NAME: …… ADM NO: …….. CLASS: …….
CHEMISTRY PAPER 3 FORM THREE END OF YEAR EXAM – 2019
TIME: 1 ¾ HOURS

1. **You are provided with:**
   - Dilute hydrochloric acid labeled A
   - Solution B containing 3.15g of dibasic acid $H_2C_2O4.2H_2O$ dissolved to form 500cm^3 of solution.
   - Sodium hydroxide solution labeled as solution C.

You are required to:
- Standardize the sodium hydroxide solution C.
– Use the standardized solution C to determine the concentration of solution A.

Procedure:
(i) Place solution B in a clean burette.
(ii) Using a pipette and a pipette filler, place 25cm^3 of solution C into a conical flask and add two drops of phenolphthalein indicator. Titrate with solution B and record your results in table 1.

Table 1
Volume of pipette used = _____ (1 mk)

	I	II	III
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of solution B used (cm^3)			

(4 mks)

(a) Calculate the:
(i) Average volume of solution B used. (1 mk)

(ii) Concentration of the dibasic solution B in moles per litre. (H = 1, O = 16, C =12)
(4 mks)

(ii) Concentration of the sodium hydroxide solution C in moles. (4 mks)

Procedure II:

(i) Using a clean measuring cylinder, measure 25cm^3 of solution A and transfer into 250ml volumetric flask.

(ii) Use distilled water to top up the solution in the volumetric flask to the mark.
(iii) Mix the solution well and label it a solution K.
(v) Clean the burette and place solution K.
(v) Using a pipette and pipette filler, place 25cm^3 of solution C into a conical flask and add two drops of phenolphthalein indicator.
(vi) Titrate the concentration in the conical flask with solution K. Record the results in table 2. Repeat the titration two more times and record your results.

TABLE 2

Volume of pipette used = _____ (1 mk)

	I	II	III
Initial burette reading (cm^3)			
Final burette reading			
Volume of solution K used (cm^3)			

(a) What is the average volume of solution K used? (1 mk)

(b) Calculate the concentration of solution K in moles per litre. (4 mks)

(c) Determine the concentration of solution A in moles per litre. (3 mks)

2. You are provided with solid D. Carry out the tests below and record your observations and inferences in the spaces provided.

(a) Place solid D in a boiling tube. Add about $8cm^3$ of distilled water to dissolve the solid. Divide the solution into four portions. (3 mks)

Observations	Inferences

(b) To the first portion, add aqeous sodium hydroxide dropwise until in excess. (3 mks)

Observations	Inferences

(c) To the second portion, add aqeous ammonia dropwise until in excess. (2 mks)

Observations	Inferences

(d) To the third portion, add barium chloride solution (3 mks)

Observations	Inferences

(e) To the fourth portion, add acidified lead (II) nitrate solution. (2 mks)

Observations	Inferences