Name ..... Index No. .....

School .....Candidate's signature .....

Date .....

233/1

CHEMISTRY
Paper 1

July/August 2016

Time 2 hours

NTIMA, NYAKI AND MUNICIPALITY CLUSTER EVALUATION - 2016

Kenya Certificate of Secondary Education

CHEMISTRY

Paper - 233/1

July/August 2016

Time: 2 hours

INSTRUCTIONS TO CANDIDATES

a) Write your name and index number in the spaces provided.

b) Sign and write the date of examination in the spaces provided.

c) Answer ALL questions in the spaces provided.

d) All working must be clearly shown when necessary.

e) Electronic calculators and mathematical tables may be used for calculations.

FOR EXAMINER'S USE ONLY

Question	Maximum score	Candidate's score
1 - 29	80	

This paper consists of 10 printed pages

Candidates should check the question paper to ensure that all the printed pages are printed as indicated and no questions are missing.

1. Give one reason why air is a mixture but not a compound. (1 mark)

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2. The table below shows ammeter readings when two acids with the same concentration were tested.

Electrolyte	Ammeter readings
Sulphuric acid	14
Ethanoic acid	0.6

Explain the difference in ammeter readings. (2 marks)

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3. The table below shows pH values of solutions A to F.

Solution	A	B	C	D	E	F
pH	1	2	6	7	8	12

a) Which solution will turn Red with universal indicator. (1 mark)

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b) Which solution is likely to be carbonic acid. (1 mark)

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.....

c) State the observation made when a piece of magnesium ribbon is dropped in a boiling tube controlling solution B. (1 mark)

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4. The electronic arrangement of two ion Q^{2+} and P^{2-} are 2,8,8 and 2.8.8 respectively.

a) Write the election arrangement of neutral atoms Q and P. (1 mark)

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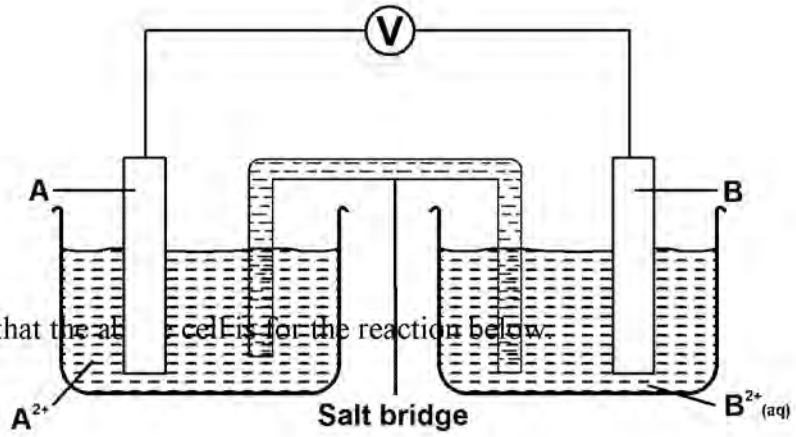
.....

b) Which is the most likely structure of an oxide of element (i) P (ii) Q (2 marks)

.....

5. Study the electrochemical cell below and use it to answer the question that follow.



Given that the above cell is for the reaction below.

$Cu^{2+}_{(aq)} + Mg_{(S)} \rightarrow Mg^{2+}_{(aq)} + Cu_{(S)}$

Identify:

Element A .....(1 mark)

Electrolyte B .....(1 mark)

6. Study the equation below and answer the questions that follow.

i) Name the process shown in the equation above. (1 mark)

.....

ii) Give two condition necessary for the above reaction to occur. (1 mark)

$CH_2CH_{2(g)} + H_{2(g)} \rightarrow CH_3CH_{3(g)}$

.....

iii) State one industrial application of the process named in (i) above. (1 mark)

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7. Describe how a solid sample of lead (II) chloride can be prepared using the following reagents: - dilute nitric acid dilute hydrochloric acid and lead (II) carbonate. (2 marks)

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8. Calculate the volume of 0.1M sodium carbonate solution required to neutralize 25cm³ of 0.2M hydrochloric acid. (3 marks)

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9. Air was passed through reagents as shown below.

i) State and explain the observation made when air is passed through chamber A for a long time. (2 marks)

.....

.....

ii) Air → Calcium hydroxide solution (A) → Hot copper → Excess hot magnesium (B) → C

Name one component in C. Explain. (1 mark)

.....

.....

