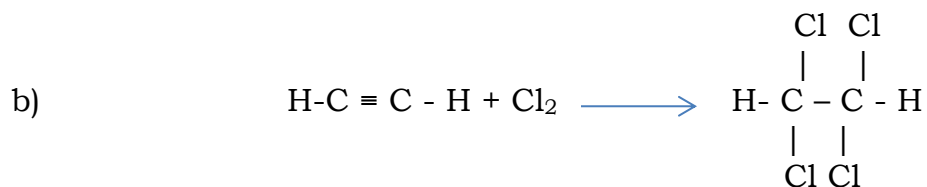


233/1 CHEMISTRY MARKING SCHEME PAPER ONE

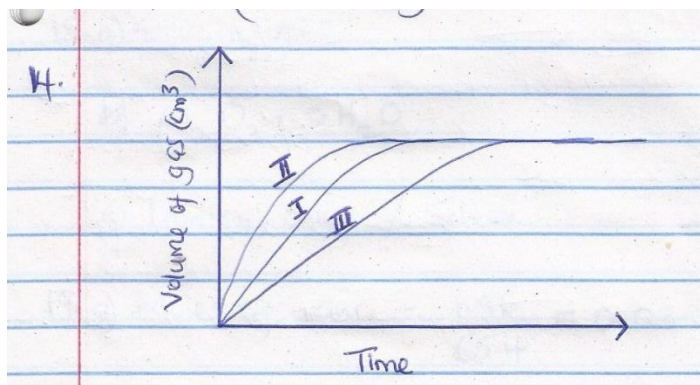
1. a) Sample II – It requires little soap to lather.
b) Sample III – Has temporary hardness which is removed by boiling.
2. a) C – Almost colorless zone.
D – Bright yellow zone.
b) By keeping the airhole fully open.
3. a) Calcium 2.8.8.2
Beryllium 2.2
b) Both elements are in the same group but the valence electrons of calcium are further away from the nucleus hence are readily released/lost or
Calcium has bigger atomic radius than Beryllium hence loses electrons more readily.
4. a) Molar heat of fusion.
b) Negative . Heat is liberated when a gas changes to liquid.
5. a) i) T- Iron (II) sulphide
ii) U – Hydrogen sulphide.
b) When lead (II) acetate paper is inserted in the gas, it turns black.
6.
$$\frac{62.93 \times 69.09}{100} + \frac{64.93 \times 30.91}{100} = 43.4783 + 20.0698$$
$$= 63.548$$
7. a) Structure
$$\begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & & \text{H} & & \text{H} \\ & | & & | & & | & & | & & | \\ \text{H}- & \text{C} & - & \text{C} & - & \text{C} & - & \text{C} & = & \text{C} \\ & | & & | & & | & & | & & | \\ & \text{H} & & \text{H} & & \text{H} & & \text{H} & & \text{H} \end{array}$$

Name ; pent-1-ene



8. Iron wool turns brown /rusts due to formation of hydrated iron(III) oxide.
Level of water inside the tube rises to occupy the space left by oxygen.
9. a) $2\text{Cr}_{(\text{s})} + 3\text{Fe}^{2+}_{(\text{aq})} \longrightarrow 2\text{Cr}^{3+}_{(\text{aq})} + 3\text{Fe}_{(\text{s})}$
b) E.m.f = -0.44 -x
0.30 = -0.44 - x
X = -0.44 - 0.30 = -0.74V.
10. Add excess copper to Nitric (V) acid and filter the mixture. Add excess sodium carbonate solution to the filtrate. Filter to obtain copper (II) carbonate as residue.
11. a) Sodium hydroxide.
b) Blue precipitate was formed which later dissolves to form a deep blue solution.
12. a) X increases the surface area for condensation.
b) Methanol. It has lower boiling point compared to propanol since its van der Waals forces are weaker than those of propanol.
13. a) Carbon (II) oxide and carbon (IV) oxide.
b) Carbon (IV) oxide is used in fire extinguishers.
Carbon (II) oxide is used as a reducing agent.

(accept any other correct use.)



14.

