



233/1 -

**CHEMISTRY  
(THEORY)**

- Paper 1

SEPT.2018 - 2 hours

**05**

Name ..... Index Number .....

Candidate's Signature ..... Date .....

### Instructions to candidates

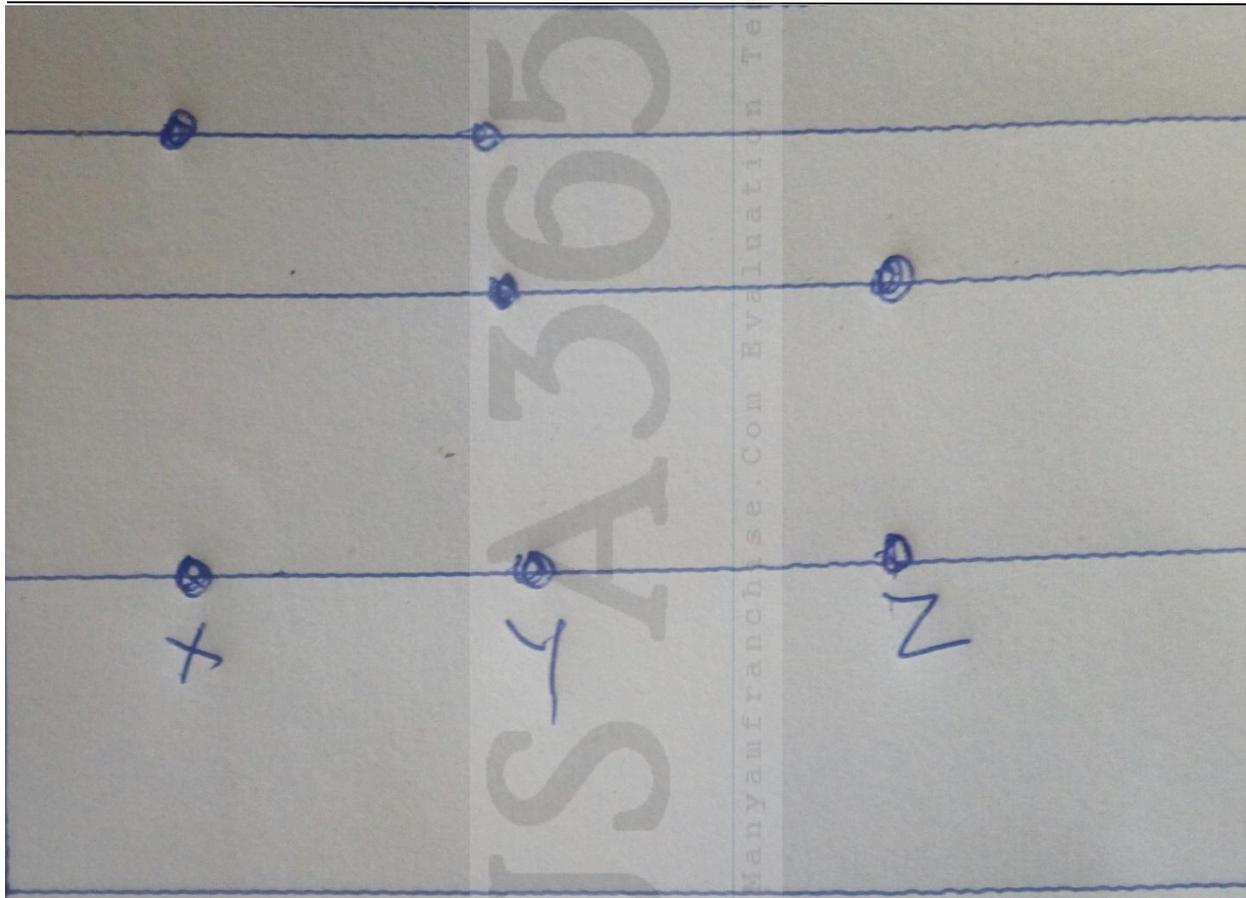
- Write your name and index number in the spaces provided above.
- Sign and write the date of examination in the spaces provided above.
- Answer **ALL** the questions in the spaces provided in the question paper.
- KNEC mathematical tables and silent non-programmable electronic calculators may be used.
- All working **MUST** be clearly shown where necessary.
- This paper consists of ~~8~~ printed pages.**
- Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
- Candidates should answer the questions in English.