10. Complete the table below.

Anions	SO^{2-}_3	SO^{2-}_4
Tests	**Observation**	**Observation**
Add $Ba(NO_3)_{2(aq)}$	½ mark	(1½ mark)
Add $Ba(NO_3)_{2(aq)}$ followed by HNO_3	½ mark	½ mark

11. Diamond and graphite are allotropes of carbon. In terms of structure and bonding explain the following.

a) Diamond is used in drilling through hard rock. (1½ mark)

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b) Graphite is used as a lubricant. (1½ mark)

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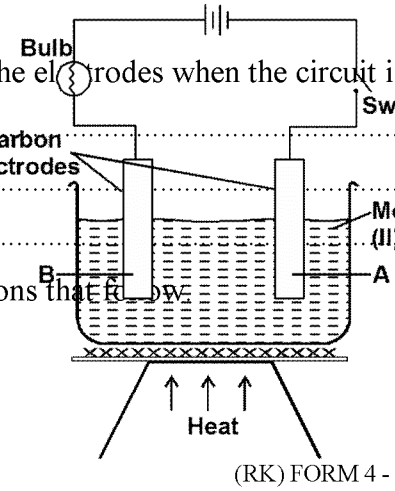
12. Study the set-up and answer the questions that follow.



State and explain the observation that would be made at the electrodes when the circuit is complete. (2 marks)

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13. Study the information given below and answer the questions that follow.

i) Which is the least stable isotope? Explain. (1 mark)

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ii) How long does it take 32g of $^{131}_{53}I$ to reduce to 4g. (2 marks)

ISOTOPE	HALF LIFE
$^{131}_{53}I$	8.1 DAYS
$^{238}_{92}I$	4.5×10^{9} years
$^{214}_{84}Po$	1.5×10^{-4} seconds

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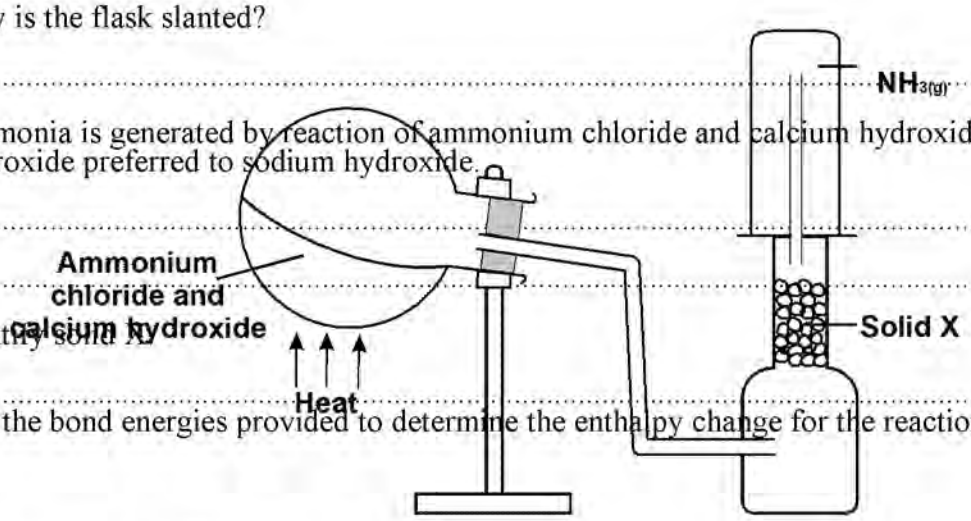
14. Study the diagram and answer the questions that follow.

$^{131}_{53}I$



a) Why is the flask slanted? (1 mark)

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b) Ammonia is generated by reaction of ammonium chloride and calcium hydroxide. Why is calcium hydroxide preferred to sodium hydroxide. (1 mark)

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.....

c) Identify solid X. (1 mark)

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15. Use the bond energies provided to determine the enthalpy change for the reaction represented below.

Covalent bond	Bond energies. (kJ/mol)
N - H	388
H - H	436
N ≡ N	944

(2 marks)

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.....

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b) Draw an energy load diagram for the reaction above. (2 marks)

.....

.....

$2NH_{3(g)} \rightarrow N_{2(g)} + 3H_{2(g)}$

.....

.....

c) State one use of zinc. (1 mark)

.....

.....

16. The flow chart below shows stage involved in extraction of zinc metal. Study it and answer the questions that follow

a) Give the name of the main ore used. (1 mark)

.....

