

Name:

Index No:

School:

Candidate's Signature.....

Date:

233/2

CHEMISTRY

Paper 2

July/August 2014

Time: 2 Hours

TRANS-MARA WEST ASSESSMENT TEST (TWAT)

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

CHEMISTRY

Paper 2

July/August 2014

Time: 2 Hours

INSTRUCTIONS TO CANDIDATES:

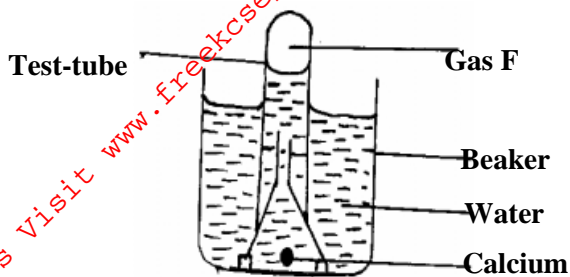
- Write your **name, index number and school** in the spaces provided above
- **Sign and write** the date of examination in the spaces above
- Answer **ALL** the questions in the spaces provided in the question paper
- **Mathematical tables and silent electronic calculators may be used**
- **All working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

FOR EXAMINER'S USE ONLY

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1	10	
2	12	
3	13	
4	11	
5	11	
6	12	
7	11	
TOTAL SCORE	80	

This paper consists of 8 printed pages. Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing

1. (a) The set-up below was used to collect gas F, produced by the reaction between water and calcium.



(i) Name gas F. (1mk)

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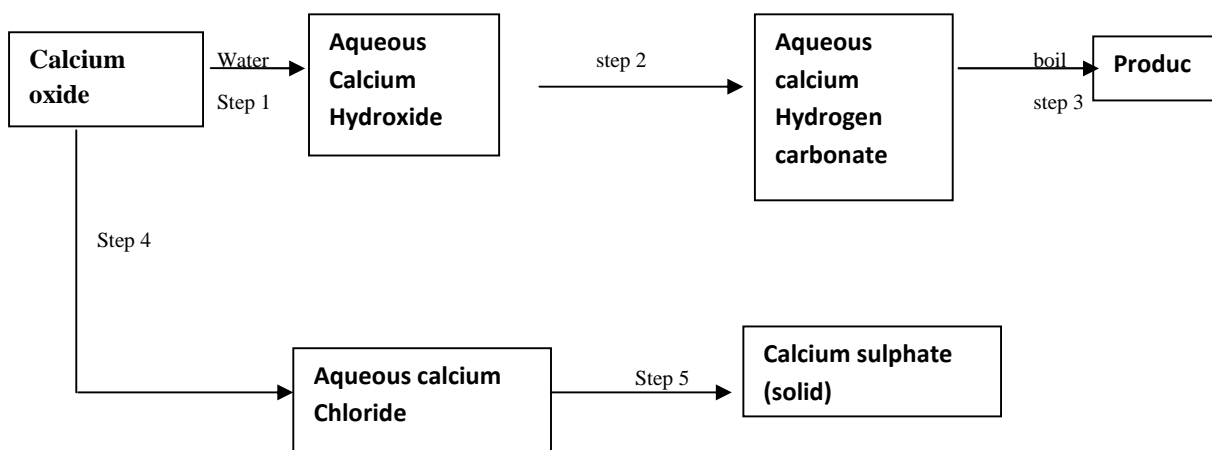
(ii) At the end of the experiment, the solution in the beaker was found to be a weak base. Explain. (1mk)

.....

(iii) Give **one** laboratory use of the solution formed in the beaker. (1mk)

.....

(b) Study the reaction below and answer the questions that follow.



(i) Name the reagent used in steps 2 and 4. (2mks)

Step 1

.....

Step 4

.....

(ii) Write an equation for the reaction in step 3. (1mk)

.....

.....

(iii) Describe how a solid sample of anhydrous calcium sulphate is obtained in step 5. (3mks)

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.....
.....
.....

(iv) Give **one** industrial use of calcium sulphate. (1mk)

.....
.....