### For Examiner's Use Only

Question	Maximum Score	Candidate's Score
1 - 28	80	

# K.C.S.E PREDICTIONS & REVISION KIT CHEMISTRY PAPER 1

1. The diagram below shows a chromatograph of substances X, Y and Z. Study it and answer the questions which follows



- i) identify the pure substances (1mk)
- ii) Which substance is a mixture (1mk)
- iii) On the diagram show the lower and the upper solvent front (1mk)

2. State and explain the changes in mass of the following substances when they separately heated in a open crucible.

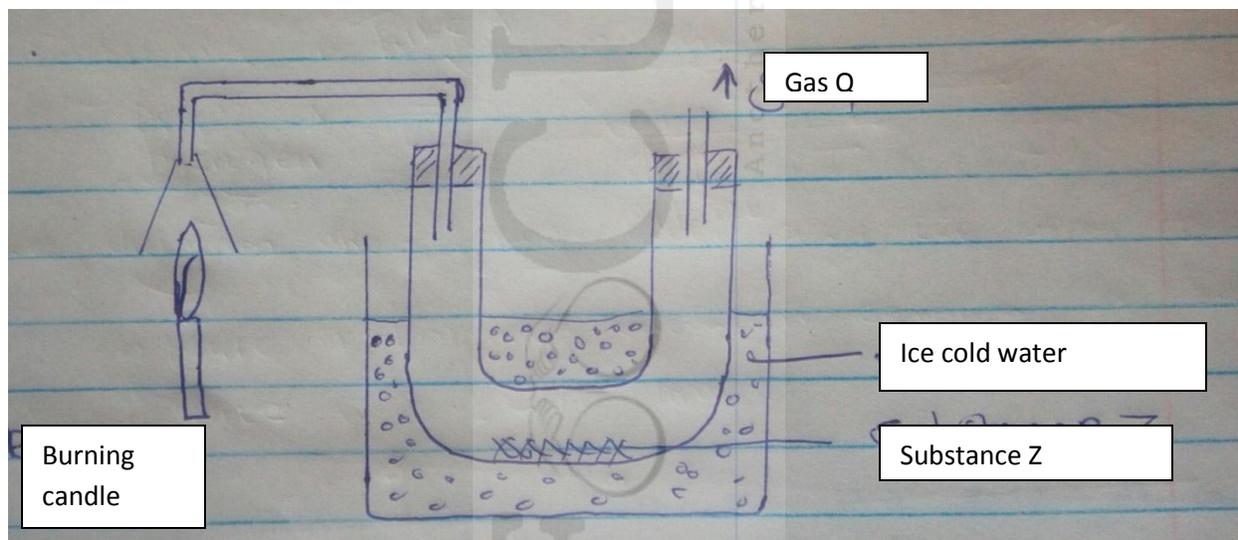
- i) copper metal (1mk)
- ii) Sulphur powder (1mk)
- iii) copper(II) nitrate (1mk)

3(a) Complete the table below to show the colour of given indicators in the basic and acidic solutions (1mk)

Indicator phenolphthalein	Colour in	
	Basic solution	Acidic solution
		Colourless
Methyl orange	Yellow	

