

MARKING SCHEME CHEMISTRY PAPER 233/2 2000

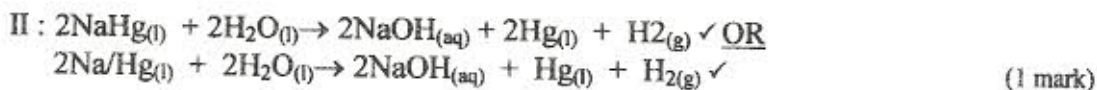
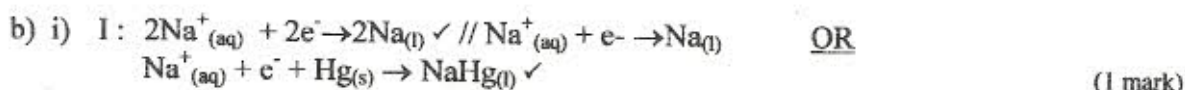
1. a) i) Alkaline earth metals ✓ (1 mark)
 ii) A ✓ (1 mark)
 iii) Covalent ✓, because they form bonds by sharing of electrons ✓ (2 marks)
 iv) D_2O_3 OR Al_2O_3 (1 mark)

v)

							A
	C		D	B	✓	E	
	F						

- b) i) H ✓, because their boiling points are quite close ✓ (1 mark)
 ii) K ✓ (1 mark)
 iii) I - L ✓, because its boiling point is lower than room temperature and is slightly soluble in water ✓ (2 marks)
 II - J ✓ (1 mark)

2. a) i) I - Distilled water/ H_2O ✓ (1 mark)
 II - Titanium/Platinum ✓ (1 mark)
 ii) Chlorine/ $Cl_{2(g)}$ ✓ (1 mark)
 iii) I - Paper Industry/Rayon manufacture/Dyes manufacture
 - Glass industry
 - Manufacture of soap
 - Manufacture of Al
 - Manufacture of bleaching agents
 - Manufacture of drugs
 II - To reduce running costs/make ✓ process economical
 - To avoid pollution ✓



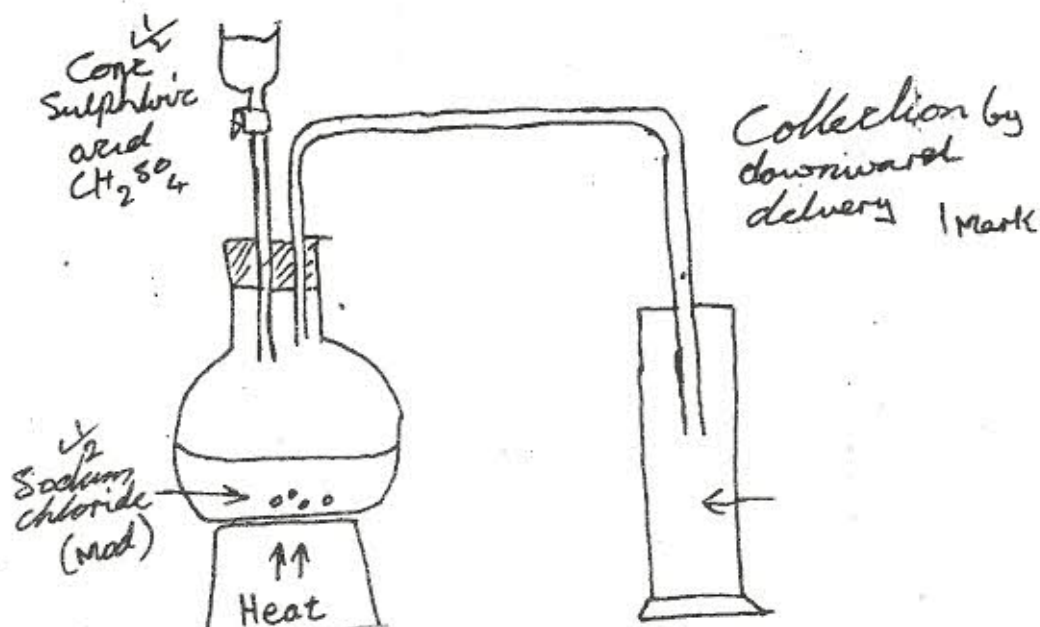
ii) $Q = It = 100 \times 5 \times 60 \times 60 = 1800000$ 1 Faraday forms 1 mole of Na
 1 Mole of Na/Hg \Rightarrow 1 mole of NaOH NaOH = 23 + 16 + 1 = 40

$$96500C \Rightarrow 40g \text{ of NaOH } 180000 \Rightarrow \frac{40 \times 1800000}{96500} = 746g$$

3. a) i) Galena ✓ (reject PbS on its own) (1 mark)
 ii) Some of the sulphide is converted with oxide (PbO or SO_2) (1 mark)
 iii) Carbon monoxide (CO) ✓ OR Carbon dioxide (CO_2) ✓ (1 mark)
 iv) $PbO_{(s)} + C_{(s)} \rightarrow Pb_{(s)} + CO_{(g)}$ ✓ (1 mark)
 v) To reduce unreacted PbS to Pb ✓ (1 mark)
 vi) SO_2 is poisonous ✓ // SO_2 causes acid rain ✓ OR CO is poisonous ✓ OR lead is poisonous ✓ (any two 1 mark)

- b) Hard water contains Mg^{+2}/Ca^{+2} , these ions form a protective layer of $CaCO_3/CaSO_4/MgCO_3$ on lead. Soft water does not form these deposits✓ (3 marks)
- c) Radioactive shielding✓ (1 mark)
 Lead and accumulators/batteries
 Making roofs
 Making alloys e.g. soldering wire
 Making of anti-knock additives
 Manufacture of paints/bullets/fall bearings