2. The following table gives information on four elements by letters **W**, **X**, **Y** and **Z**.

(a) Study it and answer the questions that follow. The letters are not the actual symbols of the elements.

Element	Electron Arrangement	Atomic radius (mm)	Ionic radius (mm)
W	2.8.2	0.136	0.065
X	2.8.7	0.099	0.181
Y	2.8.8.1	0.203	0.133
Z	2.8.8.2	0.174	0.099

(i) Which **two** elements have similar properties? Explain. (2mks)

.....
.....

(ii) What is the most likely formula of the oxide of **X**. (1mk)

.....
.....

(iii) Which element is a non-metal? Explain. (2mks)

.....
.....

(iv) Explain the difference in the atomic radii of **Y** and **Z**. (1mk)

.....
.....

(b) Sodium hydroxide pellets were accidentally mixed with sodium chloride. 17.6g of the mixture were dissolved in water to make one litre of solution. 100cm³ of the solution was neutralized by 40cm³ of 0.5M sulphuric (VI) acid.

(i) Write an equation for the reaction that took place. (1mk)

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.....

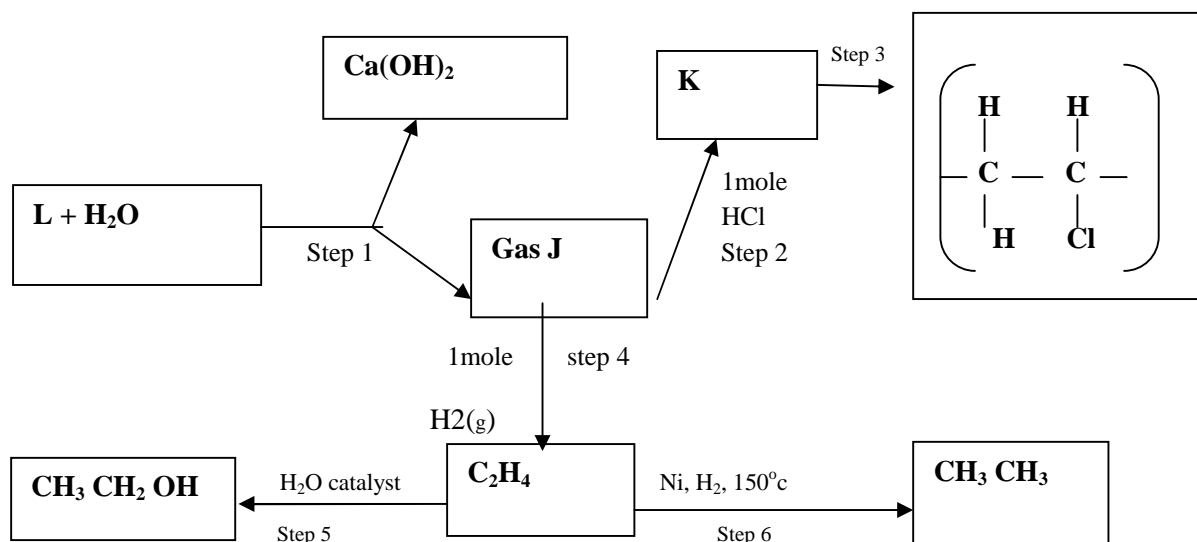
(ii) Calculate:

I. Number of moles of the substance that reacted with sulphuric (VI) acid.

II. Number of moles of the substance that would react with sulphuric (VI) acid in one litre of solution. (1mk)

III. Mass of the unreacted substance in one litre of solution. (H=1, Na=23, Cl=35.5, O=16). (2mks)

3. Study the flow chart below and answer the questions that follow:



(a) (i) Identify reagent **L**. (1mk)

.....

(ii) Name the catalyst used in step 5. (5mks)

.....

(iii) Draw the structural formula of gas **J**. (1mk)

(v) Name the process in: (3mks)

Step 3.....

Step 5.....

Step 6.....

