

NameADM No:.....Target.....

233/2

CHEMISTRY

PAPER 2

FORM THREE

(THEORY)

2 Hours

Candidate's Signature.....

Date.....

MUSALI SECONDARY SCHOOL END OF YEAR EXAM

Kenya Certificate of Secondary Education

CHEMISTRY

Paper 2

(THEORY)

2 Hours

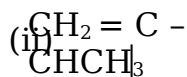
Instruction to candidates.

- a) Write your name and admission number in the spaces provided above .
- b) Sign and write the date of the examination in the spaces provided above.
- c) Answer **ALL** the questions in the spaces provided.
- d) All questions must be answered in **English**.
- e) Mathematical tables and silent electronic calculators may be used.
- f) All working **MUST** be clearly shown where necessary.
- g) This paper consists of 7 printed pages.**
- h) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**

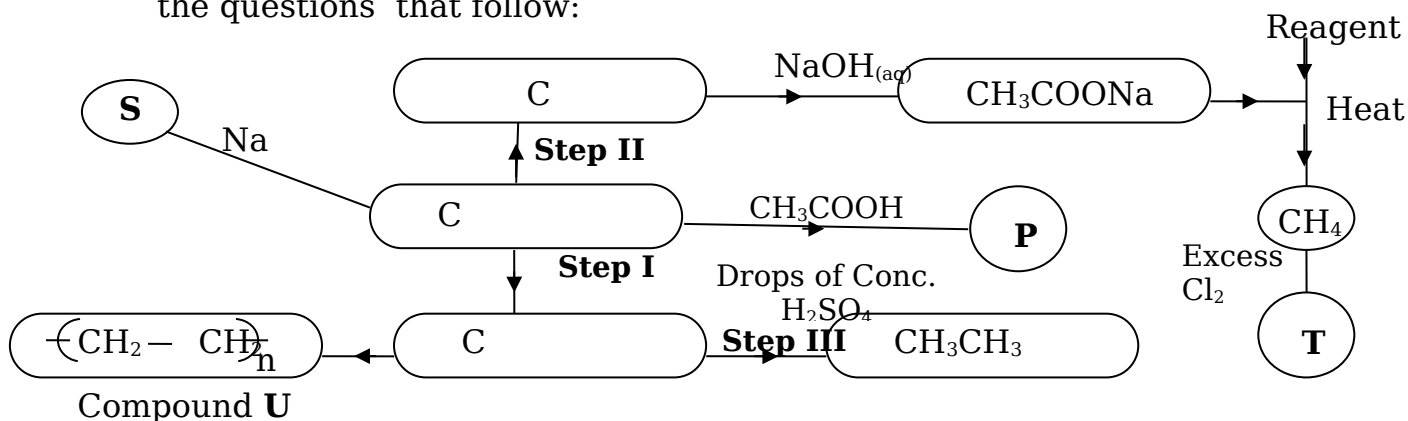
For Examiner's use only

Question	Maximum score	Candidate's score
1	11	
2	12	
3	13	
4	12	
5	11	
6	13	
7	08	
Total score	80	

1. (a) Give the IUPAC names of the following compounds:(1 marks)



(b) The structure below shows some reactions starting with ethanol. Study it and answer the questions that follow:



(i) Write the formula of the organic compounds **P** and **S** (1 marks)

*

(ii) Name the type of reaction, the reagent(s) and condition for the reactions in the following steps

(I) Step I(1 mk)

(II) Step II.....(1 mk)

(III) Step III.....(1 mk)

(iii) Name reagent **R**(1 mk)

(iv) Draw the structural formula of **T** and give its name (1 mk)

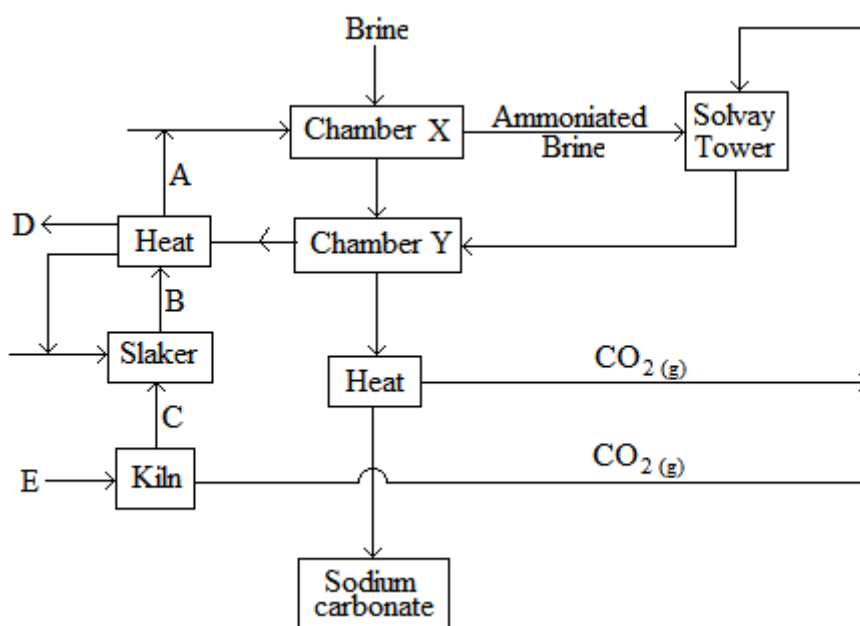
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(v) (I) Name compound **U**.....(**1 mk**)

