**MWAKICAN JOINT EXAMINATION CHEMISTRY FORM 4 PAPER 1**

**MARKING SCHEME**

1. a) A- 2.8.2 ( ½ mk)

B – 2.8.7 ( ½ mk)

b) AB2 (1mk)

1. a) C (1mk)

b) A or D (1mk for any )

Reason: Aluminium oxide being amphoteric will react with both acidic and alkaline solutions (1mk)

1. m

|  |  |  |
| --- | --- | --- |
|  | C | H |
|  i) % compositionii) R.A.Miii) No o moles iv)  | 92.31292.3 127.697.77.71 | 100-92.3 = 7.7 ( ½ mk)17.7 ½ mk 17.77.77.71 ½ mk |
|  |  |  |

E.F = CH ½

 M.F = E.F xn11

n = 78 = 6 ½

 13

M.F = (CH) x 6

= C6 H6 ½

1. SO2 dissolves in water forming sulphurous acid ½ mk that contains sulphite ion. The sulphite ion is oxidized (1mk) by chloride into sulphate ion ( ½ ) ion. Thus Barium Chloride solution reacts with the sulphate ion forming a white precipitate which is Barium sulphate (1mk)
2. a) A green ppt (1mk)

b) - Increase the surface area for the absorption of the gas (1mk)

 - Prevent sucking back (any 1mk)

c) Fe2+ + 2OH- Fe(OH)2

 (aq) (aq) (s) (green ppt)

1. a) The rate of diffusion of a gas at constant temperature and pressure is inversely proportional to the squareroot of its density (1mk)

b)

|  |  |
| --- | --- |
| TCH4 = $\frac{\sqrt{MC}H4}{\sqrt{MHC};}$THCl40 = $\frac{√16}{√36.5}$ (½ mk)THCl$\frac{-40}{THCl}$ =$ \frac{ 4}{6.041}$ | 40 x 6.041 = 4x THCl 10THCl = 40 x 6.041  4 1 (1mk) = 60.41 s (½ mk) |

1. i) II ½ MK uses little soap. (½ mk)

ii) Sample III contained temporary hardness (1mk) which was removed by boiling (1mk)

1. L – Ca (HCo3) 2

P – AgCl ( ½ mk each)

Q – CaCO3

X – CO2

b) Ag+ + Cl- AgCl

 (aq) (aq) (s) (white ppt)

1. 2C + 2H2 + 52.3 KJMol-1  C2 H4

 (s) (g)

 3O2 3

 - 286KJ Mol –1 HC

 2O2 O2  -394 kjmol-1 (1mk) 2CO2  + 2H2O

 HC of ethane = 52.3 + 2x -394 + 2x-286

 = (- 52.3 + -788 + -572 KJmol-1 ) 1mk

 = -1412.3KJmol-1 (1mk)

1. React Lead(ii) carbonate with nitri (v) acid to form lead (ii) nitrate ( ½ mk) solution Add Sodium Shulphate ( ½ mk) crystals into the lead(II) nitrate solution and shake the mixture thoroughly. Filter out ( ½ mk) the insoluble lead (II) Sulphate ( ½ mk) and dry it ( ½ mk) in between filter papers
2. a) A black solid is formed (1mk)

b) Chloric (i) acid which has bleaching effect is decomposed by sunlight into HCl and Oxygen (1mk)

c) Cr2O72-

 2x + -2x7 =-2 2x =+12 2x =+ 12

 2x = -2 +14 2 2

 = +6 (1mk)

1. Hydrogen chloride gas is methyldbenzene exists as molecules(1 mk) which is water ionizes(1mk)
2. a) Q (1mk)

b) i) m2+ + ze m (1mk)

 (aq) (s)

ii) 2x- X2 + ze- (1mk)

 (aq) (g)

1. a) A black solid (1mk) was formed. The black solid is Lead(ii) sulphide (1mk)

b) Pb2+ + S2- Pbs

 (aq) (aq) (s) black solid)

1. a) H2O (1mk)

b) Cu( NH3)4 2+ (1MK)

1. 39.8g of KCl in 100g of H2O at 100°C

39.8 g x 70g 709 of H2O at 100°C

100 g

27.986g of KCl (1mk)

35.9g of KCl in 100g of H2O at 80°C

39.8 g x 70g 709 of H2O at 80°C

100 g

 = 25.13g of KCl (1mk)

Mass of KCl = 27.986g - 25.13 g

 = 2.856g (1mk)

1. a) PbO + CO Pb + CO2 (1mk)

 (s) (g) (s) (g)

b) A grey solid (1mk)

c) H2 or NH3 (any one 1mk)

1. R.M.M of CH3OH = 32G ( ½ mk)

8g of CH3OH 178KJ

32g of CH3OH 178 x32 ( ½ mk)

 8

= -712KJmol-1 (1mk)

1. a) Hygroscopy (1mk)

b) Used as a drying agent (1mk)

c) – used in car batteries

- to manufacture sulphate fertilizers

-manufacture of detergents

-manufacture of paints and dyes (any one, 1mk)

1. Energy for bond breaking

4 C-H – 4x + 414 = +1656

1 Cl-Cl - + 244 = +244

 + 1900KJ ( ½ mk)

Energy for bond formation

 3 C- H - 3x -414 = - 1242

 1 C- Cl - -326 = -326

 1 H –Cl - -431 = -431

 -1999 KJ ( ½ mk)

Enthalpy change = (+ 1900 + -1999) KJ (1mk)

 = -99KJ (1mk)

1. a) Hydrogen (1mk)

b) mg + H2O mgO + H2

 (s) (g) (s) (g)

c) Zinc or iron (any one (1mk)

1. a) cracking (1mk)

b) x- C3H6

Structure H H H

 C= C - C-H (1mk)

 H H

c) Bromine water is decolonried (1mk)

1. a) The melting points increase ( ½ mk) from sodium to aluminium due to the increase in strength (1mk) of the metallic bond with increase in number of delocalized electrons

b) Atomic size decreases ( ½ mk) from sodium to aluminium due to increase in atomic (1mk) number across the period

1. A B C D

 Increasing reactivity

1. a) Al3+ (1mk)

b) Aluminium hydroxide or Al(OH)3 (1mk)

c) Al(OH)3 is amphoteric (1mk)

1. i) 2KOH + H2X K2X + 2H2O

 (aq) (aq) (aq) (l)

 2 : 1

No of moles of KOH = 25x 0.12

 1000

 = 0.003moles ( ½ mk)

No of moles of H2X that reacted

0.003 = 0.0015 moles ( ½ mk)

 2

0.0015 = 30 x m (½ mk)

 1000

M = 0.0015 x1000 = 0.05m ( ½ mk)

 30

ii) 3.15g 500cm3

 3.15g x 1000 1000cm3

 500

=6.3g/l ( ½ mk)

6.3g 0.05moles

6.3g = 126g

0.05

R.F.M of H2x = 126g ( ½ mk)

1. a) Q– water ( ½ mk)

 R- Sodium peroxide ( ½ mk)

b) correctly draw over water method (1mk)

c) 2Na2O2 + 2H2O 4NaOH + O2 (1mk)

 (s) (l) (aq) (g)

1. W – 14 - 2.8.4

X - 17 – 2.8 7

WX4 (1mk)



1. (C17 H35 Coo)2 mg or (C17 H35COO)2 Ca (1mk for any one)