(vi) State **one** commercial application of the process which takes place in step 6. (1mk)

(vii) Write equations for the reaction in

Step 2 (1mk)

Step 4 (1mk)

(b) The lists below are for organic compounds. Use it to answer the questions that follow:

K1 CH₃CH₂CH₂OH

K2 CH₃ CH₂ CH₃

K3 CH₃ CH₂ CH₂ C(=O)OH

K4 CH₃ CH₂ CH₂ CH=CH₂

K5 CH₃ CH₂ CH₂ CH₃

(i) Select **two** compounds which

I. Are not hydrocarbons. (1mk)

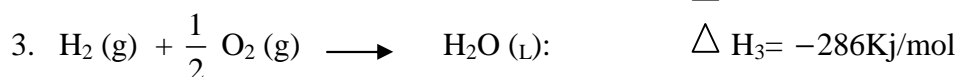
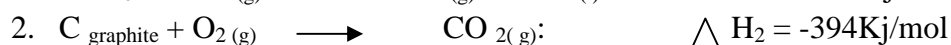
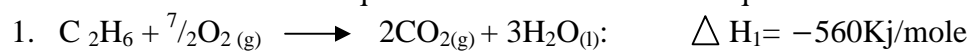
II. Belong to the same homologous series. (1mk)

(ii) Identify the compound that is likely to undergo polymerization. (1mk)

(iii) Write an equation for the reaction between K3 and potassium metal. (1mk)

4. (a) Define the standard enthalpy of formation of a substance. (1mk)

(b) Use the thermo chemical equations below to answer the questions that follow:



(i) Name **two** types of heat changes represented by ΔH_3 . (2mks)

.....
.....

(ii) Draw an energy level diagram for the reaction represented by equation 1. (2mks)

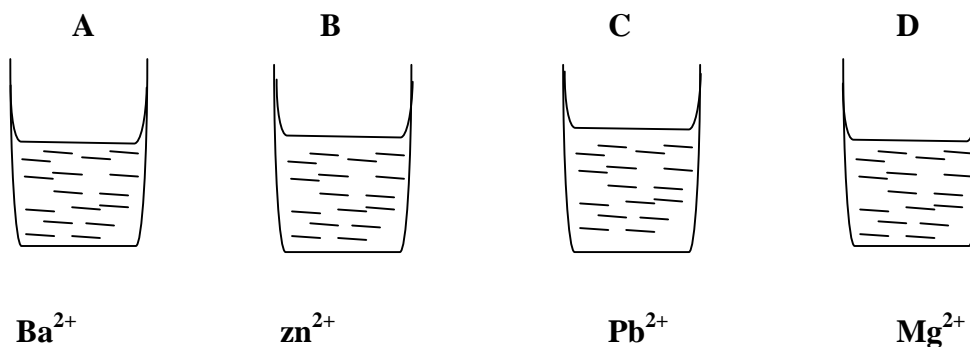
(iii) Calculate the standard enthalpy of formation of ethane. (2mks)

(c) When a sample of ethane was burnt, the heat provided raised the temperature of 500cm^3 of water by 21.5k (specific heat capacity of water = 4.2kJ/kg/k and density of water = 1g/cm^3)
Calculate the:-

(i) Heat change for the reaction. (2mks)

(ii) Mass of ethane burnt (RFM of ethane = 30). (2mks)

5. 1cm^3 of dilute sulphuric (VI) acid was added to four test tubes containing cation as shown below.



(a) (i) In which **two** test tubes was a white precipitate formed. (2mks)

.....
.....

(ii) Write the ionic equation for the formation of the precipitates formed. (2mks)

.....
.....

(b) When a few drops of soap solution are added into the contents of test tube D, a white substance is formed on the sides of the test tube.

(i) Name the white substance. (1mk)

.....

- (ii) Three samples of water were collected from three districts labeled A, B, and C. Some soap solution was added to equal volumes of each water sample and the soap volumes required to form lather before and after boiling the samples were as recorded in the table below.

Sample of water from district	A	B	C
Volume of soap solution before boiling	20	5	11
Volume of soap solution after boiling	20	5	5

- (a) From which district is the water sample likely to be soft? Explain. (2mks)

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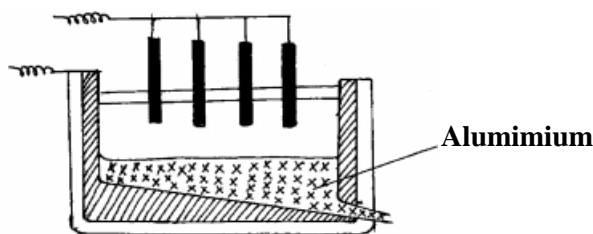
- (b) Which district has temporary hard water? Explain. (2mks)

.....