(II) If the relative molecular mass of **U** is 42000, determine the value of n ($\text{C}=12$, $\text{H}=1$)(2 mk)

(c) State why C_2H_4 burns with a more smoky flame than C_2H_6 (1 mk)

2 The flow chart below represents the main steps in the manufacture of sodium carbonate.



(a) Name the substances labelled A, B, C, and D
(2mks)

A

B

C

D

b) Identify substance E and write a chemical equation for the reaction occurring in the kiln.

(2mks)

c) Cold water is made to circulate around X. What does this suggest about the reaction between A and brine?

(1mk)

d) What process takes place in the chamber Y?

(1mk)

(i) Name two by - products that are recycled in this process.

(1mk)

(ii) Why is recycling important?

(1mk)

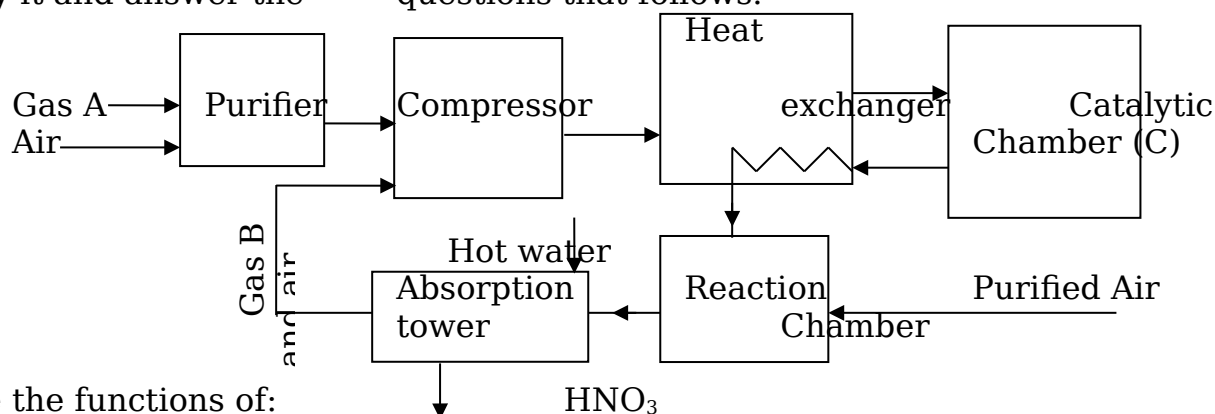
e) Write the equation for the reaction that takes place in the upper part of the Solvay tower.

(1mk)

f) Assuming that there was no recycling in the process, two moles of ammonia would be required for producing one mole of anhydrous sodium carbonate. Calculate the volume of ammonia at s.t.p that would be used to produce 10.6 kg of sodium carbonate by a factory operating at 80% efficiency. (C= 12, O = 16, H= 1, Na = 23, N = 14, 1mole of gas occupies 22.4dm³ at s.t.p.) (2mks)

g) Explain the effect of increased carbon (IV) oxide on the environment.
(1mk)

3 The flow chart below shows how nitric (v) acid is produced on a large scale. Study it and answer the questions that follows.



State the functions of:

(i) Purifier

(1mk)

(ii) Heat exchanger
(1mk)

Identify

(i) gas A

(1 mk)

(ii) gas B

(1 mk)

(iii) Catalyst C

(1 mk)

Write equations for the reaction that take place.

