29.6.3 Chemistry Paper 3 (233/3)

1 You are provided with:

acid A labelled solution A;

2.0 M sodium Ndroxide solution labelled solution B; Solution C. containing 25.0 g per litre of an alkanoic acid.

You are required to:

- (a) prepare a dilute solution of sodium hydroxide, solution B.
- (b) determine the:
 - (i) molar mass of the alkanoic acid
 - (ii) reaction ratio between sodium hydroxide and acid A.

Procedure 1

Using a pipette and a pipette filler, place 25.0 cm³ of solution **B** into a 250.0 ml volumetric flask. Add about 200 cm³ of distilled water. Shake well. Add more distilled water to make upto the mark. Label this solution **D**. Retain the remaining solution **B** for use in procedure **II**.

Fill a burette with solution **C**. Using a clean pipette and a **pipette filler**, place 25.0 cm³ of solution **D** into a 250 ml conical flask. Add two drops of phenolphtalein indicator and titrate with solution **C**. Record your results in **table 1**. Repeat the titration two more times and complete the table.

Table 1	I	- III	III
Final burette reading			
Initial burette reading		eterminante juris naviali.	
Volume of solution C (cm³) added		a that of the desire and the second s	1 1 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

(4 marks)

Determine the:

(i) average volume of solution C used;

(1 mark)

(ii) concentration of solution D in moles per litre;

(1 mark)

- (iii) concentration of the alkanoic acid in solution C in moles per litre (1 mole of the acid reacts with 3 moles of the base); (1 mark)
- (iv) molar mass of the alkanoic acid.

(1 mark)

Procedure II

Fill a **clean** burette with solution **A**. Place 5 cm³ of solution **A** into a 100 ml beaker. Measure the initial temperature of solution **A** in the beaker and record it in **table II**. Using a 10 ml or a 100 ml measuring cylinder, measure 25 cm³ of solution **B**. Add it to solution **A** in the beaker and immediately stir the mixture with the thermometer. Record the maximum temperature reached in **table II**. Repeat the experiment with other sets of volumes of solutions **A** and **B** and complete the table.

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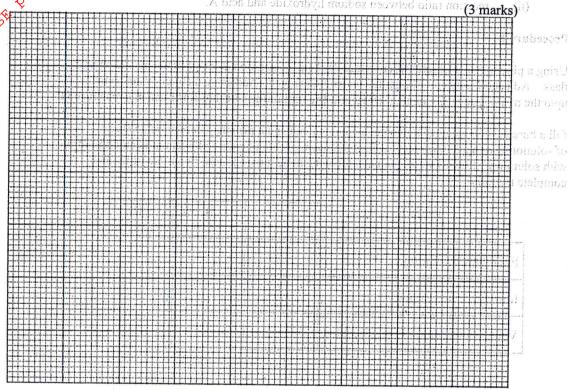
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Table II

	- O					S. Const. Street
Volume of solution A (cm ³)	C\$5	9	13	17	21	25
Volume of solution B (cm ³)	25	21	17	13	9	5
Maximum temperature (°C)		di primi	a htiladi	i nomba	5 16 M 1346 - 5 M 1 5 5 5 6	a qr. us a candon
Initial temperature (°C)	.iji'.				tf galid	Inc. 3
Change in temperature, ΔT						

(6 marks) filate solution of sedium hydroxide, solution B.

(a) On the grid provided; plot a graph of ΔT (Vertical axis) against the volume of solution A.



- From the graph, determine the volume of solution A which gave the maximum change (b) in temperature.
- Determine the volume of solution B that reacted with the volume of solution A in (b) (c) above. (i(x) am d) need ration at solution D to moles per libre:
- (d) Calculate their ray solom at I neithful discussion of the noise process of the advances of the content of the c
 - (i) ratio between the volumes of solutions A and B that neutralised one another; bios pionalla sui la same allon(1 mark)

Using a 10 mi or a 100 nd mensuring cylinder measure 25 cm) of solution B. Add is to solution A in the beaker and in traceferrely stir the mixture with the Theresonance Record the maximum temperature reached in which Report the experiment with

other sets of volumes of solutions A and B and complete the table.

concentration in moles per litre of the acid in solution A. (ii) (Assume that the volume ratio is the same as the mole ratio). (Aram) sucetic with solution A. Place 2 etc. or solution A min a late in technical sure the internal matter the matter than the matter

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- You are provided with solids E, F and G. 2 Carry out the tests below and write your observations and inferences in the spaces provided. Place all of solid E in a boiling tube. Add 20 cm³ of distilled water and shake until all (a) the solid dissolves. Label this as solution E. To about 2 cm³ of solution E in a test-tube, add 4 drops of 2 M sulphuric (VI) (i) scid. For More Free Acst Past Past OBSERVATIONS INFERENCES (2 marks) (1 mark) (ii) To about 2 cm3 of solution E in a test-tube, add 2 M sodium hydroxide dropwise until in excess. **OBSERVATIONS** INFERENCES (1 mark) (1 mark) Than ranks and his and a united and of O notation nationals and of (iii)

 Place one half of solid F in a test-tube. Add 2 cm³ of distilled water and (iii) shake well. Add 4 drops of this solution to about 2 cm3 of solution E in a test-tube. **OBSERVATIONS INFERENCES** (1 mark) (1 mark) To about 2 cm³ of solution E in a test tube, add 2 drops of aqueous potassium (iv) iodide. **INFERENCES OBSERVATIONS** (1 mark) (1 mark)
 - (b) (i) Using a **metallic** spatula, ignite about one half of solid G in a Bunsen burner flame.

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(1 mark) (1 mark)

- (ii) Place the other half of solid G into a boiling tube.
 Add 15 cm³ of distilled water and shake well. Label this solution G.
 Use this solution for the following tests.
 - I Place 2 cm³ of solution **G** in a test-tube and determine its pH.

(1 mark) (1 mark) To about 2 cm3 of the solution obtained in (ii) above, add 3 drops of acidified potassium manganate (VII). For More Free Actifi Past Papi **OBSERVATIONS INFERENCES** (1 mark) (1 mark) III To about 2 cm³ of the solution obtained in (ii) above, add 2 drops of bromine water. **OBSERVATIONS INFERENCES** (1 mark) (1 mark) To the remaining solution G in the boiling tube, add the other half of solid F. (iii) **OBSERVATIONS INFERENCES** 2.104(4)31(12) (1 mark) (1 mark)