- (c) Give **two** other methods other than boiling that can be used to remove hardness in water. (2mks)

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6. The extraction of aluminium from its ore takes place in two stages, purification stage and electrolysis stage. The diagram below shows the set up for the electrolysis stage.



- (a) (i) Name the ore from which aluminium is extracted. (1mk)

.....

- (ii) Name the impurity which is removed at the purification stage. (1mk)

.....

- (b) (i) Label on the diagram each of the following:- (1mk)
 Anode (1mk)
 Cathode (1mk)
 Region containing electrolyte. (1mk)

- (ii) The melting point of aluminium oxide is 2054°C , but electrolysis is carried out between 800°C - 900°C .

I. Why is electrolysis not carried out at 2054°C. (1mk)

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II. What is done to lower the temperature? (1mk)

.....

(ii) Give **two** properties that makes aluminium be collected as shown in the diagram. (2mks)

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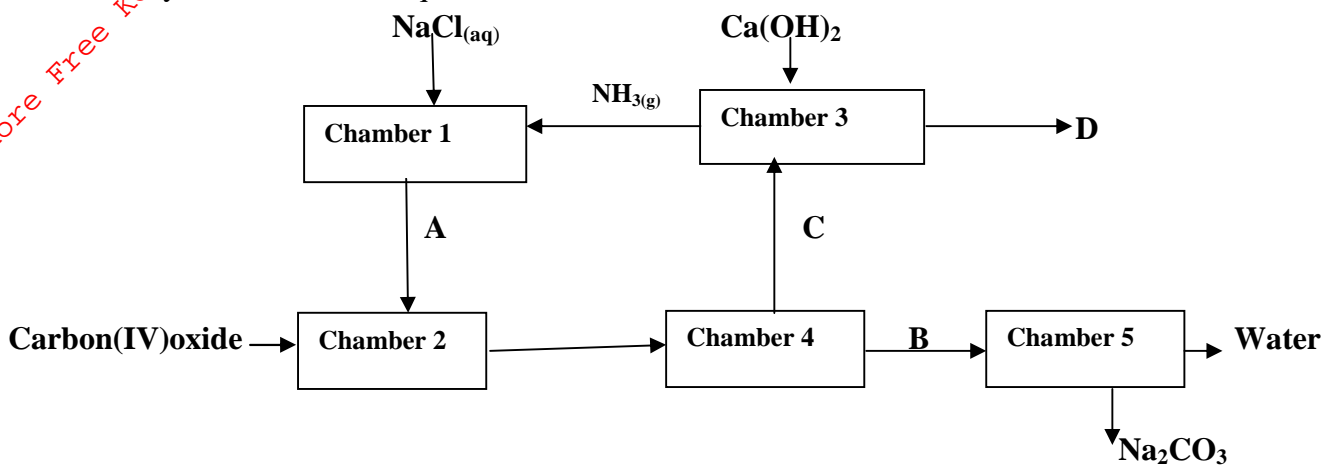
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(c) A typical electrolysis cell uses a current of 40,000 amperes. Calculate the mass in kg of aluminium produced in one hour. (3mks)

IF=96500c, Al=27

7. The flow chart below shows industrial manufacture of sodium carbonate.

Study it and answer the questions that follow.



(a) Name substances **A, B, C** and **D**. (4mks)

A

B

C

D

(b) Write equation for the reactions taking place in chamber 3 and 5. (2mk)

Chamber 3

.....

Chamber 5

.....

(c) Name the physical process in chamber 4 and 5. (2mks)

Chamber 4

.....

Chamber 5

.....

(d) Name **one** source of cheap carbon (IV) oxide for Solvay process. (1mk)

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(e) Briefly explain how sodium chloride required for this process is obtained from sea water. (2mks)

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