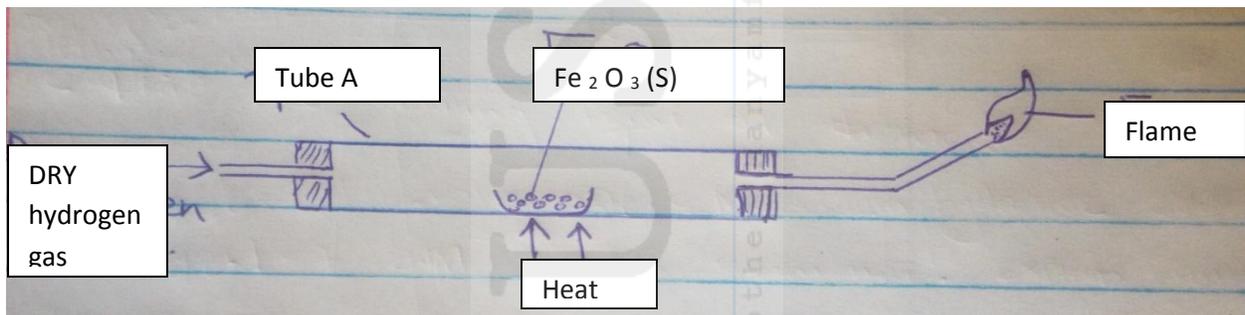
b) how does the PH value of 0.1M sodium hydroxide solution compare with that of 0.1M aqueous ammonia? Explain (2mks)

4. A form four student set up the apparatus as shown below



- a) What would be observed if three drops of substance Z are added to anhydrous copper(1) sulphate in a test tube. (1mk)
- b) How can you confirm the purity of substance Z. (1mk)
- c) State one environmental effects of gas Q when it get into the environment (1mk)

5. Hydrogen gas was passed over heated iron(111) oxide as shown in the set up below



- a) Write a balanced chemical equation for the reaction taking place in tube A (1mk)

- b) Give one observation made in tube A (1mk)
- c) Which gas is being burnt at the end of the outlet tube. Explain (1mk)

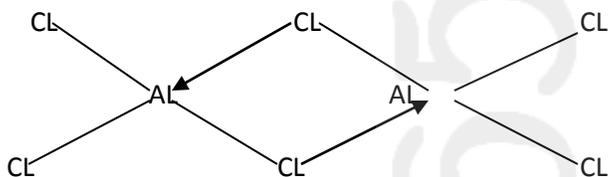
6. A mixture containing Barium sulphate calcium chloride and dry ice. Describe how calcium chloride can be obtained from the mixture. (3mks)

7. Use the information in the table below to answer the questions that follow.

Melting point	Element	Atomic number
97.8	R	11
660	S	13
1440	T	14
-40.1	U	17
63.1	v	19

- a) Write the electron arrangement of (1mk)
- i) Ion of S
  - ii) atom of T
- b) Explain why the melting point of T is higher than that of U (2mks)

8. Study the structure below and answer the questions that follow



- a) What is the total number of electrons used for bonding in the above structure (1mk)
- b) study the table below and complete it (A<sup>-</sup> and B<sup>4+</sup>) are not the actual symbols of the ions (2mks)

Ion	Number of protons	Number of electrons	Mass no.	Electron arrangement
A <sup>-</sup>		20		2.8.8
B <sup>4+</sup>	124		28	

9. Using electrons in the outermost energy level draw dot (.) cross (x) diagram for

i) H<sub>3</sub>O<sup>+</sup> (1mk)

ii) C<sub>2</sub>H<sub>4</sub> (1mk)

b) What would be the effect of dipping litmus paper in aqueous solution of H<sub>3</sub>O<sup>+</sup> (1mk)

