Candidate's Name: .....

Signature:.....

Random No.						Personal No.		

(Do not write your School Name or Number anywhere on this booklet.)

545/3
CHEMISTRY
(PRACTICAL)
Paper 3
Jul./Aug. 2023
2 hours

WAKISO-KAMPALA TEACHERS' ASSOCIATION (WAKATA)

WAKATA MOCK EXAMINATIONS 2023

Uganda Certificate of Education

CHEMISTRY

Paper 3

2 hours

INSTRUCTIONS TO CANDIDATES:

Answer **both** *questions. Answers are to be written in the spaces provided in this booklet.*

All your work **must** *be in* **blue** *ink or* **black** *ink. Any work done in* **pencil** will **not** *be* **marked** *except drawings.*

You are **not** *allowed to use any reference books. (i.e. text books, booklets on qualitative analysis etc.).*

All working must be clearly shown.

Mathematical tables and silent non – programmable calculators may be used.

For Examiners' Use Only		
Q. 1		
Q. 2		
Total		

1. You are provided with the following:

BA1, which is a 0.5M solution of an acid.

BA2, which is a 1.0M solution of an alkaline compound.

You are required to determine the concentration of hydrogen ion, H^+ in **BA1.**

Procedure

(a) Wrap a 250cm^3 plastic beaker with an aluminum foil properly to ensure good insulation.

(b) Use a burette to transfer 40.00cm^3 of **BA1** into the insulated plastic beaker. Measure the temperature of **BA1** and record the value in table **1**.

(c) Use a measuring cylinder to transfer 10cm^3 of **BA2** into the insulated plastic beaker. Use the thermometer to stir the mixture and measure the temperature throughout the reaction. Record the highest temperature reached in table **1**.

(d) Empty the insulated plastic beaker and rinse it with water.

(e) Repeat procedure (a) to (d) but with different volumes of **BA1** and **BA2** as given in the table **1** and complete the table.

