

NAME _____ INDEX _____

DATE _____ SIGNATURE _____

233/2
CHEMISTRY
FORM FOUR
1ST TERM 2016
2 HRS.

Kenya Certificate of Secondary Education
CHEMISTRY Paper 2
FORM FOUR 1ST TERM EXAMINATION 2016

INSTRUCTIONS

- Write your name and your class in spaces provided.
- Sign and write the date of the examination in the spaces provided.
- Answer all the questions in the spaces provided .
- Mathematical tables and electronic calculators may be used
- All working must be Cleary shown where necessary

For Examiner's Use Only

QUESTION	MAXIMUM SCORE	STUDENT'S SCORE
1	12	
2	11	
3	12	
4	11	
5	12	
6	11	
7	11	
TOTAL	80	

This paper consists of 12 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. a) Describe the process by which nitrogen is obtained from air on a large scale. (4marks)

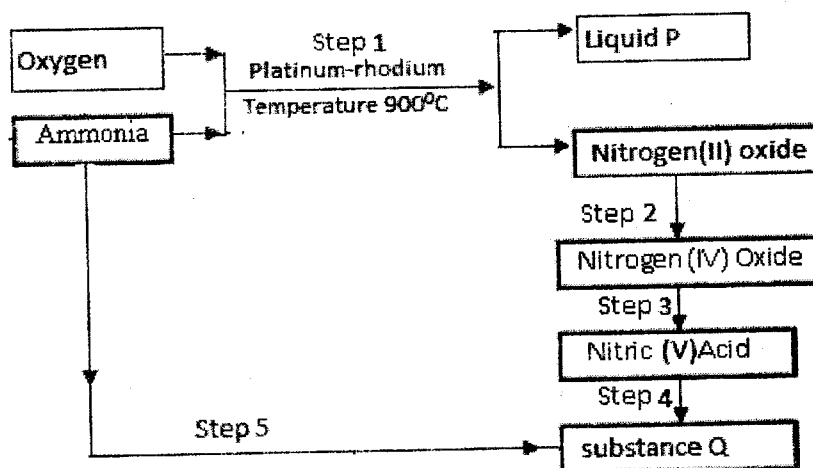
b) Nitrogen (II) oxide is prepared as shown below
i) Identify substance K

(1 mark)

ii) State and explain the observation made when the nitrogen (II) oxide gas collected in the gas jar was exposed to air. (2 marks)

iii) Write an equation for the reaction that takes place when nitrogen (II) oxide is passed through iron (II) sulphate. (1 mark)

c) Study the scheme below and answer the questions that follow.



i) Identify liquid P.

(1mark)

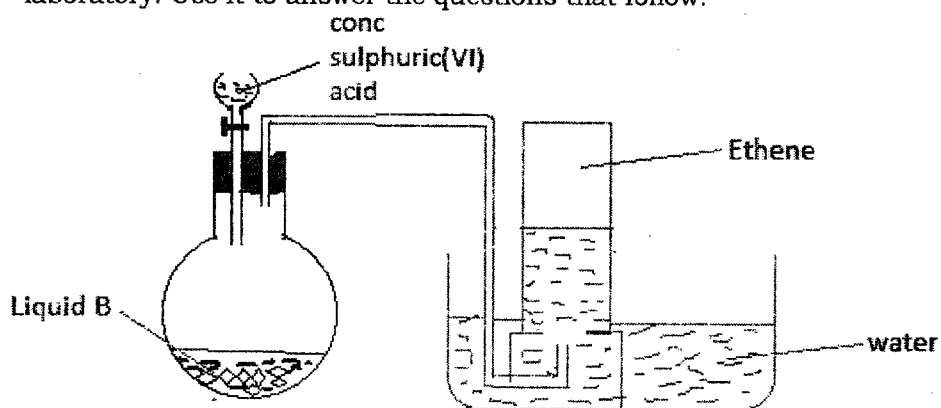
ii) Give one use of substance Q.

(1 mark)

iii) Name the reagents used in step 3. (1marks)

iv) Explain why nitric (V) acid is stored in dark brown bottles. (1mark)

2. a) The diagram below represent a set up that was used to prepare ethene gas in the laboratory. Use it to answer the questions that follow.

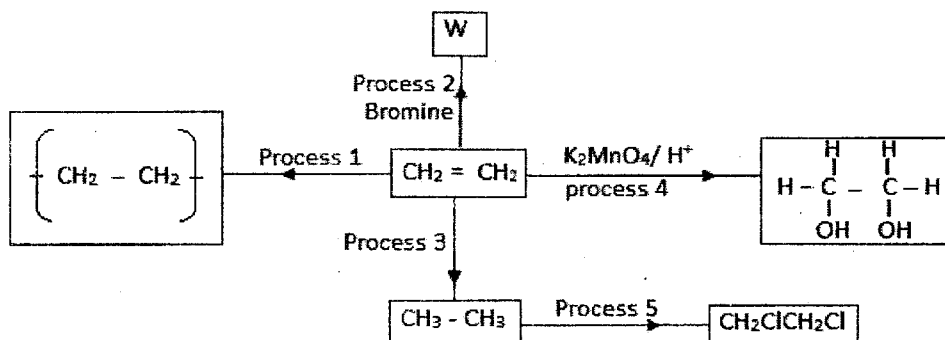


i) Identify an omission made in the diagram. (1 mark)

ii) Name liquid B. (1 mark)

