



NAME: _____ ADM NO.: _____

SCHOOL: _____ SIGNATURE: _____

FORM 4

PAPER 3 (233/3)

CHEMISTRY (PRACTICAL)

TRIAL 2, 2019

TIE: 2¼HRS

INSTRUCTIONS

- Write your name and index number in the spaces provided above.
- Sign and write the data of the examination.
- Answer all the questions in the spaces provided.
- You are not supposed to start working with the apparatus for the first 15 minutes of 2¼ hours allowed for this paper. This time is meant to read through the paper and ensure you have all the chemicals and apparatus require.
- All working must be clearly shown
- KNEC mathematical tables and silent electronic calculations may be used.
- All questions should be answered in English

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FOR EXAMINERS USE ONLY

QUESTIONS	MAXIMUM	CANDIDATE'S SCORE
1	21	
2	11	
3	08	
TOTAL SCORE	40	

QUESTION 1

You are provided with:

- Solid A 5.0g $(\text{COOH})_2 \cdot x\text{H}_2\text{O}$
- Solution B 0.13M KMnO_4

Task

- You are supposed to determine the solubility of A at different temperatures.
- Determine the number of moles of water of crystallization in solid A.

PROCEDURE 1

- Using a burette, add 4cm³ of distilled water to solid A in a boiling tube.
 - Heat the mixture while stirring with the thermometer to about 80°C.
 - When the whole solid dissolves, allow the solution to cool while stirring with the thermometer
 - Note the temperature at which crystals first appear and record this temperature in the table 1 below.
- Using a burette add 2cm³ more into the content of the boiling tube and warm until the solid dissolve.
 - Remove from the flame and allow the solution to cool in air while stirring.
 - Record the temperature at which crystal first appear in table 1.
 - Repeat procedure (b) 3 more times and complete table 1 below.
 - Retain the content of the boiling tube for procedure II

Table 1

Volume of water in the boiling tube (cm ³)	Temperature at which crystals of solid A appear (°C)	Solubility of solid A g/100g of water
4		
6		
8		
10		
12		

I. a) Draw a graph of solubility of solid A (vertical axis) against temperature (3mks)

b) From your graph determine the solubility of solid A at 60°C (1mk)

PROCEDURE II

- a) – Transfer the contents of the boiling tube into a 250ml volumetric flask.
 - Add distilled water up to the mark
 - Label this solution A
- b) – Using a clean pipette and a pipette filler, transfer 25ml of solution A into a conical flask.
 - Warm the mixture up to 60°C
 - Fill a burette with solution B
 - Titrate B against the hot solution A until a permanent pink colour persist
 - Read your results in Table 2 below
- c) Repeat (b) 2 more times and record your results in the table 2 below.

TABLE 2

	I	II	III
FINAL BURETTE READING			
INITIAL BURETTE READING			
VOLUME OF SOLUTION B USED (CM ³)			

II) a) Calculate the average volume of solution B used (1mk)

b) Calculate the number of moles of B used (1mk)

c) Given 2 moles of KmnO_4 react with 5 moles of A, calculate the number of moles of A in 25cm^3 (1mk)

d) Calculate the molarity of A (1mk)

e) Determine the molar mass of A (1mk)

f) Determine the value of X (1mk)
(C=12, O=16 H=1)

QUESTION 2

You are provided with solid C. Use it to carry the test below.

Dissolve the whole of C into 10cm³ of water and divide it into five portions.

a) To the 1st portion add sodium sulphate solution.

Observations	Inferences
(1mk)	(1½mks)

b) To the 2nd portion add Ammonia solution dropwise until in Excess.

Observations	Inferences
1mk)	1mk

c) To the 3rd portion add sodium Hydroxide dropwise until in Excess.

Observations	Inferences
(1mk)	(1mk)

d) To the forth portion add Lead (II) Nitrate solution

Observations	Inferences
(½mk)	(2mks)

e) To the last portion add Barium Nitrate solution

Observations	Inferences
(1mk)	(1mk)

QUESTION 3

You are provided with liquid D use it to carry the test below.

Divide liquid D into four equal portions

a) To the 1st portion add sodium hydrogen carbonate

Observations	Inferences

(1mk)	(1mk)
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b) To the 2nd portion add acidified potassium manganite (VII) (KmnO_4)

Observations	Inferences
(1mk)	(1mk)

c) To the 3rd portion add Bromine water

Observations	Inferences
(1mk)	(1mk)

d) To the last portion add potassium dichromate(VI) and wrm.

Observations	Inferences
(1mk)	(1mk)