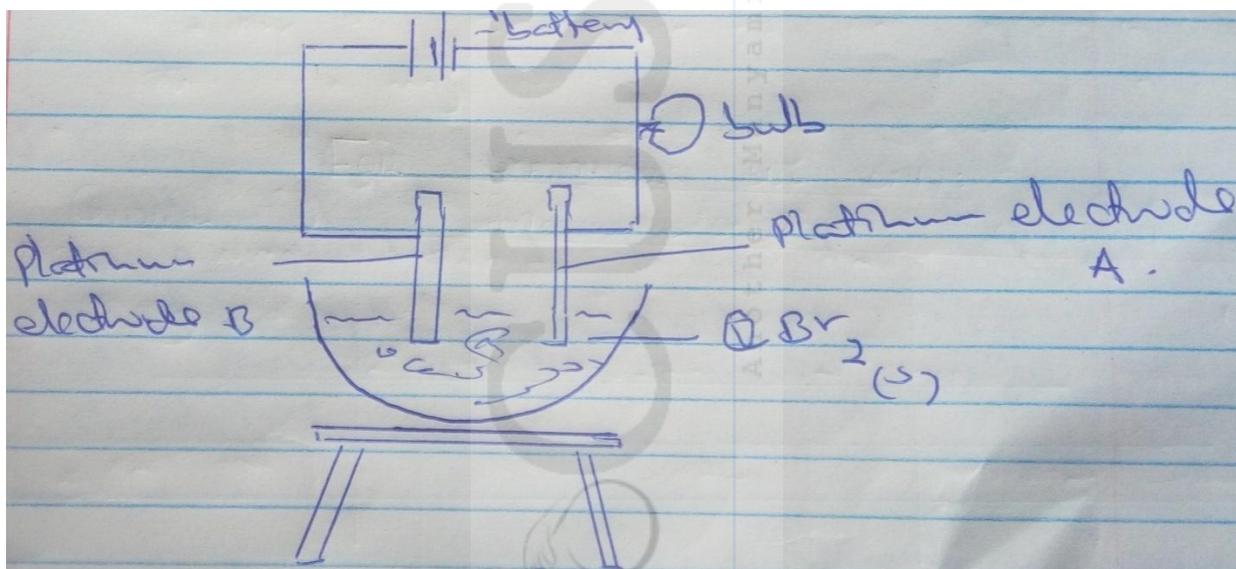
10. Explain the difference in the boiling point of diamond and graphite (3mks)

11. Starting with zinc carbonate solid describe how  $\text{Zn(OH)}_2$  can be prepared in the laboratory. (3mks)

12. i) When extinguishing fire caused by burning kerosene,  $\text{CO}_2$  is preferred to water. Explain (2mks)

ii) Write the formula of the oxide of carbon which is silent killer (1mk)

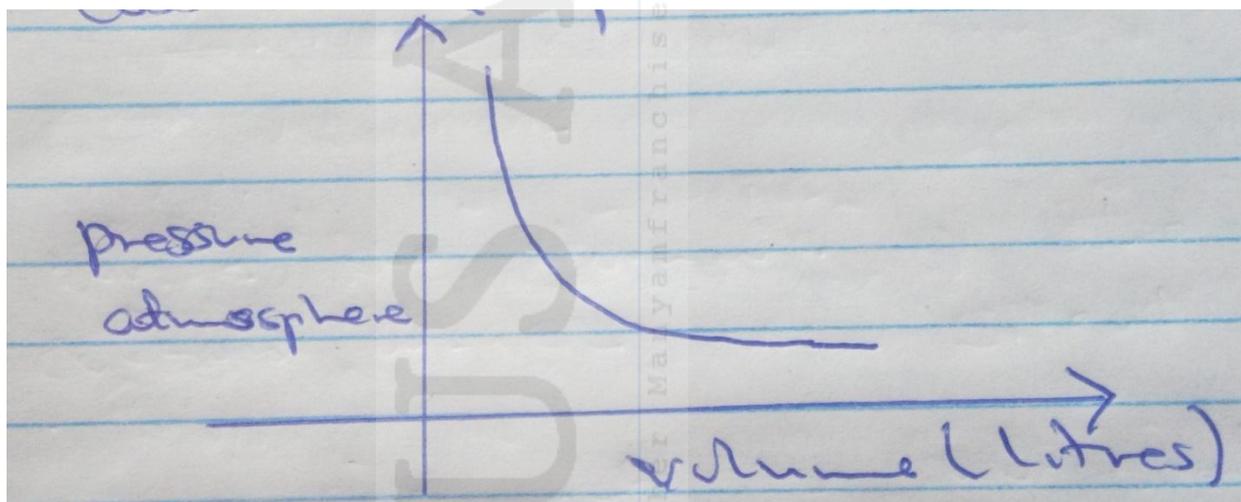
13. In an experiment to investigate the conductivity of substances a student used the set up shown below



The student noted that the bulb did not light.