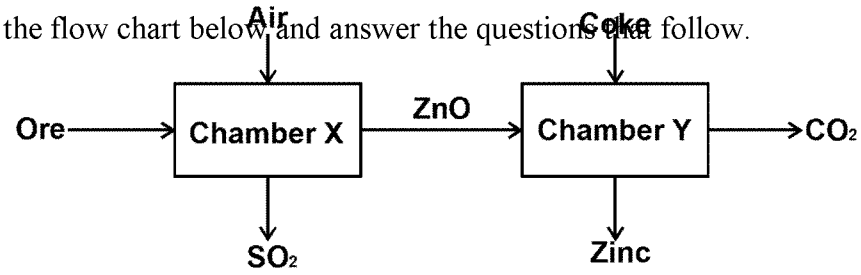
b) Write the equation for the reaction which occurs in chamber X. (1 mark)

.....

c) State the use of zinc. (1 mark)

.....

17. Study the flow chart below and answer the questions that follow.



a) Identify the following substances;

i) Acid A.....(1 mark)

ii) Gas B.....(1 mark)

b) State the observation made in step 2. (1 mark)

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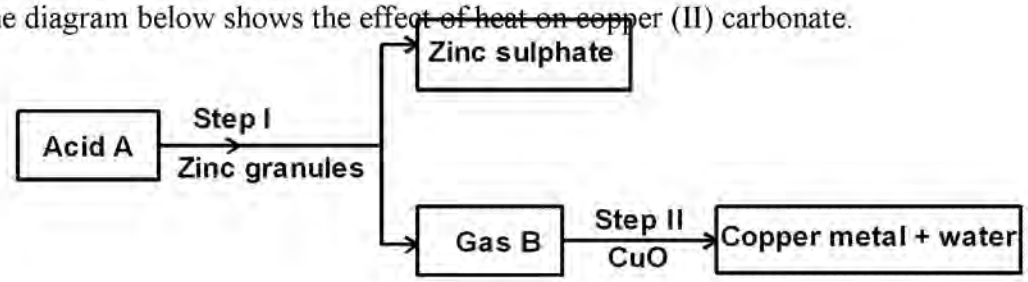
18. The diagram below shows the effect of heat on copper (II) carbonate.



a) State observations made in boiling tube A and B. (2 marks)

A .....

B .....

b) Write the equation for the reaction in boiling tube A. (1 mark)

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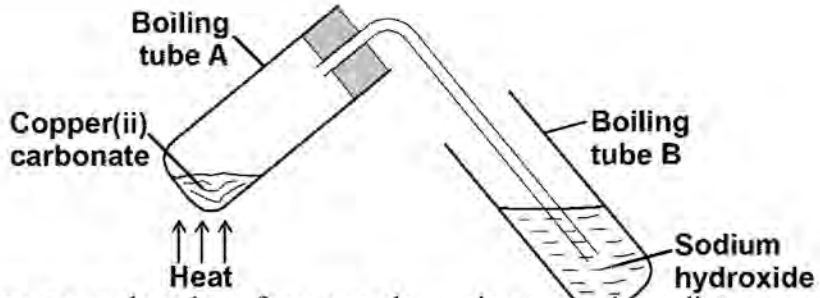
19. Study and complete the table below.



20. An experiment was done by a form one class using a wooden splint over a flame of a Bunsen burner. Results of the experiment are shown in the diagram below.

i) Identify the flame used in the experiment. (1 mark)

.....

ii) Suggest the region of the flame used. (1 mark)

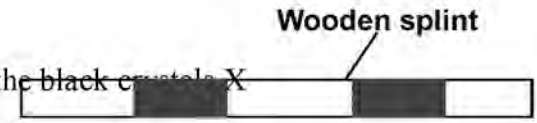
.....

iii) Name another material that can be used in place of wooden splint. (1 mark)

.....

21. The following is a set-up used to prepare salt. Study it and answer questions that follow.

Tests	Observation	Explanation
Addition of litmus solution to hydrogen chloride in water	½ mark	½ mark
Putting a spatulaful of sodium carbonate into a solution in methylbenzene	½ mark	½ mark



a) i) Name the black crystals X (1 mark)

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ii) Write a balanced equation for the formation of product X. (1 mark)

.....

iii) State the use of anhydrous calcium chloride in the U-tube A and in bottle B. (1 mark)