4 a) 1) (4 marks)

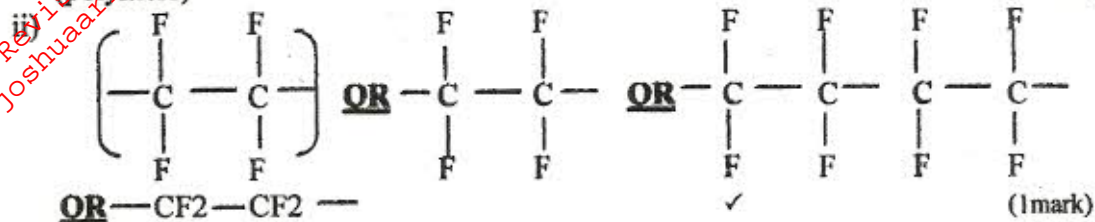


- ii) $NaCl_{(s)} + H_2SO_{4(l)} \rightarrow NaHSO_{4(s)} + HCl_{(g)}$ ✓ (1 mark)
- iii) - Concentrated Sulphuric acid- Silica gel OR
 - Anhydrous $CaCl_2$ (1 mark)
- iv) A white precipitate✓ is produced $HCl_{(g)}$ in water ionizes to form H^+ ions and Cl^- ions. The Cl^- ions✓ combines with Pb^{+2} to form lead (a) chloride✓. $PbCl_{2(s)}$ OR
 $HCl_{(aq)} \rightarrow H^+_{(aq)} + Cl^-_{(aq)}$ ✓
 $Pb^{+2} + 2Cl^-_{(aq)} \rightarrow PbCl_{2(s)}$ ✓ (white ppt)✓ (3 marks)
- v) HCl is not an oxidizing agent^(1/2), it only reacts and removes the oxides hence cleaning the surface^(1/2), HNO_3 is a strong oxidizing^(1/2) agent, it reoxidises the cleaned surface^(1/2). (2 marks)

- b) i) $HCl_{(aq)} + NaOH_{(aq)} \rightarrow NaCl_{(aq)} + H_2O_{(l)}$ ✓
 Moles of $NaOH$ = Moles of HCl
 $= \frac{46 \times 11}{1000}$ ✓ = 0.506 moles^(1/2) (2 marks)
- ii) Moles of HCl in $250cm^3 = 0.506 \times 10 = 5.06$ moles^(1/2)
 R.M.M of $HCl = 1 + 35.5 = 36.5$ ✓^(1/2)
 Mass of $HCl = 5.06 \times 36.5$ ✓^(1/2)
 $= 184.69g$ ✓^(1/2)
 $Q = 14$ (2 marks)
- 5 a) i) Pent-2-ene✓
 ii) Butanoic acid✓ (2 marks)

- b) i) Substitution ✓ (1 mark)
 ii) Addition ✓ (1 mark)
- c) i) $2C_4H_{10(g)} + 13O_{2(g)} \rightarrow 8CO_{2(g)} + 10H_2O_{(l)}$ ✓ (1 mark)
 ii) Carbon dioxide (CO₂) is produced ✓. This then dissolves in water, forming an acidic solution ✓ (2 marks)

- d) i) Process where monomers (small molecules) join together to form large molecules (polymers) ✓ (1 mark)



- e) Cheaper, more durable/stronger, can be recycled, easily available, easily moulded/made into many shapes, lighter, can be made on demand ✓ (any two 2 marks)

6. a) i) M - Graphite ✓
 N - Diamond ✓ (2 marks)

- ii) • Glass cutters/cutting glass
 • Jewellery
 • Padlocks
 • Tips of drills (or drilling) ✓ (1 mark)

- iii) M/Graphite ✓; The fourth electron of each carbon is unbonded/free/delocalised ✓ (2 marks)

- b) i) $C_{(s)} + CO_{2(g)} \rightarrow 2CO_{(g)}$ ✓ (1 mark)
 ii) Potassium hydroxide (KOH) ✓ OR calcium hydroxide Ca(OH)₂ (1 mark)

- iii) Pass the gases through limewater (Ca(OH)_{2(aq)}) ✓, CO₂ form a white precipitate. But CO does not give a change OR CO burns with a flame CO₂ does not burn. (2 marks)

- iv) • Fuel in water gas and produce gas/Synthetic petrol ✓ - Extraction of metals
 • Manufacture of methanols (1 mark)

7. a) i) • Add drop of the liquid to anhydrous/white Copper (II) Sulphate (CuSO₄) and it will turn blue OR
 • Use cobalt chloride paper ✓; which turns from blue ✓ to pink.
 • Use anhydrous cobalt chloride which turns from blue to pink ✓ (2 marks)

- ii) - Find the boiling point, water has a B.P of 100°C at 1 atmospheric pressure ✓
 - Find the freezing point, water has a freezing point of 0°C at 1 atmospheric pressure ✓
 - Find the density; water has a density of 1g/cm³ at 4°C ✓ (1 mark)

- b) i) Sand/leaves/gravel/grit/stones
 ii) Sedimentation ref. Precipitation
 iii) I - Causes the small suspended particles to settle/precipitate
 II - Kill microorganisms/microbes/germs

- c) i) Permanent
 ii) - Addition of Na₂CO_{3(aq)} which precipitate Mg²⁺ as MgCO₃
 - Use of distillation; residue of MgSO₄ is left behind
 - Use of ion exchange resins which will remove Mg²⁺