KAPSABET HIGH SCHOOL

233/3 –

CHEMISTRY
(PRACTICAL)

2½hoS

Name …… Index Number ……...

Class ……..... Candidates Signature…….

Date ……

INSTRUCTIONS TO THE CANDIDATES:-

a) Write your name and index number in the spaces provided above.
b) Answer ALL the questions in the spaces provided in the question paper
c) You are NOT allowed to start working with the apparatus for the first 15 minutes of the 2 ¼ hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus that you may need.
d) Mathematical tables and silent electronic calculators may be used
e) All workings MUST be clearly shown where necessary.

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1	22	
2. PART (I).	10	
3. PART (II).	08	
TOTAL SCORE	40	

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

1. You are provided with;

- A dibasic acid labeled solution **A**

- Solution **B** containing 5.56g per litre of potassium carbonate

- Aqueous sodium hydroxide labeled solution **C**

You are required to determine the:

- Concentration of solution **A** in moles per litre

- Molar heat of neutralization of solution **C** with sodium hydroxide labeled solution C

A Procedure I

Using a pipette filler, place 25cm^3 of solution **A** into a 250ml volumetric flask. Add water to make 250cm^3 of solution label this solution **D**. Place solution **D** in a burette. Clean the pipette and use it to place 25.0cm^3 of solution **B** into a conical flask. Add2 drops of methyl orange indicator provided and titrate with solution **D**. Record your results in table 1. Repeat the titration two more times and complete the table.

Table 1

	I	II	III
Final burette reading			
Initial burette reading			
Volume of solution **D** used (cm^3)			

(**4mks**)

Calculate the:

i) Average volume of solution **D** used

(**1mk**)

……

ii) Concentration of potassium carbonate in solution **B** (K = 39.0, O = 16.0, C = 12.0)

(**1mk**)

……

……

iii) Concentration of dibasic acid in solution **D**

(**2mks**)

……

……

……

……

iv) Concentration of dibasic acid in solution **A**

(**1mk**)

……

……

B. Procedure II

Clean the burette and fill it with solution **C**. Clean the pipette and use it to place 25.0cm^3 of solution **A** into a 100cm^{3}plastic beaker. Measure the initial temperature of this solution and record it in table 2.

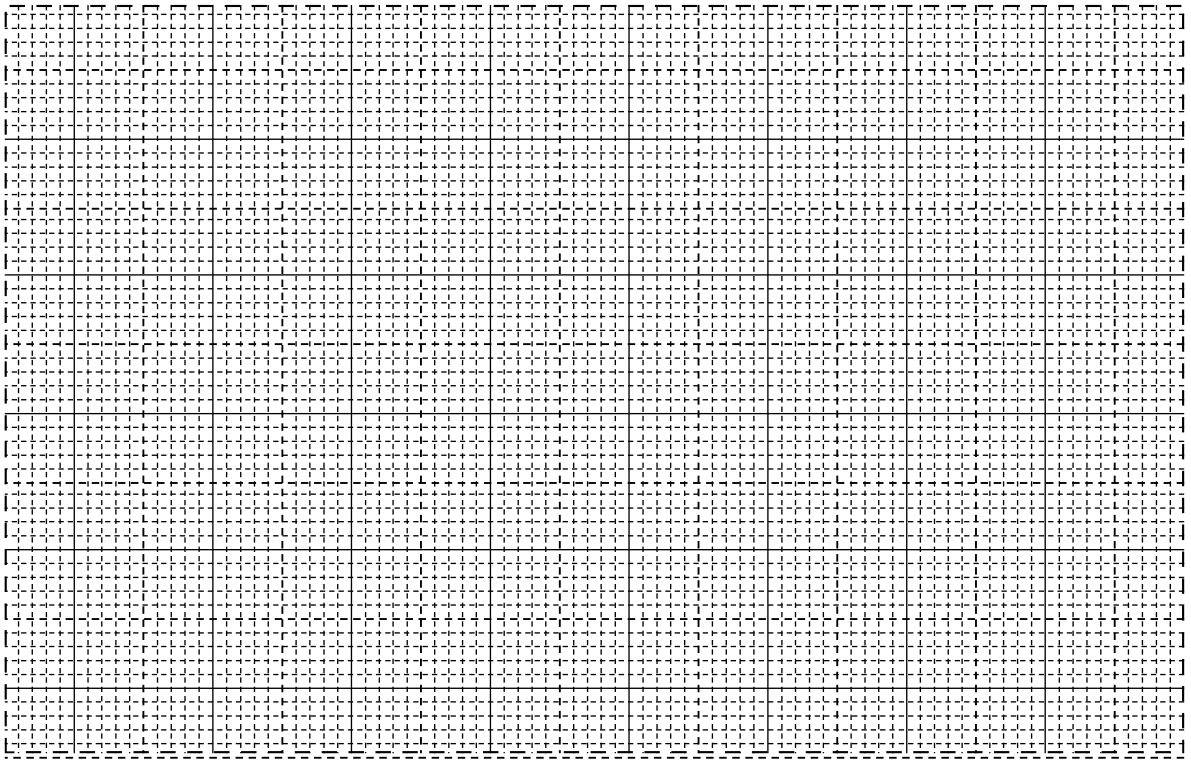
From the burette, place 5cm^3 of solution **C** into the beaker containing 25.0cm^3 of solution **A**, stir the mixture carefully and record the highest temperature of the mixture in table 2. Place another 5cm^3 of solution **C** into the mixture in the beaker, stir carefully and record the highest temperature of this mixture in table 2. Continue this procedure of placing 5cm^3 portions of solution **C** and complete table 2