- What had been omitted in the set-up. (1mk)
- Explain why the bulb lights when the omission is corrected. (1mk)
- Write the equation for the reaction that takes place at the cathode (1mk)

14. The graph below shows the behavior of a fixed mass of a gas at constant temperature.



- What is the relationship between the volume and pressure of the gas. (1mk)

- b) 60cm<sup>3</sup> of oxygen gas diffuses through a porous paddle in 50 seconds. How long would it take for sulphur(IV) oxide gas to diffuse through the same plate under the same conditions. (2mks)

15. When 8.8g of hydroxide Z was burnt in excess air. 1.44g of water and 11.95dm<sup>3</sup> of carbon(IV) oxide were obtained. Determine the empirical formula of Z. (3mks)

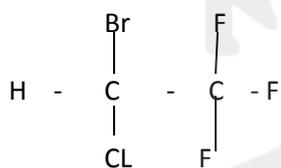
16. 2cm<sup>3</sup> of a gas was collected at a pressure of 770mmHg and at 25 °C . Calculate the volume of the gas at s.t.p (s.t..p. temp = 0° c pressure 760mmHg)

17. 20cm<sup>3</sup> of a solution containing 4g per litre of sodium hydroxide was neutralized by 5.0cm<sup>3</sup> of aqueous sulphuric acid. Determine the concentration of sulphuric acid in moles dm<sup>-3</sup>

18. a) Define the term efflorescence (1mk)

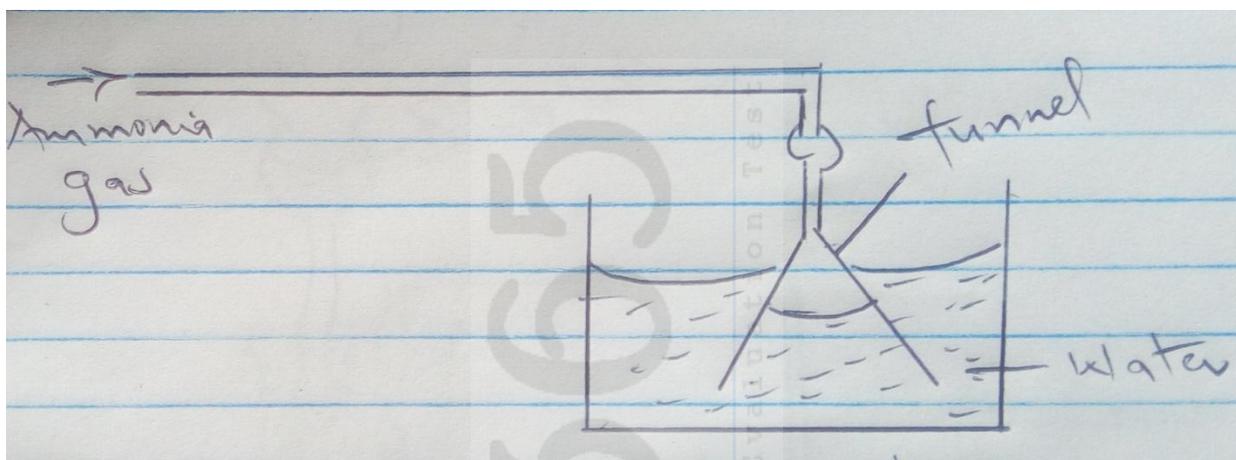
b) State and explain the observation that you would make if you left sodium hydroxide pellets in a watch glass overnight. (2mks)

