

Name ..... ADM No.....

School ..... Candidate's signature .....

Date .....

233/3

**CHEMISTRY**

Paper 3

Time 2¼ hours

**CHEMISTRY - 233/3 PRACTICAL**

**TIME: 2¼HOURS**

**KCSE TOP PREDICTION MASTER CYCLE 2**

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**INSTRUCTIONS TO CANDIDATES**

- Write your name and index number in the spaces provided above.
- Sign and write the date of examination in the spaces provided.
- Answer ALL the questions in the spaces provided in the question paper
- Mathematical tables and electronic calculators may be used.
- All working MUST be clearly shown where necessary.

**FOR EXAMINER'S USE ONLY**

Question	Maximum marks	Candidate's score
1	22	
2	12	
3	6	
<b>Total score</b>	40	

*This paper consists of 7 printed pages*

*Candidates should check the question paper to ensure that all the printed pages are printed as indicated and no questions are missing.*

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- 1.a)** You are provided with
- 2.0M sodium hydroxide solution labelled solution B
  - Solution C containing 12.25 g per litre of a mineral acid C

You are required to

- i) Prepare a dilute solution of sodium hydroxide, solution B.
- ii) Determine the  
Relative Formula mass of the acid C  
Molar Enthalpy change of reaction between acid C and sodium hydroxide solution B.

**Procedure 1.**

Using a pipette and a pipette filler place 25.0cm<sup>3</sup> of solution B in a 250.0ml volumetric flask. Add to it about 150cm<sup>3</sup> of distilled water. Shake well. Add more distilled water to make upto the mark. Label this solution D.

Fill a burette with solution C. Using a clean pipette and a pipette filler, place 25.0cm<sup>3</sup> of solution D into a 250ml conical flask. Add two drops of phenolphthalein indicator and titrate with solution C. Record your results in table 1. Repeat the titration two more times and complete the table. (4 marks)

	1	2	3
Final burette reading (cm <sup>3</sup> )			
Initial burette reading (cm <sup>3</sup> )			
Volume of solution C used (cm <sup>3</sup> )			

Calculate:

- i) Average volume of solution C used. **(1 mark)**

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- ii) Moles of solution D used. **(2 marks)**

**(2 marks)**

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- iii) Concentration in moles per litre of acid in solution C given that the number of moles of acid C used are half the moles of D used. **(2 marks)**

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vi) Relative formula mass (RFM) of solution C.

***(1 mark)***

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**b) PROCEDURE II.**

- i) Using a clean burette, place 5.0cm<sup>3</sup> of solution C into each of six (6) test-tubes.
- ii) Using a 100ml measuring cylinder, place 20cm<sup>3</sup> of solution D, sodium hydroxide solution in a 100ml plastic beaker. Measure the temperature of solution D and record it in table 2 below.
- iii) To solution D in the beaker, add acid C, solution C from one of the test-tubes. Stir the mixture with the thermometer and record in Table 2, the maximum temperature reached. Continue with step (iv) IMMEDIATE
- iv) Add the acid C, solution C from another test-tube to the mixture obtained in (iii) above, stir and record the maximum temperature reached in Table 2. Continue adding the acid C, solution C from each of the other four test-tubes, stirring the mixture and recording the maximum temperature each time and complete Table 2.

TABLE 2 (4 marks)

Volume of solution C acid C added (cm <sup>3</sup> )	0	5	10	15	20	25	30
Maximum temperature (°C)							

