

NAME..... INDEX NO.....

233/3  
CHEMISTRY  
PAPER 2  
PRACTICAL  
JULY/AUGUST – 2009  
2 ¼ HOURS

## **BARINGO – KOIBATEX DISTRICTS**

EDUCATIONAL IMPROVEMENT EXAM – 2009  
Kenya Certificate of Secondary Education (K.C.S.E)

233/2  
Chemistry  
Practical  
Paper 3  
July/August 2009  
2 ¼ Hours

### **I. You are provided with:**

- 2.0g of sodium carbonate, solid A
- Hydrochloric acid, solution B
- Phenolphthalein indicator
- Methyl orange indicator

### **You are required to:**

Determine the molarity of hydrochloric solution B

### **Procedure:**

Place all solid A in a 250ml volumetric flask, in a 250ml volumetric flask, add about 100ml of distilled water to the flask and swirl until the entire solid dissolves. Top up with distilled water to the mark and label it solution A. Clean the pipette and use it to place 25.0 cm<sup>3</sup> of solution A into a clean conical flask. Add 3 drops of phenolphthalein indicator provided and titrate it with solution B in the Burette. Do not pour out the contents of the conical flask. Record your results in table I below. Add 3 drops of methyl orange indicator to the contents of the conical flask and continue titrating with solution B. Record the readings in table II below.

(a) Table I ( Using phenolphthalein indicator

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

( 3 marks)

(i) Calculate the average volume of solution B used ( $V_1$ )

(  $\frac{1}{2}$  mark)

**Table II**( Using methyl orange indicator)

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

( 3 marks)

(ii) Calculate the average volume of solution B used ( $V_2$ )

(  $\frac{1}{2}$  )

(iii) The total volume of solution B used ( $v_1 + v_2$ ) =

( 1 mark)

(b) calculate

(i) The concentration of sodium carbonate solution A in moles per litre

(Na = 23.0, C = 12.0, O = 16.0)

( 1 mark)

(ii) The moles of solution A which are present in 25cm<sup>3</sup> of solution ( 1 mark)

(iii) Moles of hydrochloric acid solution B in the total volume that reacts completely with 25cm<sup>3</sup> of sodium carbonate solution ( 2 marks)

(iv). Concentration of hydrochloric acid in moles per litre ( 2 marks)

**2. You are provided with**

- 0.1M Ethane-1, 2 – dioic acid (oxalic acid) solution R
- 0.02 M acidified potassium manganate (VII) solution N

You are required to:

Determine the rate of the reaction between acidified potassium manganate (VII) and ethane-1, 2 dioic acid (oxalic) acid at different temperatures.

**Procedure:**

Place 4 tubes on a test tube rack. Using a 10cm<sup>3</sup> measuring cylinder, measure out 5cm<sup>3</sup> of solution R into each of the test tube.

Place 5 cm<sup>3</sup> of solution N with a Bunsen burner flame to about 75<sup>0</sup> C. allow it to cool to 70<sup>0</sup>C and immediately add 5cm<sup>0</sup> of solution R into solution N and start the stop watch. Stir the mixture gently using the thermometer and record the time taken for the purple colour to disappear and the temperature at which the colour disappeared in table II below using a clean boiling tube and test tube, repeat the procedure while allowing solution N to cool to 60<sup>0</sup> C 50<sup>0</sup> and 45<sup>0</sup> C in each case and complete table II below.

Table III

Temperature before mixing (°C)	70	60	50	
Temperature at which purple colour disappears(°C)				
Time taken for purple colour to disappear (s)				
$\frac{1}{t}$ (S <sup>-1</sup> ) time				

(b) On the grid provided plot  $\frac{1}{\text{time}}$  (y - axis) against the temperature at which the purple colour disappears ( 6 marks)  
( 3 marks)

(c) From your graph

(i) Determine the time taken for the purple colour to disappear at  $47.5^{\circ}\text{C}$  ( 1 mk)

(ii) State and explain the relationship between rate of reaction and the temperature at which the purple colour disappears ( 2 marks)

**3. You are provided with solid w. Carry out the tests below and write your observations and inferences in the spaces provided.**

(a) Place all of solid W provided in a boiling tube and add  $10\text{cm}^3$  of distilled water and stir thoroughly. Divide the solution into five portions each of about  $1\text{cm}^3$

Observation

Inferences

(1mk)

(1 mk)

(b) (i) To the first portion, add 3 drops of potassium carbonate solution

Observation

Inferences

(1mk)

(1 mk)

(ii) To the second portion, add 3 drops lead (II) nitrate solution

Observation

Inferences

(1mk)

(2mks)

(iii) To the third portion add 3 drops of barium chloride followed by 2cm<sup>3</sup> of 2M hydrochloric acid and shake the mixture

Observation

Inferences

(2mks)

(1 mk)

(iv) To the fourth portion, add 3 drops of acidified potassium manganate (VII) solution

Observation

Inferences

(1mk)

(1 mk)

(v) To the fifth portion deep a piece of universal indicator paper into the mixture and determine B.P

Observation

Inferences

(1mk)

(1 mk)