19. A certain compound has structural formula shown below



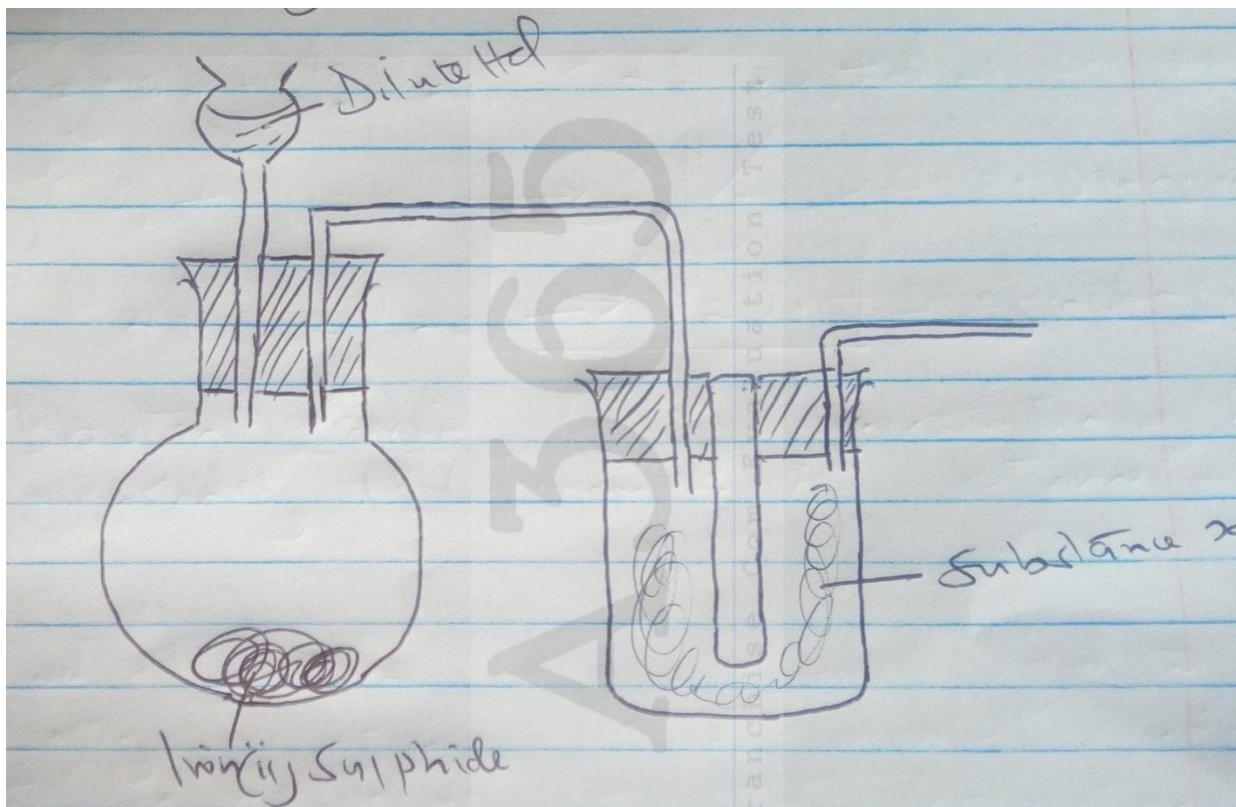
- Name the compound (1mk)
- the above compound belongs to a group of compounds known as CFC(S) . Briefly explain the dangers of these CFC(s) (2mks)

