2018 CHEMISTRY PAPER 1 MID YEAR EXAMINATION MARKING SCHEME

1 -Hold a magnet on top of the mixture to attract iron filling. √1

-Add water to the mixture, stir and filter to obtain $PbCl_2$ as a residue and NaCl solution as the filtrate.√1

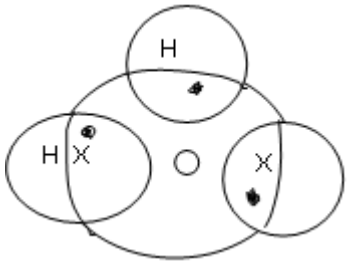
-Heat the filtrate to evaporate water leaving behind NaCl crystals √1

2. a) Existence of a substance in two or more forms without a change of state (1 mk)

b) (i) Graphite($^1/_2$ mk)

(ii) Conducts electricity, ($^1/_2$mk) contains delocalised electrons. ($^1/_2$mk) OR soft and slippery (1 mk) Hexagonal layer are held together by weak van der waals forces (1/2 mk)

3 (a)



b) Dative/coordinate bond (1 mk)

4 $\frac{RO2}{RSO2}=\sqrt{MSO2/MO2}$ $\frac{1.2}{80/t}=\sqrt{64/32}$√1

RO2=60/50 $\frac{1.2t}{80}=2$

=1.2 1.2t=160

RSO2=$^{80}/_t$ t= **133.33 sec√1**

5.(a) Enthalpy change when one mole of the compound is formed from its constituents elements in their standard states (stp)

(b) $C_{(s)} + O_2 \xrightarrow{-394.8} CO_{2(g)}$ (1 mk)

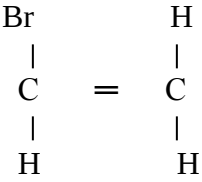
DH_3 ↘ ↗ -285.6

$CO_{(g)} + ½\ O_{2(g)}$

$DH_3 + -285.6 = -394.8$

$DH_3 = -394.8 + 285.6 = -109.2$kj1mol (1 marks)

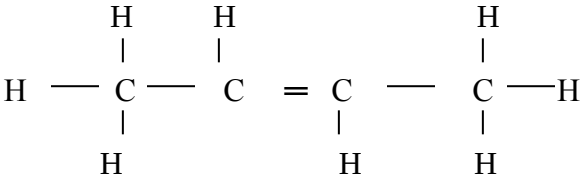
6.a)



(1/2 mk)

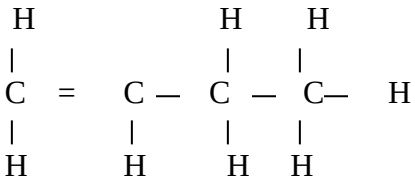
Bromethene (1/2 mk)

b)



(1/2 mk)

But –2-ene (1/2 mark)



But-1-ene

7.a) To prevent suck back (1 mk)

b) Changes from red to blue (1/2 mk) because ammonia dissolves in water to form Ammonium hydroxide which is alkaline (1/2 mks)

8.(a) KBr√1

(b) 60-55 = 5g√1

(c) Fractional crystallization√1

9. - Add distilled water to $ZnCl_2$ solid √ ½ and shake until all solid dissolves √ ½

- Add Na_2CO_3 √½ solution to form white √ ½ precipitate of $ZnCO_{3(s)}$

- Filter √1/$_2$ and wash the residue with a lot of water √ ½

10(a) Calcium oxide reacts with chlorine to form calcium hypochlorite to for calcium hypochlorite√1

(b) Anhydrous $Cacl_2$ / conc. H_2SO_4√1rej. names

11(i) Vanadium (v) oxide/platinum√1

(iii) **I** yield decreases √1/2extra heat decomposes SO_3 /forward reaction isexothermic/equilibrium shifts to the left.√1/2

II Yields increases√1/2 since extra oxygen is used √1/2

12 (a) $H^+_{(aq)} + OH^-_{(aq)} \longrightarrow H_2O_{(l)}$√1

(b) Y_2√$^1/_2$– complete neutralization /end point√$^1/_2$

II Y_1 and Y_2 –Neutralization is taking place producing heat.√1

III Y_2 and Y_3 reaction has come to completion and products are cooling/cooling releases heat to the surrounding.√1

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• A black solid is formed; √1/2 • Heat is given out	Chemical√1/2
Purple vapour condenses on cooler parts of test tube into shiny grey crystals√1/2	Physical√1/2
Solid decomposes to form gas and black solid/blue- green due loss of water√1/2	Chemical√1/2

