

# **IKUTHA SUB-COUNTY KCSE REVISION MOCK EXAMS 2015**

233/2  
CHEMISTRY  
PAPER 2  
(THEORY)  
TIME: 2 HOURS

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NAME \_\_\_\_\_  
SCHOOL \_\_\_\_\_

INDEX NO. \_\_\_\_\_  
SIGNATURE \_\_\_\_\_  
DATE \_\_\_\_\_

**233/2**  
**CHEMISTRY**  
**PAPER 2**  
**(THEORY)**  
**TIME: 2 HOURS**

## **IKUTHA SUB-COUNTY FORM FOUR JOINT EXAMINATION, 2015**

### **Kenya Certificate of Secondary Education (K.C.S.E)**

233/2  
CHEMISTRY  
PAPER 2  
(THEORY)  
TIME: 2 HOURS

#### **INSTRUCTIONS:**

- Write your name, school and index number in the spaces provided above.
- Sign and write the date of the examination in the spaces provided above.
- Answer **ALL** the questions in the spaces provided.
- Mathematical tables and silent electronic calculators may be used.
- All working must be clearly shown where necessary.

#### **FOR EXAMINER'S USE ONLY**

Question	Maximum score	Candidate's score
1	04	
2	06	
3	16	
4	12	
5	13½	
6	13	
7	15½	
<b>Total score</b>	<b>80</b>	

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

1. The electron arrangement of ions of  $Q^{3+}$  and  $R^{2-}$  are 2.8 and 2.8.8 respectively.

a) Write the electron arrangement of the element.

i) Q (½ mark)

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ii) R (½ mark)

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b) Write the formula of the compound that would be formed between.

i) R and Q (½ mark)

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ii) Q and phosphate ion (½ mark)

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c) State any **two** uses of element;

i) R (1 mark)

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ii) Q (1 mark)

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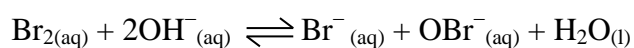


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2. a) When bromine gas reacts with aqueous sodium hydroxide, the equilibrium represented by the equation



(Orange)

is established. What observation would be made if a few drops of sulphuric acid were added to the equilibrium mixture? Explain. (2 marks)

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- b) Calculate the amount of calcium carbonate that would remain if 12g of calcium carbonate were reacted with 0.2 moles of hydrochloric acid. (C = 12, O = 16, Ca = 40) (2 marks)

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- c) Explain why hard water in lead pipes is safe for drinking but soft water in lead pipe is not safe. (2 marks)

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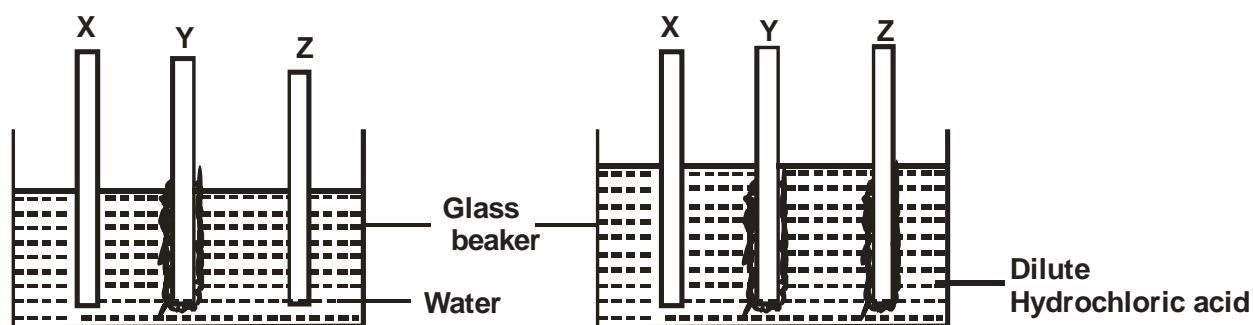


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3. In an experiment, rods of metals X, Y, Z were cleaned with sand paper and placed in a beaker containing water. Another set of rods was also cleaned and placed in a beaker containing dilute hydrochloric acid. After placing the rods in the two liquids, bubbles of a gas were seen around some of the rods as shown in the diagrams below.



- a) Why was it necessary to clean the rods with sand paper before dipping them into the liquids? (1 mark)

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- b) Arrange the three metals in order of their.

- i) Reactivity series in descending order. (1 mark)

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- ii) Electronegativity in ascending order. (1 mark)

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c) Which pair of metal rods if used in a cell will produce:-

i) A lot of e.m.f. (1 mark)

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ii) State the gas produced. (1 mark)

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d) Explain why it is not advisable to use wood ash for cleaning aluminium utensils. (1 mark)

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e) Duralumin is an alloy of aluminium and magnesium. What is the advantage of using duralumin in place of aluminium for manufacture of aeroplane parts? (1 mark)

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f) A compound has an empirical formula  $C_3H_{16}O$  and a relative formula mass of 116.

i) Determine its molecular formula. (H =1, C = 12, O =16) (2 marks)

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ii) Calculate the percentage composition of carbon by mass in the compound. (1 mark)