20. Ammonia gas was passed into water as shown below.



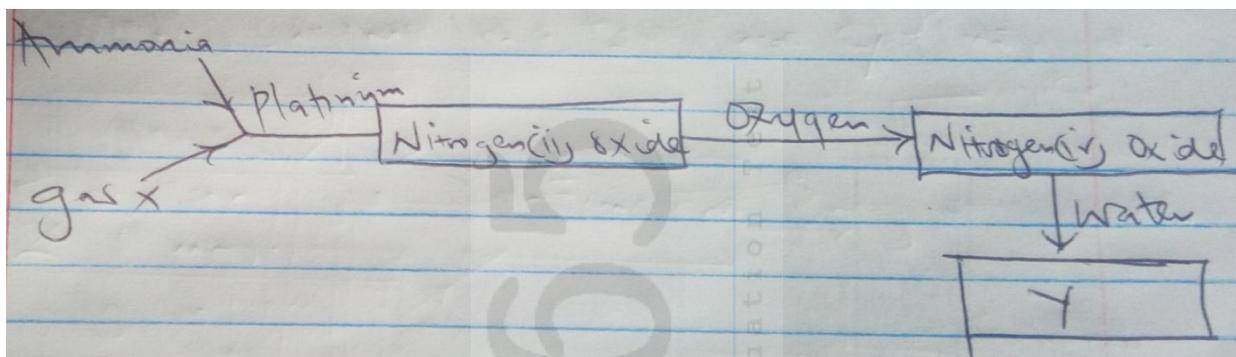
- State the physical property demonstrated by the above set up. (1mk)
- When red litmus paper is dropped into the resulting solution it turns blue. Identify the ion responsible for this observation. (1mk)
- What is the function of the funnel. (1mk)

21. The diagram below shows a set up used to prepare gas Z.



- Complete the diagram to show how gas Z is collected. (1mk)
- Write an equation for the reaction between iron(II) sulphide and dilute hydrochloric acid (1mk)
- What is the purpose of substance X (1mk)

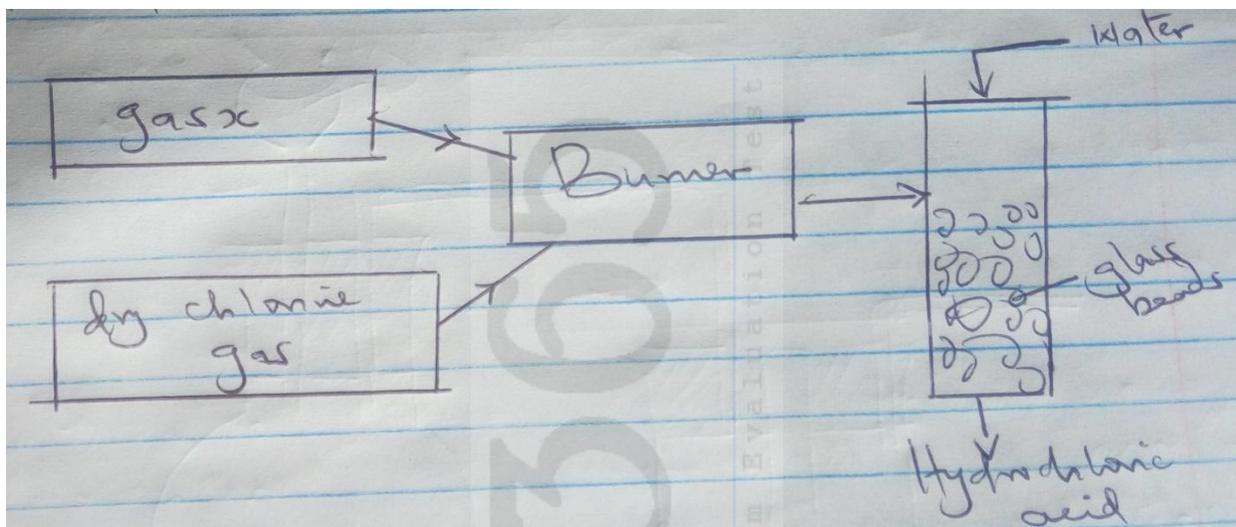
22. Study the chart below and answer the questions that follows



Identify

- i) gas x (1mk)
- ii) compound y (1mk)

23. The scheme below represents steps for large scale manufacture of hydrochloric acid. Study it and answer the questions that follow.