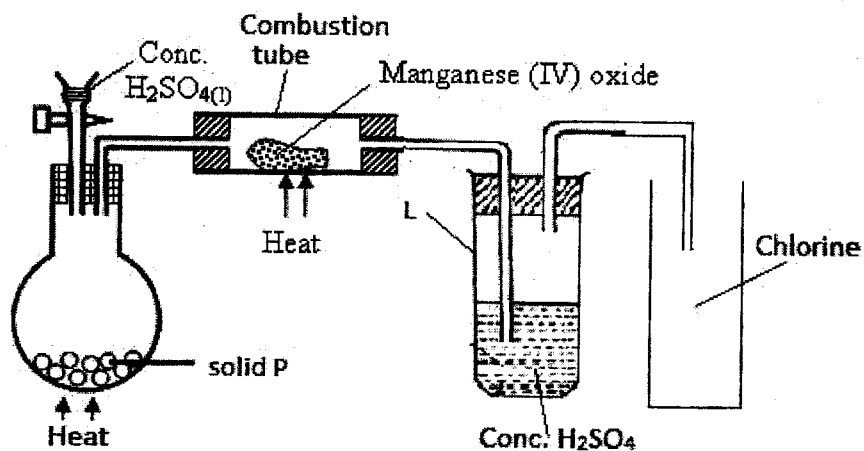
iii) What is the role of concentrated sulphuric (VI) acid in the reaction? (1 mark)

- b) The flow chart below shows some reaction of ethene. Study it and answer the questions that follow.



- i) Give the name and the structural formula of compound W. (1 mark)
- ii) Name the type of the reaction that takes place in; (3 marks)
- I: Process 1
-
- II: Process 4
-
- III: Process 5
-
- iii) Name the reagents and conditions required for the; (2 marks)
- i: process 3
-
- II: process 5 (2 marks)
-

3. a) While preparing chlorine gas in the laboratory, concentrated sulphuric (VI) acid was added to solid P as shown and a colourless gas R was formed. The colourless gas R formed was passed over heated manganese (IV) oxide and chlorine gas was produced.



- i) State one precaution that should be taken while carrying out the experiment. (1 mark)
-
- (ii) Identify
- I. Solid P (1 mark)
-
- II. Gas R (1 mark)
-
- (iii) Name another reagent that can serve the same purpose as manganese (IV) oxide. (1 Mark)
-
- iv) Give the function of concentrated sulphuric (VI) acid in tube L. (1 mark)
-
- v) Write an equation for the reaction that takes place in the combustion tube. (1 mark)
-
- vi) How does the density of Chlorine gas compare with that of air? (1 mark)
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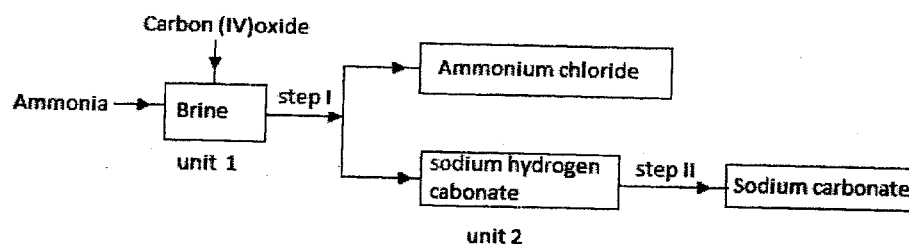
- b) In the industrial production of hydrochloric acid, controlled amount of hydrogen gas is burnt in excess chlorine to form hydrogen chloride gas. The hydrogen chloride gas formed is dissolved in water over glass beads in an absorption tower.
- i) Explain why hydrogen gas burnt must be controlled. (1 mark)

- ii) What is the function of glass beads in the absorption tower? (1 mark)

- iii) State one use of hydrochloric acid. (1 mark)

- iv) Give the meaning of 'CFCs' as applied in chemistry and state their effects on the environment. (2 marks)

4. The flow chart below is a summary of solvay process for the manufacture of sodium carbonate.



- a) Give two sources of carbon (iv) oxide for this process. (1 mark)

- b) Write an equation for two reactions that take place in unit 1. (2 marks)

- c) Name the process that takes place in;
- i) Step I (1 mark)

- ii) step II (1 mark)

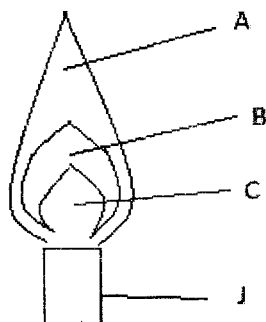
- d) Give two industrial uses of sodium carbonate. (2 marks)

- e) In an experiment to determine the percentage purity of the sample of sodium carbonate produced in the solvay process, 2.15g of the sample reacted completely with 40.0cm³ of 0.5M sulphuric (VI) acid.

