac{1 x 1 }{0.01}g$ √ ½ mk

= 100g √ ½ mk

* 1. x + 12 + 48 = 100 √ ½ mk

x + 60 = 100

x = 40 √ ½ mk

**Question 2**

1. Alkali metals √1mk
2. 1. B is more reactive than D. √1mk the outermost energy level electron in D is more firmly held than in S √1mk
	2. J is more reactive than K. √ ½ mk the nuclear – electron attraction is higher in J than in K. √ ½ mk
3. E has a larger atomic radius than F. √1mk nuclear charge increases across the period. √1mk
4. Before G √1mk
5. The melting point increases √1mk across the period. Due to increase in the strength of the metallic bonds formed as the number of valency electrons increases. √ ½ mk
6. EK3 √1mk
7. Ionic / electrovalent bond √1mk it is formed through transfer of electrons from metal to a non metal. √1mk
8. Used in light bulbs. √1mk
9. C = 2,8,8,8 √ ½ mk

G = 2,8 √ ½ mk

**Question 3**

1. 1. I = polymerization √1mk

II – Thermal Cracking √1mk

* 1. A = 1,2 – dibromopropane √1mk

B = Ethyne √1

* 1. Asbestos √1mk

H CH3

| | √1mk

* 1. ─ C ─ C ─

| |

H H  n

1. 1. As a fuel √1mk
	2. As ink solvent √1mk
2. 1. C3H6(g) → CH4(g) + C2H2(g)  √1mk
	2. C3H6(g)  + Br2(g) → C3H6Br2 (g)  √1mk

**Question 4**

1. A – Potassium Nitrate / Sodium Nitrate √1mk
2. Gentle warming / Moderate temperature √1mk
3. Yellow √1mk It contains dissolved nitrogen (iv) oxide √1mk
4. To condense nitric (V) acid fumes √1mk
5. 1. Nitrogen (ii) oxide √1mk
	2. Nitrogen (iv) oxide √1mk
	3. Nitrogen (ii) Oxide is oxidized by oxygen √1mk
	4. 3Cu(s) + 8HNO3(aq) → 3 Cu (NO3)2(aq) + 2NO(g) + 4H2O(l) √1mk
6.
* Manufacture of explosives √1mk
* Manufacture of dyes √1mk any 2
* Manufacture of fertilizers √1mk

**Question 5**

1. Hydrogen peroxide √1mk

Manganese (IV) oxide √1mk

1. 2H2O2(l) MnO2 2H2O(l) + O2(g) √1mk
2. 1. To ensure that all the oxygen has been used up. √1mk
	2. For maximum contact between copper and oxygen so that reaction occurs completely. √1mk
	3. The brown copper metal turned into black copper (ii) oxide. √1mk
	4. 2Cu(s) + O2(g)  → 2CuO(s) √1mk
	5. Volume of oxygen used = $110-87.5 cm^{3}$ √ ½ mk

$22.5 cm^{3}$ √ ½ mk

% of oxygen used = $\frac{22.5 }{110} x 100$ √ ½ mk

 = $20.5$ √ ½ mk

* 1. Making oxyacetylene flame used in welding . √1mk

Question 6

1.

A

B

C

D

3cm

6cm

8cm

√1mk

√1mk

√1mk

√1mk

Baseline

1. Substance present in mixture D are A √ ½ mk and C √ ½ mk
2. Add water to the mixture, stir to dissolve √ ½ mk calcium chloride as residue. √. Evaporate the filtrate to dryness √ ½ mk to obtain solid calcium chloride. √ ½ mk
3. 1. Fractional distillation √ 1 mk
	2. Since the two liquids are immiscible, pour both liquids in a separating funnel √ ½ mk and allow them to settle. The denser liquid will settle at the bottom and the less dense √ ½ mk will form a second layer on top. √ ½ mk open tap and run out the liquid in the bottom layer leaving the liquid in the second layer in the funnel. √ ½ mk

Question 7

1. 1. Sodium Sulphite √ 1 mk

* 1.



* 1. Na2SO3(s) + 2HCl → 2NaCl(aq)  + SO2(g) + H2O(l)
	2. Moles of HCl used = $\frac{2.5 x 140}{1000}$

= $0.35$ √ ½ mk

Mole ratio acid : SO2 = 2 : 1

Therefore

Moles of SO2  produced = 0.35 x ½

 = 0.175 √ ½ mk

1 mole of SO2 occupy 24000cm3

0.175 moles of SO2 occupy?

 = 0.175 x 24,000 √ ½ mk

 = 4200cm3 √ ½

* 1. S(s) + O2(g) $\rightarrow $ SO2(g) √ 1mk
	2. Reducing agent / reduction property √ ½ mk
	3. Fe2+(aq) + 2OH-(aq) → Fe(OH)2(s)√1
	4. Contact process √ 1mk
	5. Oxygen √ ½ mk and vanadium oxide √ ½ mk
	6. Liquid L – Conc. H2SO4 √ ½ mk

Liquid R – water √ ½ mk

Metal Z – Copper √ ½ mk

* 1. If liquid R (water) is used in step V it would react with SO3(g)  so exothermically that the acid vaporizes giving acid mist √ ½ mk . The mist is not easily condensed and therefore results to serious explosions while use of liquid L.(Conc. H2SO4) in step vi would not cause dilution of oleum √ ½ mk .