

MARKING SCHEME CHEMISTRY PAPER 233/1 2000

1. a) Mass increases \checkmark because oxygen combine with copper metal (1½ marks)
 b) Mass decreases \checkmark . It decomposes into gases that escape (1½ marks)
2. a) $2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_{2(\text{g})}$ \checkmark (1 mark)
 b) $\text{Mg}_{(\text{s})}$ \checkmark

3. a) Ammonia gas \checkmark (1 mark)
 b) Filtration/precipitation/Crystallization \checkmark (1 mark)
 c) $2\text{NaHCO}_{3(\text{s})} \rightarrow \text{Na}_2\text{CO}_{3(\text{s})} + \text{CO}_{2(\text{g})} + \text{H}_2\text{O}_{(\text{g})}$ \checkmark (1 mark)

4. a) $Q = It = 1.5 \times 15 \times 60\text{c} = 1350\text{c}$ \checkmark (1 mark)

b) Alternative 1

$$1350 = 0.6 \text{g of } M^{(1/2\checkmark)}$$

$$3 \times 96500 = \frac{0.26}{1350} \times 3 \times 96500 \checkmark$$

$$= 55.76^{(1/2\checkmark)}$$

Alternative 2

$$M = \frac{Q \times M}{F \times C}$$

$$0.26 = \frac{1350 \times M}{96500 \times 3}^{(1/2\checkmark)}$$

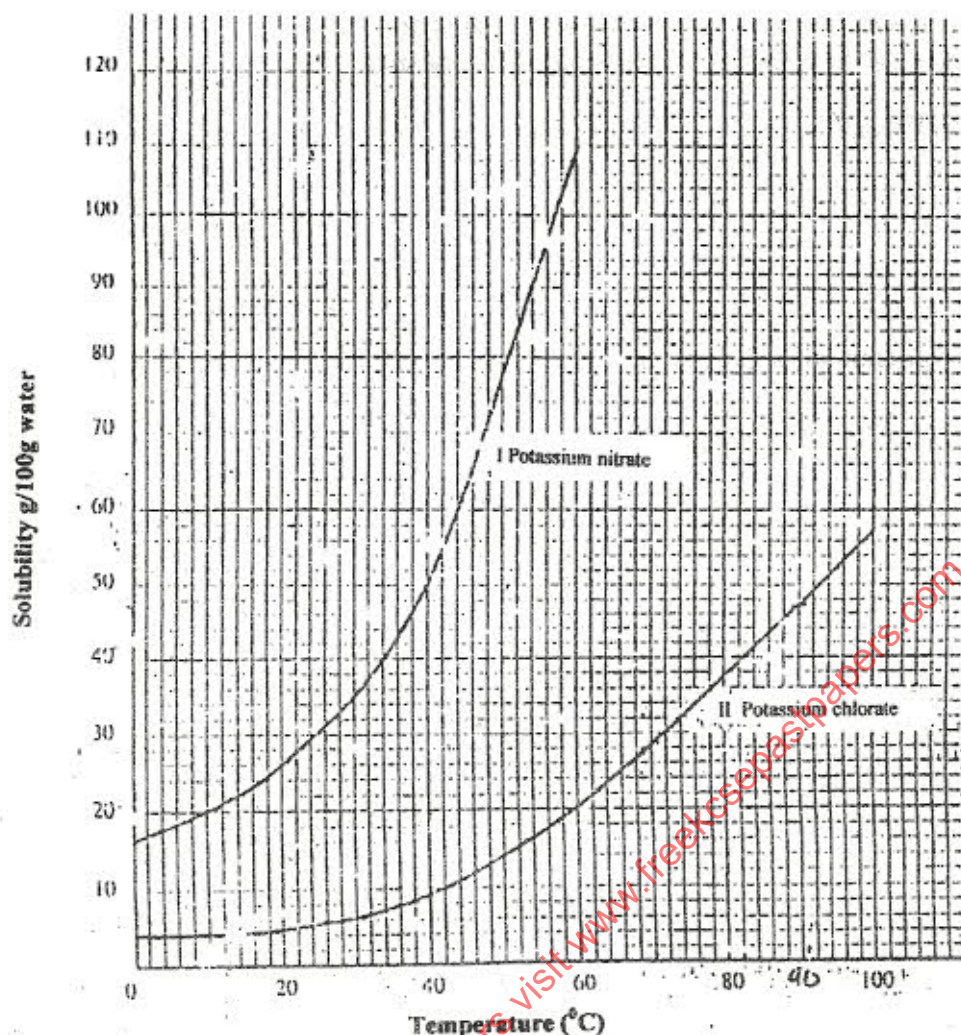
$$M = \frac{0.26 \times 96500 \times 3}{1350} \checkmark$$