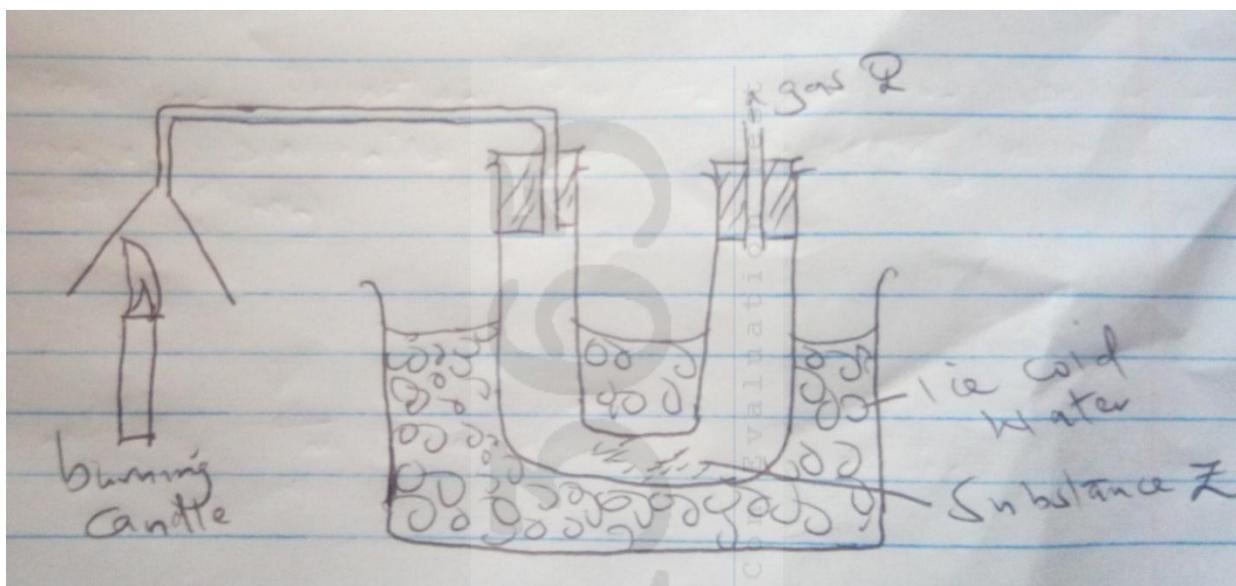


a) Name gas X (1mk)

b) What is the purpose of the glass beads (1mk)

c) State two uses of hydrochloric acid. (1mk)

24. A form four student set up the apparatus as shown below



a) What would be observed if three drops of substance Z are added to anhydrous copper(ii) sulphate in a test tube (1mk)

b) How can you confirm the purity of substance Z (1mk)

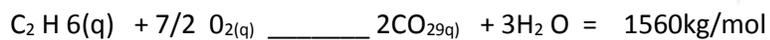
c) State one environmental effect of gas Q when it gets into the environment (1mk)

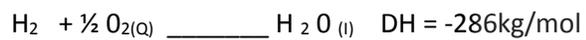
25. Water is a polar molecule.

a) What's meant by a polar molecule (1mk)

b) By using molecules of water show the covalent bonds and the inter molecular forces

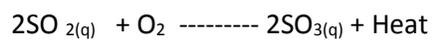
26. Use the thermal chemical equations' below to answer the questions that follow





- i) Draw an energy cycle diagram to show the enthalpy of formation of ethane (2mks)
  
  
  
  
  
  
  
  
  
  
- ii) Calculate the enthalpy of formation of ethane (2mks)

27. Study the reaction below and answer the questions that follow



Explain the effect on equilibrium on

- i) Increasing pressure (1mk)
  
  
  
  
  
  
  
  
  
  
- ii) Increasing temperature (1mk)

