Name……..……. Index No……

233/3
CHEMISTRY
PAPER 3
July/August – 2009
Time: 2 ½ Hours

INTERZONAL

Kenya Certificate of secondary Education

QUESTION 1 (13 marks)

You are provided with

- 0.2 M sodium hydroxide, solution B
- solution of carboxylic acid $C_2H_2(CO.OH)_n$
- Solution A

You are required to determine the value of n in the formula $C_2H_2(CO.OH)_n$ of carboxylic acid A

Procedure

1 (a) Place solution A in the burette. Pipette 25.0cm^3 of solution B into a conical flask and titrate with solution A using phenolphthalein indicator
Record your results in table 1 below and repeat the titration to achieve consistent results
Results: volume of pipette…….cm^3

Table 1

Burette readings			
Titration Number	I	II	III
Final Burette reading cm^3			
Initial Burette reading cm^3			
Volume of solution A use in cm^3			

(b) Average volume of A (1 mark)

(c) Calculate the number of moles of NAOH used (2 marks)

(d) calculate the number of moles of A used
(e) Determine the concentration of NAOH solution V in moles per litre

Fill the burette with solution V. Pipette 25.0 of the carboxylic acid solution W into a conical flask. Add two drops of phenolphthalein solution and titrate with solution V. Repeat so as to obtain three consistent values

Table II

Titration	I	II	III
Final burette reading			
Initial reading			
Volume used (cm^3)			

(f) If the mass of Mg ribbon used in the 1st experiment was 2.0g
Determine the volume of gas produced
(Molar gas volume = $24cm_3$ at r.t.p Mg = 24)

(g) From the graph determine the solubility at
(i) 45^0 C

(ii) 75^0 C

(h) Calculate the amount of solid Q deposited when the solution is cooled from 75^0C to 45^0C

(i) Comment on the type of graph obtained (1 mark)

QUESTION 3 (14 MARKS)

1. You are provided with solution W and solid X. Carry out the tests below. Write your observation and inferences in the spaces provided

   (a) place about 3 cm_3 of solution W into a test tube and test it with both blue and red litmus papers

OBSERVATION	**INFERENCES**
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(1 mark) (1 mark)

   (b) Place all of solid X in a dry test tube. Add 1 cm^3 of solution W. Allow the reaction to proceed for about 5 minutes then add 6 cm^3 of distilled water to the mixture. Decant and divide the solution into three portions
   (i) To the first portion, add aqueous NaOH dropwise until in excess

OBSERVATION	**INFERENCES**
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(1 mark) (1 mark)

(iii) To the 2^{nd} portion add aqueous NH_3 until in excess

OBSERVATION	INFERENCES
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(1 mark) (1 mark)

(iii) To the third portion add 3 drops $BaCl_2$ solution

OBSERVATION	INFERENCES
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(1 mark) (1 mark)

2 You are provided with an organic compound K. carry out the test below write your observations and inferences in the spaces provided.
Place all solid K in boiling tube. Add distilled H_2O until the boiling tube is about half- full. Shake well to dissolve all the solid. Divide the solution into three portions

(a) To the first portion add 1% of bromine H_2O and warm

OBSERVATION	INFERENCES
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(1 mark) (1 mark)

(b) To the 2nd portion add 3 drops of acidified potassium permanganate and warm gently

OBSERVATION	INFERENCES
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(1 mark) (1 mark)

(c) To the 3rd portion add a spatula endful of $NaHCO_3$

OBSERVATION	INFERENCES
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(1 mark) (1 mark)