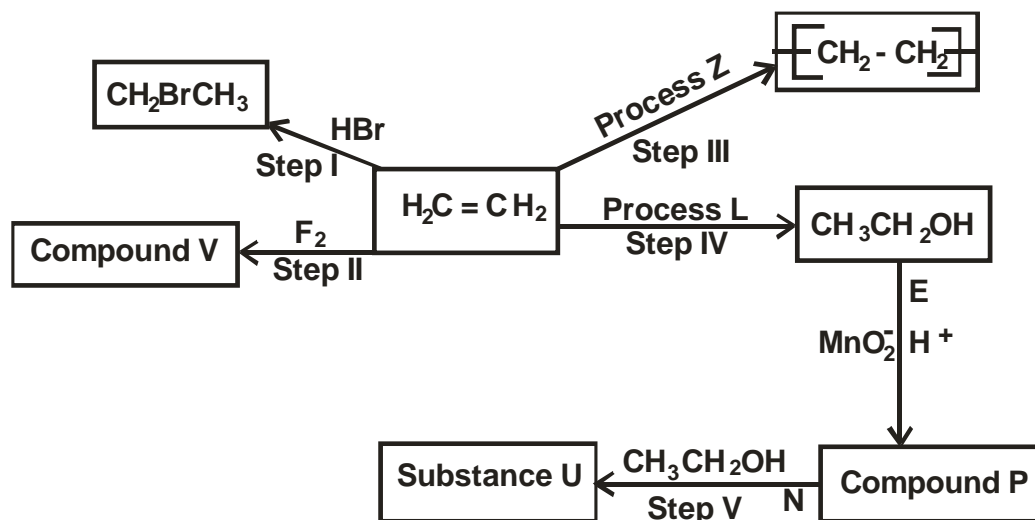
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g) Study the scheme below and answer the questions that follow.



**I.** State the conditions for process in step II. (1 mark)

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**II.** Reaction represented by process.

i) Z (½ mark)

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ii) L (½ mark)

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iii) E (½ mark)

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iv) N (½ mark)

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**III.** Draw and name the structure of the substance.

i) V (1 mark)

ii) P (1 mark)

iii) U

4. a) Explain why the enthalpy of neutralization of ethanoic acid with sodium hydroxide is different from that of hydrochloric acid with sodium hydroxide. (2 marks)

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- b) Explain why calcium hydroxide solution is used to detect the presence of carbon (IV) oxide gas while sodium hydroxide solution is NOT. (1 mark)

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- c) State and explain observations made when a solution of hydrochloric is reacted with products formed when a mixture of iron fillings and sulphur solid are heated. (2 marks)

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- d) During the production of hydrogen iodide, hydrogen gas reacts with iodine as shown by the equation.



- I) Explain how the following would affect the yield of hydrogen iodide.

- i) Increase in temperature. (1 mark)

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- ii) Decrease in pressure. (1 mark)

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II) Determine the molar heat of reaction.

(1 mark)

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III) Draw energy level diagram for the molar heat of reaction for the above reaction. (2 marks)

e) Describe how the following reagents can be used to prepare pure crystals of lead sulphate; solid potassium sulphate, solid lead carbonate, dilute nitric acid and distilled water. (2marks)

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5. The reaction of butane with fluorine gas gave a compound of  $C_4H_9F$ .

a) What condition is useful for the above reaction to occur? (1mark)

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b) Write the chemical equation of the reaction between fluorine and butane gas. (1 mark)

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c) Draw and name any **two** structures of the compound formed. (2 marks)



- d) Explain how a sample of a  $C_3H_8O$  could be distinguished from a sample of  $C_3H_6O_2$  by means of a chemical reaction. (2marks)

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- e) State any **two** uses of substances which belong to a class to which:

- I)  $C_3H_8O$  belong (1 mark)

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- II)  $C_3H_6O_2$  belong (1 mark)

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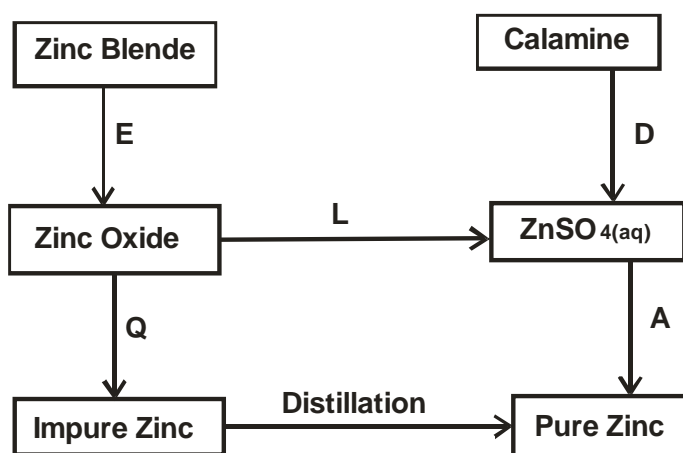


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- f) The flow chart summarizes the extraction of zinc. Study it and answer and answer the questions that follow.



- I) Name the process represented by;

- i) E (1/2 mark)

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- ii) Q (1/2 mark)

- II) Identify the reagents required for the process.