$$= 55.76^{(1/2\checkmark)}$$

(1 mark)

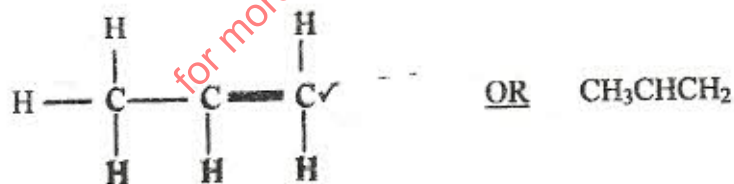
5. a) $\text{T}_{(\text{s})} + \text{X}^{2+}_{(\text{aq})} \rightarrow \text{T}^{2+}_{(\text{aq})} + \text{X}_{(\text{s})}$ (1 mark)
 b) SXTU $\checkmark\checkmark$ (2 marks)
6. Add excess CU to \checkmark HNO_3 filter \checkmark the mixture, add excess soluble carbonate, filter \checkmark to obtain residue. OR add CU to H_2SO_4 and warm - (not a must), filter \checkmark the mixture then add soluble carbonate \checkmark , filter the residue. OR Heat CU in oxygen to get CUO, dissolve \checkmark in an acid, filter, add a soluble carbonate \checkmark to the solution, filter to get residue \checkmark . (3 marks)
7. - It's light/less dense \checkmark
 - It's inert/noble/unreactive/rare gas/not flammable \checkmark (2 marks)

8. Study the solubility curves below and answer question that follows



Crystals of $KClO_3$ come out because at $83^\circ C$ the solution is saturated with $KClO_3$. Cooling causes crystallization. All KNO_3 remain in the solution because at $40^\circ C$ the solution is not yet saturated with KNO_3 OR $KClO_3$ forms solid $(40 - 9) = 31g$. KNO_3 do not form solid. (3 marks)

9. a)



(1 mark)

b) Propene or prop-1-ene

1 mark)

10. a) H - CaCO_3 /Calcium carbonate/Limestone/Manile chips

(1 mark)

J - CaO /Calcium oxide/quick lime

(1 mark)

b) As a fertilizer/for liming/making morten/living furnaces/raising soil pH/manufacture of CaC_2 / $\text{Ca}(\text{HSO}_3)_2$ / $\text{Ca}(\text{OH})_2$ /Absolute alcohol

(1 mark)

11.

Alternative 1

$$\text{Molarity of NaOH} = \frac{4}{40} = 0.1 \text{ M}^{(1/2)}$$

$$\text{Moles of NaOH} = \frac{20 \times 0.1}{1000} = 0.002^{(1/2)}$$

$$\text{Mole ratio} = 2 : 1^{(1/2)}$$

$$\therefore \text{Moles of H}_2\text{SO}_4 = 0.001 \checkmark$$

$$8 \text{ cm}^3 = 0.001$$

$$1000 \text{ cm}^3 = ?$$

$$\frac{1000}{8} \times 0.001$$

$$= 0.125 \text{ M} \checkmark$$

Alternative 2

$$\text{Molarity of NaOH} = \frac{4}{40} = 0.1 \text{ M}^{(1/2)}$$

$$\frac{M_a V_a}{M_b V_b} = \frac{1}{2} \Rightarrow \frac{M_a \times 8}{0.1 \times 20} = \frac{1}{2}^{(1/2)}$$

$$M_a = \frac{0.1 \times 20}{8 \times 2}^{(1/2)}$$

$$= 0.125 \text{ M} \checkmark$$

(3 marks)

12.