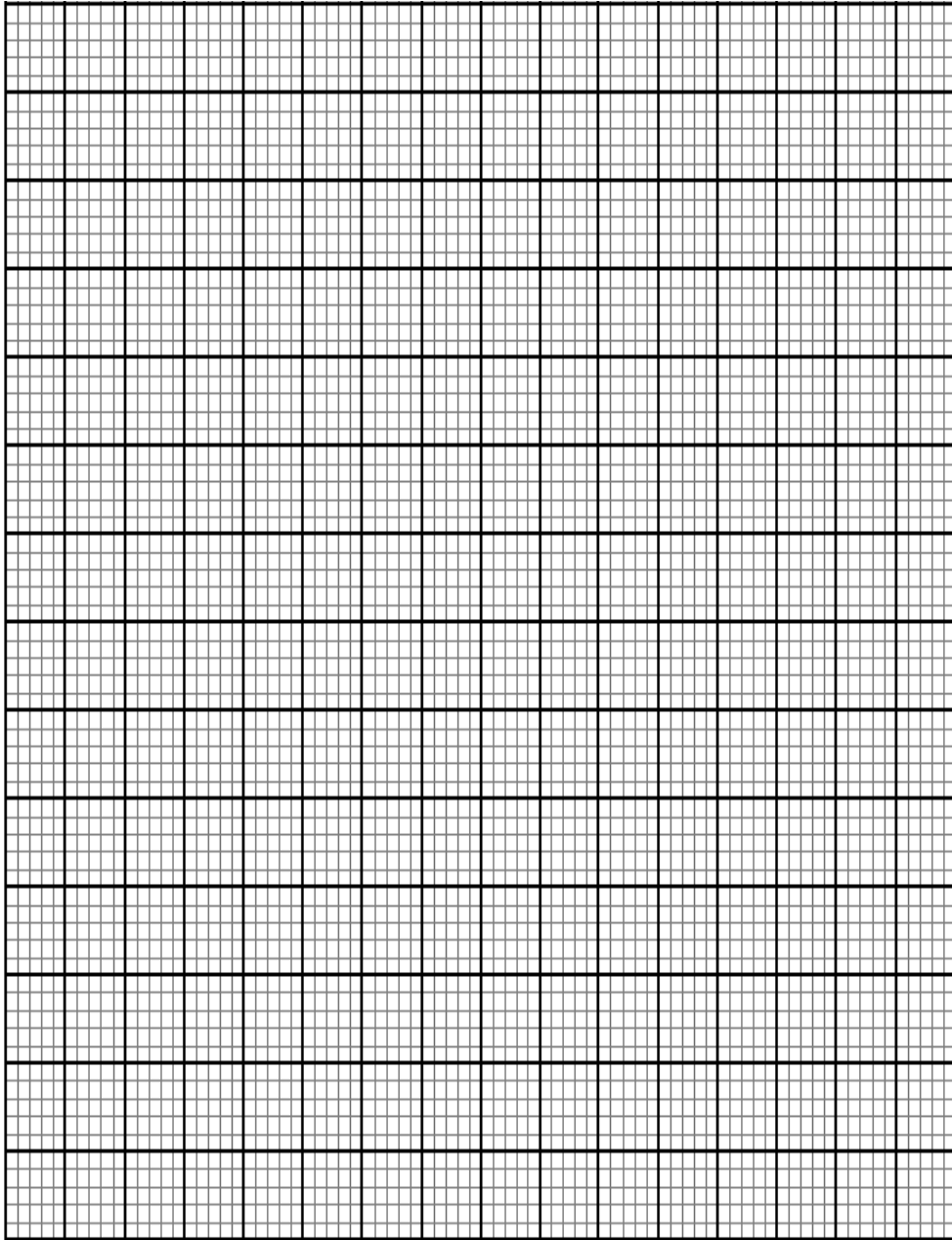
- c) On the grid provided, plot a graph of temperature (vertical axis) against volume of acid C solution C added.

***(3 marks)***

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d) Using the graph

i) Determine the volume of solution C which gave the maximum change in temperature. **(1 mark)**

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ii) Determine the temperature change for the reaction.

**(1 mark)**

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e) Using your answer in parts d (i) and d(ii), calculate the molar enthalpy change of the neutralisation reaction between acid C<sub>1</sub> and sodium hydroxide solution.  
(Heat capacity = 4.2J g<sup>-1</sup> K<sup>-1</sup>; density of the mixture = 1.0gcm<sup>-3</sup>)

**(3 marks)**

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2. a) You are provided with solid **F** carry out the following tests write your observations and inferences in the spaces provided.

i) Place a half spatula and full of solid **F** in a dry test tube and heat strongly. Test the gases produced with litmus paper

Observations	Inferences
<b>(1mark)</b>	<b>(1 mark)</b>

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ii) Place the remaining solid **F** in a boiling tube and add 10cm<sup>3</sup> of distilled water. Divide the resulting solution into five portions

Observations	Inferences

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<b><i>(1 mark)</i></b>	<b><i>(1 mark)</i></b>
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iii) To the first portion, add sodium hydroxide solution drop wise until in excess.

<b>Observations</b>	<b>Inferences</b>
<b><i>(1mark)</i></b>	<b><i>( 1 mark)</i></b>

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iv) To the second portion, add 5 drops of the hydrogen peroxide and then add ammonia solution drop wise until in excess.

<b>Observations</b>	<b>Inferences</b>
<b><i>(1 ½ mark)</i></b>	<b><i>( ½ mark)</i></b>

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v) To the third portion, add three drops of acidified lead (II) nitrate solution.

<b>Observations</b>	<b>Inferences</b>
<b><i>( 1 mark)</i></b>	<b><i>(1mark)</i></b>

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vi) To the fourth portion, add three drops of barium nitrate solution.

Observations	Inferences
<i>( 1 mark)</i>	<i>( 1 mark)</i>

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3. You are provided with an organic liquid P. Carry out the following tests and record your observations and inferences in the space provided.

a) Place about 4cm<sup>3</sup> of liquid P in a boiling tube. Add to it 10cm<sup>3</sup> of distilled water and shake well. Label this solution G.

Observations

Inferences

*(1 mark)*

*(1 mark)*

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b) Place 2cm<sup>3</sup> of solution G in a test-tube. Add to it solid sodium hydrogen carbonate provided.

Observations

Inferences

*(1 mark)*

*(1 mark)*

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c) To a second 2cm<sup>3</sup> portion of solution G in a test-tube, add 2 to 3 drops of acidified potassium dichromate (VI) and warm.

Observations

Inferences

*(1 mark)*

*(1 mark)*

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