- i) D (1/2 mark)

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- ii) Q (1/2 mark)

- iii) L (1/2 mark)

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III) State **two** uses of zinc metal.

(1 mark)

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IV) Using a diagram explain how pure zinc is obtained by process A.

(2 marks)

6. The grid below represents part of the periodic table. Study it and answer the questions that follow. The letters do not represent the actual symbols of the elements.

				<b>D</b>		<b>G</b>		
	<b>B</b>			<b>E</b>	<b>F</b>		<b>H</b>	<b>J</b>
<b>A</b>	<b>C</b>							
							<b>I</b>	

a) State the elements that can form ions with a charge of -1. Give a reason for your answer. (2 marks)

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b) What type of structure exists in the oxide of A. Give a reason for your answer? (1 mark)

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c) How does the reactivity of I compare with that of H. Explain. (1 mark)

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d) The oxide of D has a low melting point than the oxide of element C. Explain. (1 mark)

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e) With a reason choose the most;

i) Electropositive element (2 marks)

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ii) Electronegative element (2 marks)

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f) Compare the atomic radius of;

i) B and H (1 mark)

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ii) D and E (1 mark)

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g) State and explain the observations made when conc. Nitric (V) acid is added to turnings of copper. (2 marks)

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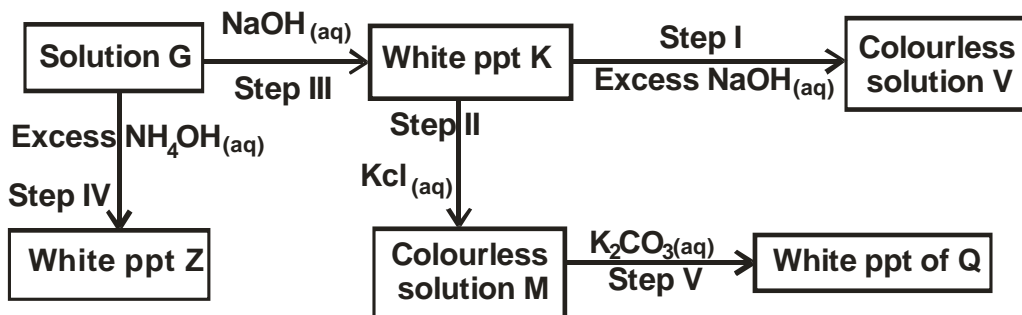


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7. Study the chart below and answer the questions that follow.



a) Write ionic equation for the reaction in;

i) Step IV (1 mark)

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ii) Step III

(1 mark)

iii) Step V

(1 mark)

b) Write equation for the reaction when substance

i) K is heated strongly

(1 mark)

ii) Q is heated strongly

(1 mark)

c) I) Identify the cation present in solution G.

(½ mark)

II) Anion present in substance K.

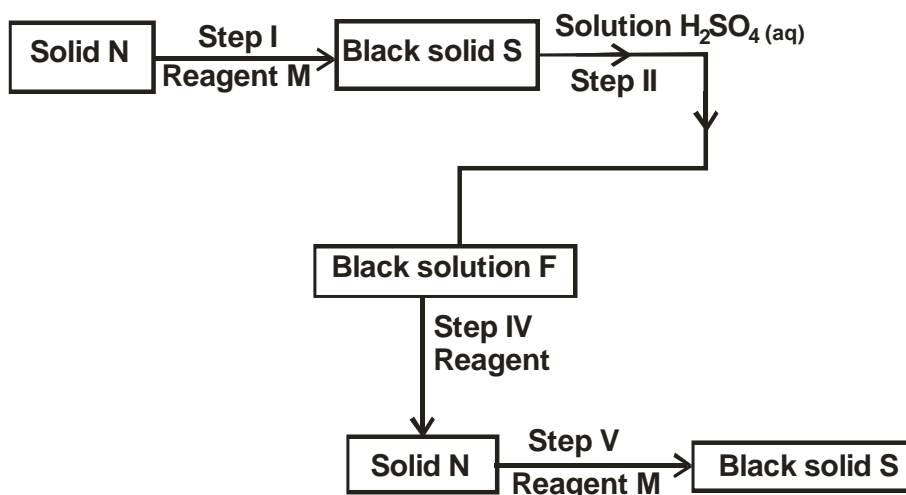
(½ mark)

d) Gas Q takes 100 seconds to diffuse through a porous pot. Gas Q has a relative molecular mass of 34. Determine how long it will take sulphur (IV) oxide gas to diffuse under the same condition?

(S = 32, O = 16,)

(2 marks)

e) Study the flow chart below and use it to answer the questions that follow.



**I) Name substances;**

i) Solid N (1 mark)

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ii) Solid S (1 mark)

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iii) Reagent M (1 mark)

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iv) Solution F ( $\frac{1}{2}$  mark)

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**II) State the condition necessary for step I to occur.** (1 mark)

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**III) State the appropriate and possible substance to be used in step IV.** (1 mark)

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**IV) State any **two** uses of substance.**

i) N (1 mark)

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ii) M (1 mark)

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