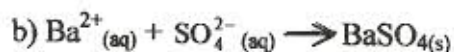
13.

14. a) Cation - Al^{3+} or Mg^{2+}

(1 mark)

Anion - SO_4^{2-}

(1 mark)



(1 mark)

15. Luminous

- Its sooty or smokey^(1/2)
- Not very hot^(1/2)
- Not steady
- Quite

Non-luminous

- Not sooty or smokey^(1/2)
- Very hot^(1/2)
- Steady
- Noisy

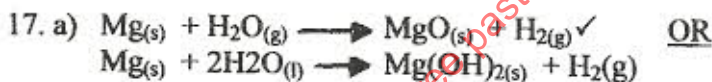
Any two in order

NB: No other differences

(2 marks)

16. When dissolves[✓] in water or in fused/molten state[✓]

(2 marks)

b) Insoluble[✓] in water/slightly soluble

(NB: mention of water is not necessary since the liquid is not labelled)

(1 mark)

18. $t\text{O}_3 = \frac{V}{96} \text{ R.M.M} = 48$

$$\frac{V}{96} \div \frac{V}{t} = \frac{\sqrt{48}}{\sqrt{44}}$$

$t\text{CO}_2 = \frac{V}{t} \text{ R.M.M.} = 44$

$$\therefore \frac{t}{96} = \sqrt{\frac{48}{44}} \checkmark$$

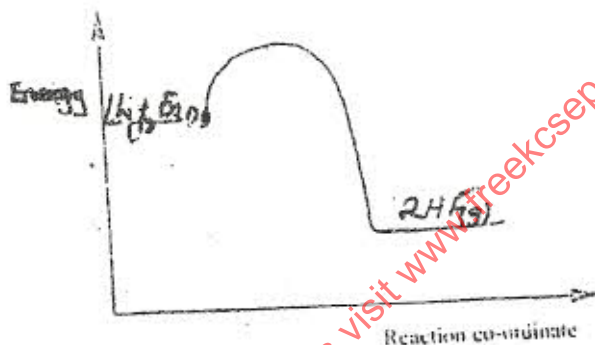
$$t = 96 \times \frac{\sqrt{48}}{\sqrt{44}}^{(1/2)}$$

$$t = 91.9$$

OR

$$\approx 92 \text{ Sec}^{(1/2)}$$

19. I[✓] - Manganese IV oxide is a catalyst[✓] and increases the rate of decomposition[✓] of the hydrogen peroxide. (3 marks)
20. Add water to the mixture[✓] in a separating funnel. Ethanol dissolves while pentane does not. Allow the mixture to separate into two layers[✓]. Open the tap to drain the lower aqueous layer. Distill the water-ethanol mixture to get the ethanol (2 marks)
21. Acetylene (ethyne) OR Hydrogen[✓] (1 mark)
22. a) C[✓] (1 mark)
 b) A[✓] (1 mark)
 c) B[✓] (1 mark)
23. Solid sulphur is made of S₈ rings^(½✓). It melts into a liquid of S₈ rings^(½✓). On further heating the rings open^(½✓) up to form long chains^(½✓) of sulphur atoms which then entangle making it viscous and dark. OR Sulphur melts into S₈ molecules. The molecules join up to form long^(½✓) chain which entangle^(½✓) making it viscous and dark (3 marks)
24. a)



b) $\frac{-538}{22} = -69 \text{ kJ mol}^{-1}$ [✓]

(1 mark)

25. The supply of oxygen in the room will be limited^(½✓) leading to formation of CO^(½✓) which is poisonous.[✓] (2 marks)
26. NH₄Cl decomposes^(½✓) to form NH_{3(g)} and HCl_(g). Ammonia diffuses[✓] faster than HCl because its lighter. Ammonia^(½✓) is basic thus red litmus turns blue while HCl[✓] is acid thus blue litmus turns red. (3 marks)
27. It reacts with NaHCO₃ to form[✓] CO₂ which causes the dough to rise[✓] (2 marks)