(i) in catalytic chamber.
(1mk)

(ii) in absorption tower.
(1mk)

d) Calculate the molarity of the commercial nitric (v) acid, given that it is 68% pure and has a density of 1.42g/cm^3 . (N=14, H=1, O=16)
(2mks)

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

F				P			G	N	I
	Q			J	K		L	M	
N		X - Z							

(a) What type of bond would you expect in the compound formed between **H** and **F**. Explain(2 mks)

(b)(i) Which of the elements **J** and **M** will have a greater ionic radius? Explain(2 mks)

(ii) Elements **F** and **N** are in the same group of periodic table. How do their atomic radius compare? Explain(2 mks)

(c) An element **W** has atomic number **15**. Indicate the position it would occupy in the table above(1mk)

(d) What is the name given to elements **X - Z**?.....(1mk)

(e) Why is **J** used in electric cables where **Q** is not(1mk)

(f) **P** and **J** are termed as metalloids. What does the term metalloid mean? (1 mk)

(g) How would you expect the reactivity of **H** and **M** to compare? Explain(2 mks)

5. In the preparation of magnesium carbonate, magnesium was burnt in air and the product

collected. Dilute sulphuric acid was then added and the mixture filtered and cooled. Sodium carbonate was added to the filtrate and the contents filtered. The residue was then washed and dried to give a white powder.

(a) Give the name of the product(1 mk)

(b) Write the chemical equation for the formation of the product (1 mk)

(c) (i) Name the filtrate collected after sodium carbonate was added.(1 mk)

(ii) Write down the chemical formula of the white powder (1 mk)

(d) Write a chemical equation for the reaction between product in **(a)** and the acid(1 mk)

(e) Write an ionic equation to show the formation of the white powder.(1 mk)

(f) Write an equation to show what happens when the white powder is strongly heated.(1 mk)

(g) Identify the ions present in the filtrate after addition of sodium carbonate. (1 mk)

(h) What is the name given to the reaction that takes place when sodium carbonate was added to the filtrate? (1 mk)

(i) Explain the observations made when crystals of sodium carbonate decahydrate are left exposed to the atmosphere for two days(2 mks)

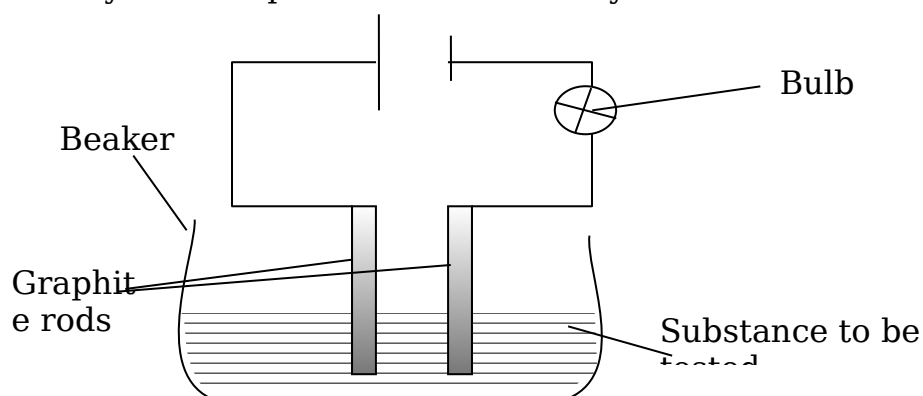
6.(a) Differentiate between:

i) Electrolyte and non-electrolyte (2 mks)

ii) a conductor and non conductor (2 mks)

(b) The diagram below is a set-up used to investigate the conductivity of electric current

by some aqueous solution. Study it and answer the questions that follow;



(i) State and explain the observation made on the bulb when each of the following solution were put onto the beaker

(a) Sugar solution (2 mks)

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

(b) (i) Salt solution (2 mks)

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

(c) If in the above set-up of apparatus, the substance to be tested is Lead II Bromide,

what modification should be included in the set-up? (1 mk)

(d) Using ionic equations, state and explain the observations made at:-

i) Anode (2 mks)

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

ii) cathode (2mks)

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

7. a). A hydrated salt has the following composition by mass. Iron 20.2 %, oxygen 23.0%,

sulphur 11.5%, water 45.3%

i) Determine the formula of the hydrated salt (Fe=56, S=32, O=16, H=11)(2 mks)

ii) 6.95g of the hydrated salt in **c(i)** above were dissolved in distilled water and the total volume made to 250cm³ of solution. Calculate the concentration of the resulting salt solution

in moles per litre. (Given that the molecular mass of the salt is 278)(2 mks)

(b)i). State the Graham's law (1 mk)

(ii) 100cm³ of Carbon (IV) oxide gas diffused through a porous partition in 30seconds.

How long would it take 150cm³ of Nitrogen (IV) oxide to diffuse through the same

partition under the same conditions? (C = 12.0, N = 14.0, O = 16.0)(3 mks)