15. a) At constant temperature and pressure, the rate of diffusion of a gas is inversely proportional to the square root of its density.

b)

$$\frac{\text{Rate of W}}{\text{Rate of X}} = \sqrt{\frac{\text{RMM of X}}{\text{RMM of W}}}$$

$$\frac{12}{\text{Rate of X}} = \sqrt{\frac{44}{16}}$$

$$\text{Rate of X} = \frac{12\sqrt{16}}{\sqrt{44}} = 7.236 \text{ cm}^3 \text{ s}^{-1}$$

16. a) $2\text{Li}_{(\text{s})} + \text{H}_2\text{O}_{(\text{g})} \rightarrow \text{Li}_2\text{O}_{(\text{s})} + \text{H}_{2(\text{g})}$
 b) Potassium is very reactive and would react violently with steam.
 c) To generate steam.
17. 10 electrons. 3 single bonds constitutes 6 electrons, the double bond constitutes 4 electrons hence total electrons are $6+4=10$
18. a) Electrolysis.
 b) $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$
 c) Iron (III) oxide / silica.

19. a) Moles of Zinc = $\frac{1.96}{65.4} = 0.03$

$$\text{Moles of HCl} = \frac{100 \times 0.2}{1000} = 0.002$$

Zinc was in excess since 0.02 moles of HCl needs to react with 0.01 Moles of Zinc.

b) Moles of H₂ produced = 0.01
Volume = $0.01 \times 22.4 = 0.224$ litres or 224cm³.

20. a) Experiment 1 and 3.
b) In experiment 1, solid potassium carbonate has no free ions to conduct electricity while in experiment 3 sugar consist of molecules which do not conduct electricity.

21. $100\text{g} \xrightarrow{t^{1/2}} 50\text{g} \xrightarrow{t^{1/2}} 25\text{g} \xrightarrow{t^{1/2}} 12.5\text{g}$

$$3t_{1/2} = 81$$

$$t_{1/2} = 81 \div 3 = 27 \text{ days.}$$

Alternatively

Remaining amount = $(1/2)^n \times \text{original amount.}$

$$12.5 = (1/2)^n \times 100$$

$$\frac{12.5}{100} = (0.5)^n$$

$$\text{Log } 0.125 = n \log 0.5$$

$$n = \frac{\log 0.125}{\log 0.5} = 3$$

$$\frac{81}{3} = 27 \text{ days.}$$

22. a) Platinum – rhodium
b) To make fertilizers.
To make explosives.
c) To prevent decomposition of the acid to NO₂ and water.

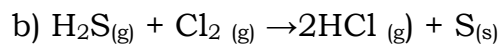
23. a) i) F

ii) I

b) Period 4, group II

				G			
				H		I	
F	J						

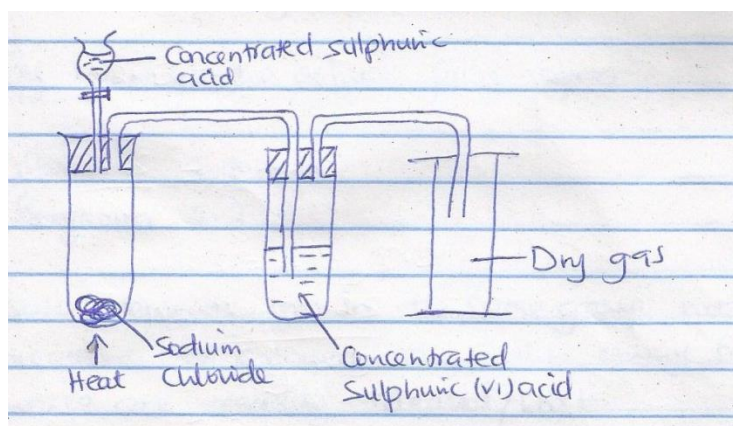
24. a) A yellow solid is formed.



c) The experiment should be done in a fume cupboard/ in the open since the gases are poisonous.

25. I conducts.
 II ionic
 III Covalent

26.



27. a) $2F + (-2 \times 5) = 0$
 $2F = 10$
 $F = \frac{10}{2}$
 $= +5$

(b) Group V

E N D >>