Table 2

Total volume of solution **C** added (cm^3)	0	5	10	15	20	25	30
Volume of solution **A** (cm^3)	25	25	25	25	25	25	25
Temperature (^0C)							

(**3mks**)

i) On the grid provided, draw a graph of temperature (vertical axes) against volume of solution **C** used. (**3mks**)



ii) From the graph, determine

I The highest temperature change, ΔT

(**1mk**)

……

……

II The volume of solution **C** required to react with $25cm^3$ of solution **A**.

(**1mk**)

……

……

iii) Calculate the

I The number of moles of solution **A** used (**1mk**)

II Molar heat of neutralization of **A** with sodium hydroxide solution labeled **C** (Assume the specific heat capacity of the solution is $4.2Jg^{-1}K^{-1}$ and density of solution is $1.0g\ cm^{-3}$)

(**2mks**

Question 3. PART(I).

You are provided with solid **G** and **H**. Carry out the tests and record your observation and inferences in spaces provided.

(**a**) Place all solid **G** in a clean boiling tube. Add about $10cm^3$ of distilled water and shake well.

Observations	**Inferences**
(**1mk**)	(**1mk**)

Divide the solution into 4 portions.

(**i**) To the first portion add 2-3 drops of sodium hydroxide until in excess. (**ii**) To

Observations	**Inferences**
(1mk)	**(1mk)**

the second portion add 2-3 drops of aqueous ammonia until excess. (**iii**) To the third

Observations	**Inferences**
(1mk)	**(1mk)**

portion add 3 drops of dilute hydrochloric acid,.

Observations	**Inferences**
(1mks)	**(1mks)**

(**iv**) To the fourth portion, add 3 drops of Lead (ii) nitrate solution followed by dilute nitrate followedby dilute nitric acid.

Observations	Inferences
(1mk)	(1mk)

Question 3. PART (II).

You are provided with solid **H**. Carry out the tests below. Record your observations and inferences in the spaces provided.

a) Place a half of solid **H** in a clean metallic spatula and ignite it on Bunsen burner flame.

Observations	Inferences
(1mk)	(1mks)

b) Put the remaining portion of solid **H** in aboiling tube and add about $12cm^3$ of distilledwater. Shake to dissolve.

i)To about $2cm^3$ of solution J in a test tube add 2 to 3 drops of bromine water.

Observations	Inferences
(1mk)	(1mks)

ii) To about $2cm^3$ of solution **H** in a test tube, add about $1cm^3$ of acidified Potassium dichromate (IV). Warm gently and allow it to stand for a minute.

Observation	Inference
(**1mk**)	(**1mks**)

iii) To about $2cm^3$ of solution **H** in a test tube, add a small amount of solid Sodium hydrogen carbonate.

Observation	Inference
(**1mk**)	(**1mks**)