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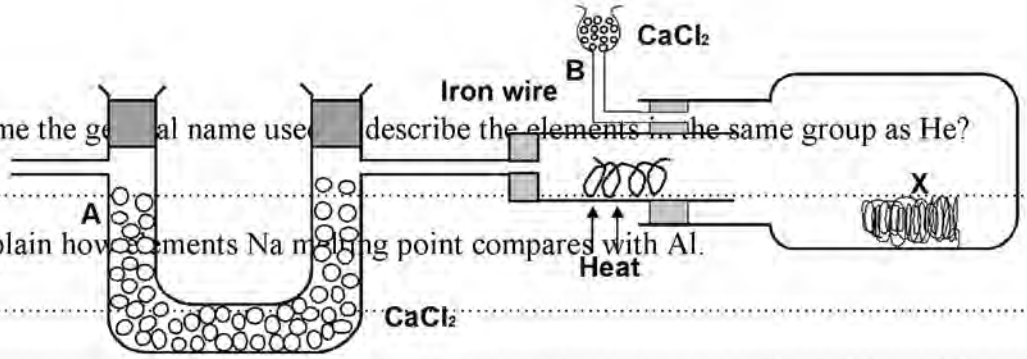
22. The table shows park of the periodic table with only a few symbols for the elements



a) Name the general name used to describe the elements in the same group as He? (1 mark)

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b) Explain how the elements Na melting point compares with Al. (2 marks)

.....

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23. Name one crystalline and one none crystalline form of sulphur.

a) Crystalline form (1 mark)

.....

b) Non-crystalline form. (1 mark)

.....

c) Give one reason why it is possible to extract sulphur using frasch process. (1 mark)

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.....

24. Show how bonding in ammonium ion (NH^+_4) (N=7, H=1) (2 marks)

						F	
Na			Al	Si		S	
	Ca					Br	

.....

25. When 0.50g of hydrocarbon P burns in excess air it forms 1.572g of carbon (IV) oxide and 0.6442g of water when 0.50g of P is vaporised, the volume occupied is 160cm³ of S.T.P.

Deduce the formula of the hydrocarbon P. (3 marks)

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26. Compound K reacts with sodium hydroxide as shown below.

a) What type of reaction is represented by the equation about. (1 mark)

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b) To what class of organic compounds does K belong? (1 mark)

.....

c) Give one advantages of using compound M. (1 mark)

.....

27.a) State Graham's law of diffusion. (1 mark)

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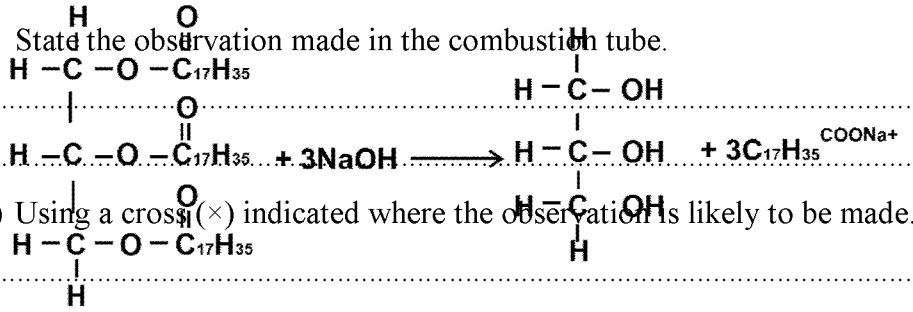
b) The set-up below was used to investigate the rate of diffusion of oxygen gas and Nitrogen (II) oxide gas. Study it and answer the question that follow.



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

.....

.....

ii) Using a cross (×) indicated where the observation is likely to be made. (1 mark)

.....

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28. Hydrogen sulphide reacts with moist chlorine gas according to the equation below:

i) Which substance is the reducing agent? Explain. (2 marks)

.....

.....

ii) State the observation made when this reaction occurs. (1 mark)

.....

29. List the names of the following process

a) Obtaining a solvent form a saturated solution. (1 mark)

.....

b) Obtaining iron (II) chloride from a mixture of iron (III) chloride and sodium chloride (1 mark)

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c) Separation nitrogen gas and Argon from air. (1 mark)

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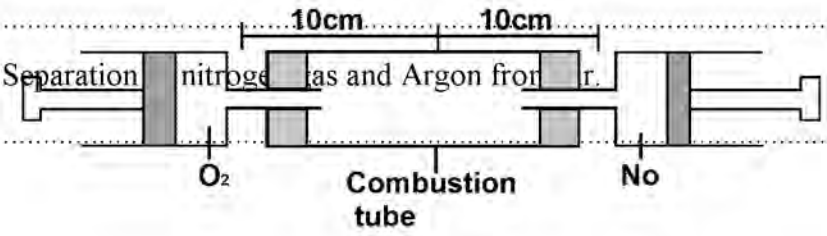

$$H_2S_{(g)} + Cl \rightarrow S_{(S)} + 2HCl_{(g)}$$