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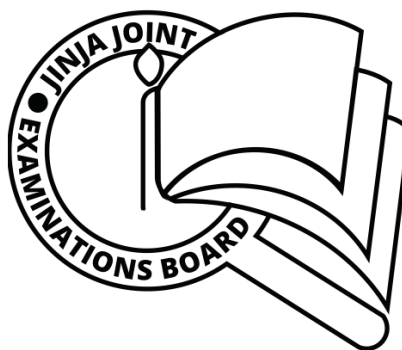
CHEMISTRY

PRACTICAL

Paper 3

AUGUST, 2022

2 hours



JINJA JOINT EXAMINATIONS BOARD

*Uganda Certificate of Education*

MOCK EXAMINATIONS – AUGUST, 2022

CHEMISTRY

PRACTICAL

Paper 3

2 hours

**INSTRUCTIONS TO CANDIDATES:**

- Answer **All** questions.
- Answers are to be written in the spaces provided.
- You are not allowed to use any reference books.
- All working must be clearly shown.
- Mathematical tables, slide rules and non-programmable silent electronic calculators may be used.
- [H=1, O=16]

**For Examiner's use only**

Q1	Q2	TOTAL

1. You are provided with the following:

**S**, which is a solution of a base.

**T**, which is a solution of an acid.

You are required to determine;

- (i) the molarity of the acid.
- (ii) the molar heat of reaction between the acid and the base.

### PROCEDURE

(a) Using a measuring cylinder, measure 120cm<sup>3</sup> of **S** and transfer it into a 250cm<sup>3</sup> beaker. Add 60cm<sup>3</sup> of distilled water, mix and label it **BA1**.

(b) Transfer 100.0cm<sup>3</sup> of **T** into another 250cm<sup>3</sup> beaker using a measuring cylinder. Add 100cm<sup>3</sup> of distilled water, mix and label **BA2**.

(c) Measure and record the initial temperature of **BA1**.

(d) Run 20.00cm<sup>3</sup> of **BA1** from a burette into a dry plastic beaker.

(e) Using a measuring cylinder, transfer at once 5.0cm<sup>3</sup> of **BA2** into the plastic beaker containing **BA1**. Stir with the thermometer and record the highest temperature attained by the mixture.

(f) Repeat procedures (d) and (e) using 10.0, 15.0, 20.0, 25.0, 30.0, 35.0 and 40.0cm<sup>3</sup> of **BA2**.

(g) Record your results in the table below.

Initial temperature of **BA1** ..... °C (01 mark)

Table

Volume of <b>BA2</b> used (cm <sup>3</sup> )	5.0	10.0	15.0	20.0	25.0	30.0	35.0
Highest temperature attained by the mixture (°)							

(07 marks)

(a) Plot a graph of highest temperature attained by the mixture against volume of **BA2** used. (7½ marks)

From the graph, determine;

**Turn over**

- (i) the volume of **BA2** required to neutralize 20.0cm<sup>3</sup> of **BA1**. (½ mark)

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- (ii) the maximum temperature change for the reaction. (01 mark)

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- (b) Calculate the molarity of **BA2** (1 mole of base reacts with 1 mole of acid;  
Molarity of **BA1** = 1.0 moles per litre). (3½ marks)

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- (c) Determine the;

- (i) maximum heat evolved during the reaction. (*Specific heat capacity of the mixture = 4.2Jg<sup>-1</sup>K<sup>-1</sup>, density of mixture = 1 gcm<sup>-3</sup>*). (2½ marks)

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- (ii) molar heat of reaction between the acid and the base. (02 marks)

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2. You are provided with substance **P**, which contains **two** cations and **one** anion. Carry out the following tests on **P** and identify the cations and anions in it. Identify the gas(es) evolved.

Record your observations and deductions in the table below.

	TEST	OBSERVATIONS	DEDUCTIONS
(a)	Heat strongly one spatula end-ful of <b>P</b> in a hard glass tube until there is no change.		
(b)	To three spatula end-fuls of <b>p</b> , add dilute nitric acid a little at a time until there is no further change. Warm if necessary to dissolve.		
(c)	To the acidic solution in (b), add dilute sodium hydroxide solution drop wise until in excess. Filter and keep the filtrate and residue.		
(d)	To the filtrate in (c), add dilute nitric acid until the solution is just acidic. Divide the acidic solution into three parts.		
i.	To the first part of the acidic solution, add sodium hydroxide solution drop wise until in excess.		

Turn over

ii.	To the second part of the acidic solution, add aqueous ammonia solution drop wise until in excess.		
iii.	To the third part of the acidic solution, add 3 – 4 drops of potassium iodine solution.		
(e)	Wash the residue with sodium hydroxide solution. Then transfer the residue in a test tube and add about 3cm <sup>3</sup> of dilute nitric acid. Divide the acidic solution into three parts.		
i.	To the first part of the solution add sodium hydroxide solution drop wise until in excess.		
ii.	To the second part of the solution, add ammonia solution drop wise until in excess.		
iii.	To the third part of the solution, add sodium carbonate solution until there is no further change.		

(f) Identify the:

(i) Cations in **P** .....

(ii) Anion in **P** .....

**END**