**CHEMISTRY PAPER 2 MARKING SCHEME**

1.(a) (i) Element A and B

 - Both have 6 electrons to achieve an octet.

 (ii) Oxide of B forms an alkaline solution that turns red litmus blue.

 Oxide of D forms acidic solution, that turns blue litmus red.

 (iii) E has a bigger ionic radius than the ionic radius of C.

 E forms ions / ionizes by gaining electrons; which C ionizes by lose of electrons.

 (iv) Formula; GH2✓1 (Rej H2G)

 (v) Oxide of D is molecular with weaker vander waals forces, while the oxide of B is a giant ionic structure with stronger ionic bonds.

 (vi) GCO3(S) GO(S) +CO2(g) ✓1

(b) B + Cl2 BCl2

 1.5 litres of Cl2 5.9375 of BCl2

 24 litres of Cl2 = (5.9375 × )g BCl2

 = 95g

 RFM of BCl2 = 95

 RAM of BCl2 = 95-71=24

 Or

 B + Cl2 BCl2

 Moles of Cl2 used = = 0.0625 moles

 0.0625 moles Cl2 = 5.9375g BCl2

 1 mole = 

 RAM of B = 95 – 71 =24. (a) Gas A – Carbon (iv) oxide ✓ ½

 2.Gas B – Ammonia gas ✓½

 (b) Liquid C – Ammonium Chloride Solution ✓ ½

 Solid D - Sodium Hydrogen Carbonate ✓ ½

 (c) NH4HCO3 (aq) + NaCl (aq)  NaHCO3 (s) + NH4Cl (aq)

 Ca (OH) 2(aq) + 2NH4Cl (aq)  CaCl2 (aq) ++ 2NH3 (g) + 2H2O (l)

 Penalize ½✓ if not balance

 ½✓ if there are no states

 (d) Ammonia - Manufacture of fertilizers

 - Manufacture of Nitric acid

 - Refrigerant

 - Softening water

 CaCl2  - Drying agent Name ✓1

 Use ✓1

 (e) - Making of glass

 - Softening water

 - Making sodium silicate used in making detergents any two✓1

 - Paper Industry

 3. ***(i) Condenser***

 ***(ii) To indicate when a liquid is boiling, a thermometer reads a constant temperature***

 ***(iii) A***

 ***(iv) Ethanol***

**🗸**

**🗸**

 ***Reason:- It has a lower boiling of 78oC compared to water with a boiling point of 100oC***

***or - The liquid with the lower boiling point boils first and its vapours are condensed***

**🗸**

 ***and the condenser to be collected as the first distillate***

**🗸**

 ***(v) Fractional distillation***

 ***(vi) - To separate components of crude oil***

* ***To isolate O2 and N2 from air***
* ***To manufacture spirits***

**🗸**

 ***(vii)- They are immiscible liquids***

* ***They have different but close boiling points***

**🗸**

***4.a) To remove any magnesium oxide coating from the surface of magnesium// To remove any***

 ***oxide film on it***

 ***b) White solid which is magnesium oxide***

 ***c) Increase in mass was due to oxygen which combined with magnesium***

 ***d) 2Mg(s) + O2(g) \_\_\_\_\_\_\_ 2MgO(s)***

 ***Penalize ½ for wrong or missing state symbols***

 ***e) The filtrate is magnesium hydroxide which is an alkaline***

 ***Red litmus paper changed blue, but blue litmus paper remained blue***

II. ***a) N2O 1 (Nitrogen (I) oxide) – Denitrogen Oxide.***

***b) K2O 1 (Potassium oxide)***

 ***c) Al2O3 (Aluminium oxide)***

(i) Yellow lead (II) oxide turned to red then grey.

(ii) I. H2(g) + PbO(s)  H2O(l) + Pb(s)

 II. 2H2(g) + O2(g)  2H2O(l)

 (iii) Reducing properties of hydrogen

 Combustion nature of hydrogen

Dry HCl

Conc. H2SO4

HCl(g)

5. (a)

(b) M is hydrogen

(c) Conc. H2SO4 is a less volatile hence displaces a more volatile and from its salts i.e

(a) 5 electrons

(b) 11-5 = 6 neutrons

(c) 20/100 x 10 + 80/100 x 11 = 2+ 8.8 = 10.8

(d)

***a) 3 Mg + N2 g \_\_\_\_\_\_\_\_ Mg 3 N2 g***

 ***b) Argon***

 ***- It is inert***

***a) 3 Mg + N2 g \_\_\_\_\_\_\_\_ Mg 3 N2 g***

 ***b) Argon***

 ***- It is inert***

***c)Haber process to manufacture ammonia***

***Hydrogenation***

***Welding***

***6.a) magnesium Oxide***

 ***b) 2Mg(s) + O2(g) \_\_\_\_\_\_\_\_\_ 2MgO(s)***

 ***c) i) Sodium sulphate***

 ***ii) MgCO3***

 ***d) MgO(s) + H2SO4(aq) \_\_\_\_\_\_\_\_ MgSO4(aq) + H2O(L)***

 ***e) Mg2+(aq) + CO2- 3(aq)\_\_\_\_\_\_\_\_ MgCO3(s)***

***f) MgCO3(g) \_\_\_\_\_\_\_\_\_ MgO(g) + CO2(g)***

 ***g) Na+ ions and SO42- ions***

 ***h) Precipitation/ double decomposition***

7.

1. Z- Anhydrous calcium chloride ***√1mk***

 Q- Water

1. Reducing agent / effect ***√1mk***

 Combustible gases / burning of hydrogen in air.

1. The flame should be blown out ***√½ mk*** first as the supply of hydrogen continues to avoid explosion.√ ***½***

 Heating of CuO should be ***√½ mk*** stopped to prevent re-oxidation ***√½ mk*** of hot copper before ***√½ mk*** the supply of hydrogen is stopped.

1. Hydrogen so produced is at once oxidized to water ***√1mk*** ( strong oxidizing agent )

 Likelyhood of producing poisonous gases such as nitrogen (IV) oxide. ***√1mk***

1. Water molecules has lone pairs***√1mk*** of electrons which can be donated ***√mk*** and be shared with H+ to form H3O+
2. Is less dense than air / lighter than air. ***√1mk***