- i) Calculate the number of moles of sodium carbonate that reacted. (2 marks)

- ii) Determine the percentage of sodium carbonate in the sample. (2 marks)

5. a) The following diagram represents a flame on a Bunsen burner.



- i) What type of a flame is it. (1 mark)

- ii) Label the parts labeled; (1 ½ marks)
- A:

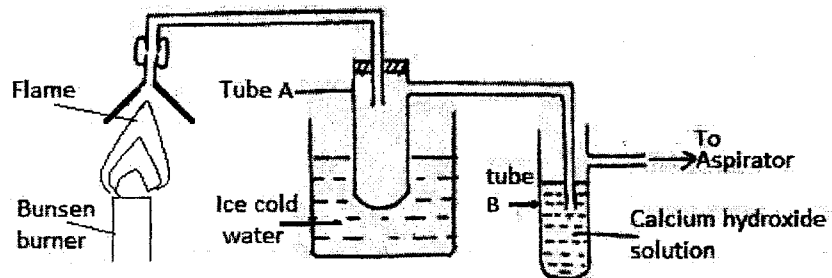
B:

C:

- iii) Which part of the flame is hottest? (½ mark)

- iv) Which part of a Bunsen burner is J. (1mark)

- b) The following experiment was performed to determine the products formed when the laboratory gas is burnt in air.

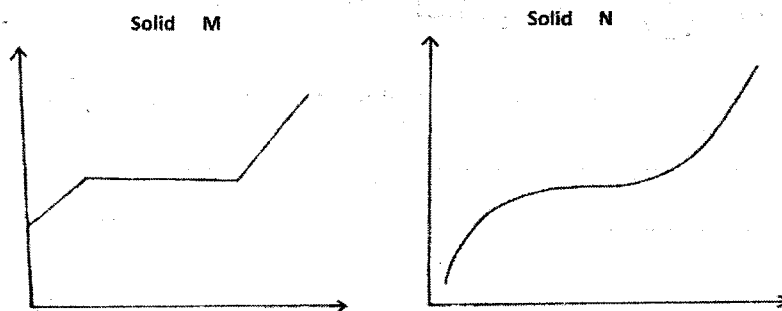


- i) State and explain the observation made in;
I: Tube A. (1 mark)

- II: Tube B. (1 mark)

- ii) Name the elements that make up the laboratory gas. (1 mark)

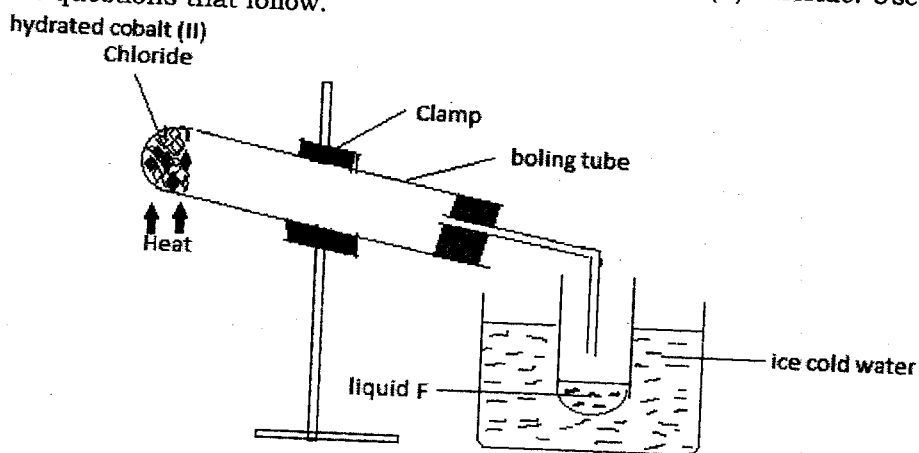
- b). The graphs below represent the temperature-time curves for solids M and N.



(i) What is the name given to the curves above? (1mark)

(ii) Which of the two solids is an impure substance? Explain. (2marks)

c) The diagram below shows the effect of heat on hydrated cobalt (II) chloride. Use to answer the questions that follow.



i) State the observation made in the boiling tube. (1 mark)

ii) Identify the colourless liquid. (1mark)

6. Study the information below and table below and answer the questions that follow. The letters are not the actual symbols of the elements.

Element	Atomic number	Boiling point(°C)
J	3	1333
K	13	2470
L	16	445
M	18	-186
N	19	774

a) State and explain which element;
 i) Is a gas at room temperature? (1 ½ mark)

- ii) Does not form an oxide (1 ½ mark)
-
-
- b) Write an equation to show how L forms its ion. (1 mark)
-
-
- c) Select two elements that belong to the same group. (1 mark)
-
-
- d) Select the most reactive metal and give a reason for your answer. (2 marks)
-
-
- e) Write the formula of a compound formed between element K and L. (1 mark)
-
- f) Element N has three isotopes, N-39, N-40 and N-41 with 93.1%, 0.01% and 6.89% percentage abundances respectively. Determine the relative atomic mass of the element. (2 marks)
- g) Write an equation for the reaction that takes place when element N reacts with cold water. (1 mark)