14 (a) A base that dissolves in water to give hydroxide ions.√1

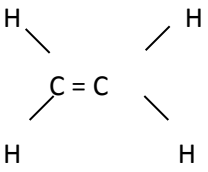
(b) (i) Very soluble in water, thus it would dissolve in water instead of being collect.√1

(ii) Less dense than air√1

15 (a) 0.702g → 560cm³

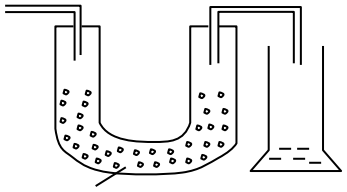
(Rmm)χg → 22400cm³ ✓①

Rmm = 28.08 ✓①

(b) 

✓①

16 (i) Iron (II) Sulphide√1

(ii) 
✓①

Anhydrous $CaCl_2$ ✓①

17(i) Effervescence ✓½ since HCl gas dissociates in water forming hydrogen ionsthat reacts with CO_3^{2-} forming CO_2. ✓①

(ii)No effervescence ✓½. HCl gas dissolves in methylbenzene without dissociatinghence no H^+ to react with Na_2CO_3. ✓①

18(i) Solvent extraction. ✓①

(ii) Chromatography. ✓①

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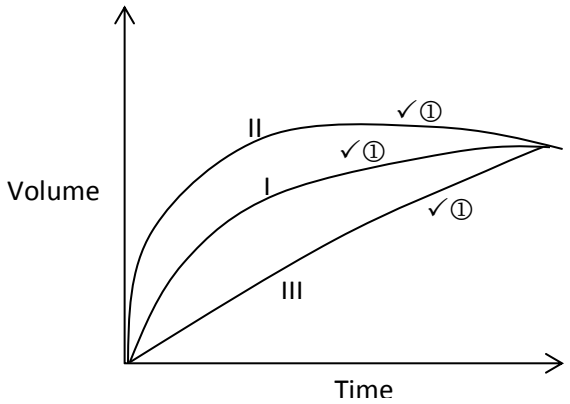
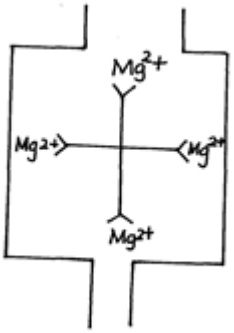


20 (a)



√(2mk)

(b) (ii) By adding concentrated brime from the top. √(1mk)

21 (a) Heating curves √1

(b) Solid **N**√1; does not sharp meting point. √1

22 (a) Y – NO_3^-√1

V- O^{2-}√1

(b) Nitrogen (IV) oxide√1

23. (a) F, G, E (1mk)

(b) Mercury //Hg; (½mk), Silver (½mk); Ag

24. (i) A white ring/solid√1 was formed inside the combustion tube closer to the cotton wool soaked in concentrated Hydrochloric acid. √ ½ Ammonia is lighter and diffuse faster. √ 1/2

(ii) $NH_{3(g)} + HCl_{(g)} \rightarrow NH_4Cl_{(s)}$ √ 1

25. Acid - NH_4^+ √ 1

Base – H_2O √ 1

26. (a) B√1 /2 because same amount little soap is used before and after boiling.√1/2

(b) Sample C contains temporary water hardness√1 /2 which was removed boiling hence little soap was used after boiling.√1/2

27. a) - Bauxite√1/2mk

- $A1_2O_3.\ 2H_2O$ √1/2mk

b) Anode: $2O_{2(l)} \longrightarrow O_{2(g)} + 4e^-$. √1

Cathode: $Al^{3+}_{(l)} + 3e^- Al_{(l)}$ √1

28. (a) C√1 /2- The element has a filled outermost energy level√1/2

(b) The atomic radius of element A is greater than that of element B√1. B has more protons than A hence highier nuclear charge which results to areduction in atomic raduis. √1

29. (a) $^{131}_{53}I \longrightarrow {}^{131}_{54}Xe + {}^{0}_{-1}e$ √1

(b) Number of half-lifes= $^{40\ days}/_{8\ days}$

= 5 half lifes√1/2

50g —1st→ 25g —2nd→ 12.5g —3rd→ 6.25g —4rth→ 3.12g —5th→ 1.5625g

Remaining mass= **1.5625g√1/2**