**MARKING SCHEME CHEMISTRY PAPER 233/1**

**1.(a)**By passing through filters/electrostatic precipitators**🗸**

 **(b)** Carbon (IV) oxide would otherwise solidify and block the pipes**🗸**

**2.** Add✓ **½** water to the mixture stir **✓ ½** the mixture for all Sodium Carbonate to dissolve. Filter

✓ ½ the mixture to obtain calcium carbonate as residue and sodium carbonate as filtrate.

Heat ✓ ½ the filtrate to evaporate ✓ **½** excess water and leave it to cool slowly for sodium

carbonate to crystallize ✓ ½ . Finally filter the product and obtain pure crystals of sodium

carbonate.

**3. (i)** Method of gas collection is wrong,gas is lighter than air

 **(ii)** Zn(s) + 2HCl(aq) ZnCl2(aq) +H2(g)

 **(iii)** It burns with a pop sound when ignited

**4. Air contains carbon (IV)oxide ;1mk this gas reacts with water to form carbonic acid hence pH drops to 6.0;1mk**

**5. Iron III chloride is molecular and methylbenzene is also molecular while magnesium II chloride is an ionic compound**

**6.** Dissolve **(🗸 ½)** Lead carbonate in dilute Nitric acid **(🗸 ½ )** React the mixture with dilute

 Hydrochloric acid (1) Filter **(🗸 ½ );** to get Lead (II) Chloride **(🗸 ½ )**

**7.** 75cm3 of CO2 takes = second ✓ **½** = 22.5 seconds✓**½**

 Rmm of CO2 = 12 + 2 x 16 = 44 **✓ ½**

 Rmm of NO2 = 14 + 2 x 16 = 46 **✓ ½**

 =

 TNO2 = 22.5 seconds **✓ ½**

 = 23.006s **✓ ½**

**8.(a)** Ca(OH)2 (aq) + CO2(s) CaCO3(s) + H2O(l**)✓ ½**

Lime water forms white **✓ ½** ppt due to the formation of calcium carbonate but in excess

calcium carbonate forms colourless solution due to the formation of soluble ✓ ½ calcium

hydrogen carbonate.

CaCO3(s) + H2O(l) + CO2 (g) Ca(HCO3)2(aq) (2 mks)

**(b).**In diamond each carbon atom is bonded to four other carbon atoms ✓ ½ arranged in a regular

tetrahedron shape the whole structure of diamond extends all directions forming a rigid ✓ ½

mass of atoms. (1 mk)

**9.** (i)D

(ii)A

(iii)B

(iv)C

**10. (i)** H H H H

 | | | |

 H- C - C - C - C – H

 | | | |

 H H H H

**(ii)** acidified potassium chromate (VI) changes from orange to green✓ 1

**11.(a)** Sulphur(iv)oxide**✓ 1**

 **(b)** Na2SO3 (s) +2HCl(aq) SO2(g) + 2NaCl(aq) + H2O(l) ✓ 1

 **(c)** the red litmus paper is bleached✓ 1

**(d) brown iron( III) ions changes to green due to reduction of iron (III) ions to iron (II) by hydrogen sulphide**

**12.Two aluminium chloride molecules join to form a diametric molecule;1mk.the diametric molecules are held together by weak van der waals forces which easily break when heated;1mk hence the solid sublimes**

**13.(a)**It is the maximum mass of solute that dissolves in 100g of water to form a saturated

 solution at aparticular temperature.

**(b)** it is agas

**(c)** the solution becomes more saturated with the gas

**14.(a).(**i) Cu2+ , Al3+

 (ii) SO42-

**(b)** Al3+(aq) + 3OH- Al(OH)3(s)

**15. (i)** fractional distillation

 **(ii)** N-add water

 P- addition of hydrogen

**16.(i)** Soap.1mk

 **(ii)** Concentrated NaCl/ Brine/ NaCl(l) **1**

**(iii)** To precipitate out the soap**1**

**17.(a) sodium**

**Potassium**

**(b)silver**

**Mercury**

**(c) 2Ca(NO3)2 2CaO+4NO2+O2**

**18.(i) increases;1/2mk because it combines with oxygen to form the solid copper (II) oxide;1mk**

**(ii) Reduces;1/2mk because it combines with oxygen to form the gaseous sulphur( IV) oxide;1/2mk which escapes;1/2mk**

**19.(I)it is the minimum amount of energy required to remove an electron from the outermost energy level of an atom in its gaseous state**

**(ii)C because it requires a lot**

**20.(i)** Hydrogenchloride

 **(ii)** it prevents sucking back/increases surface area for dissolving

 **(iii)** the pH of the water drops

**21.(i)**U- Nitrogen(I)oxide

 W- Nitrogen(iv)oxide

 **(ii)** F-ammonium sulphate

 V-ammonium nitrate

 **(iii)**NH3(g) + H2SO4(g) (NH4)2SO4

**22. (a)**

***OR***

xx

xx

xx

√ 2mks

xx

●●

Cl

x

●

x

●

Cl

Cl

x

x

x

x

xx

xx

xx

x

●

Cl

xx

xx

●●

xx

●●

xx

**(b)** It forms a molecular structure with weak vander waals forces that are easily broken **√ ½**

23. C2 H4 (g) + 3O2(g) 2CO2(g) + 2H2O(g)

 1 Mol 3 Mol : 2 Mole (1/2 mks)

 1 Mole: 3 Vol. :2 Vol.

 15cm3 :45cm3 :30 cm3

 Total residual gas mixture

 = 5cm3 of excess oxygen + 30 cm3 of Co2

 Total = 35cm3 **(1/2 mks)**

**24.(a)** volume is inversely proportional to pressure

 **(b)** P1V1 =P2V2

 3 x 1 =2 x V2

 V2 =1.5litres

**25.(a)** it is water that contains dissolved calcium and magnesium ions and does not lather easily

**(b)** Ca(HCO3)(aq) CaCO3(s) +CO2(g) +H2O(l)

**(c)** –contains calcium ions required for strong teeth

 -used for brewing

 -used for leather tanning

**26.(a)** to generate steam that reacts with zinc metal and also drive away air from the apparatus

**(b)** zinc glows and a yellow solid is seen

**27.(i)**2PbS(s) +3O2(g) 2PbO(s) +2SO2(g)

**(ii)** Carbon(iv)oxide

**(iii)** making lead pipes, making lead acid batteries

**28.(a)** (CH2)n = 42

 (12 + 2)n = 42

 14n = 42

 n = 3 **√ ½**

 MF = 3(CH2) C3H6 **√ ½**

 **(b)** CnH2n √ 1

 **(c)** But-1-ene/ **√ ½/** Butene

 