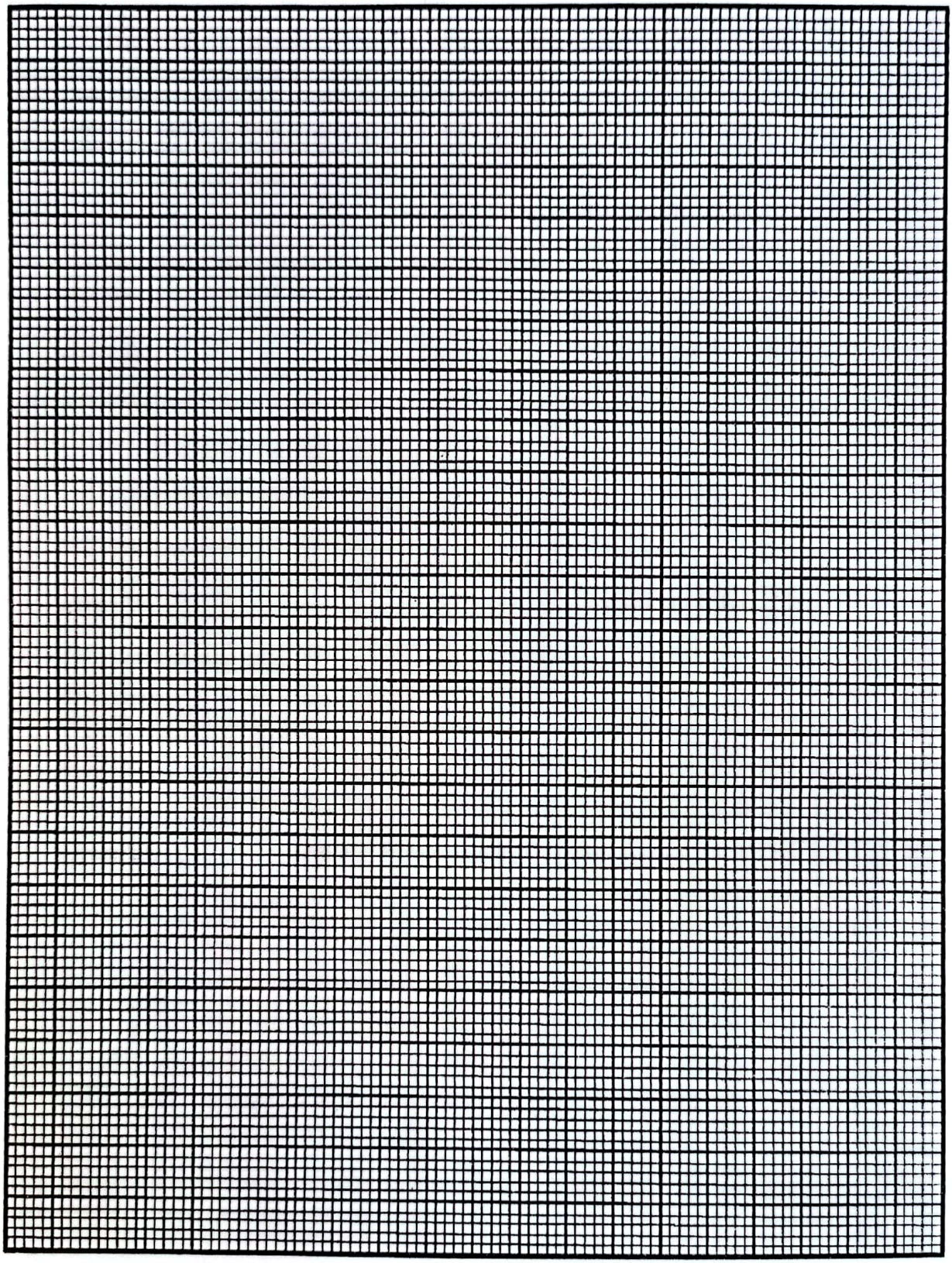
Table 1

Experiment Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Volume of **BA1**(cm^3)	40.00	35.00	30.00	25.00	20.00	15.00	10.00
Volume of **BA2**(cm^3)	10	15	20	25	30	35	40
Initial temperature of **BA1** (°C)							
Maximum temperature of mixture (°C)							
Temperature increase (°C)							

(08 marks)

Questions.

(a) Plot a graph of temperature increase against volume of **BA2.** Use these points to draw and extrapolate two intersecting straight lines of best fit *(05 marks)*



(b) From your graph, read and record the volume of **BA2** where the two lines intersect. *(01 mark)*

.....

(c) Calculate the volume of **BA1** required to neutralize the volume of **BA2** in (a) above. *(02 marks)*

.....

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.....

.....

(d) Write the equation of reaction between **BA1** and **BA2.** *(1½ marks)*

.....

.....

(e) Calculate the number of moles of;

(i) OH^- in **BA2** that reacted. *(02 marks)*

.....

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.....

(ii) H^+ in **BA1** that reacted. *(02 marks)*

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(f) (i) Determine the concentration of hydrogen ions, H^+ in **BA1**. *(02 marks)*

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(ii) Suggest the identity of the strong acid in **BA1** and explain your answer. *(1½ marks)*

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2. You are provided with substance **F**, which contains **two** cations and **two** anions. Carry out the following tests in table **2** to identify the cations and the anion in **F**. Identify any gas(es) evolved.

Record your observations and deductions in the table **2**. *(25 marks)*

Table 2

TESTS	OBSERVATIONS	DEDUCTIONS
(a) Heat a spatula end-ful of **F** strongly in a dry test tube.		
(b) To **two** spatula end-fuls of **F**, add distilled water drop wise and stir until **F** dissolves. Filter and keep both the filtrate and residue.		
(c) Divide the filtrate into **three** parts of about $2cm^3$ each. (i) To the **first** part of the filtrate, add dilute sodium hydroxide solution drop-wise until in excess.		
(ii) To the **second** part of the filtrate, add dilute ammonia solution drop-wise until in excess.		

TESTS	OBSERVATIONS	DEDUCTIONS
(iii) To the **third** part of the filtrate, add 4–5 drops of dilute nitric acid followed by 3–4 drops of silver nitrate solution.		
(d) Put all the residue into a clean test–tube and dissolve it in dilute nitric acid. Divide the resultant solution into two parts and test as follows: (i) To the **first** part, add dilute sodium hydroxide solution drop-wise until in excess.		
(ii) To the **second** part, add dilute ammonia solution drop-wise until in excess.		

(e) (i) The cations in **F** are.....and.....

(ii) The anion in **F** is .....

END