

NAME INDEX NUMBER
CANDIDATE SIGNATURE.....
DATE

233/2/

CHEMISTRY

PAPER 3

(PRACTICALS)

JULY/AUGUST 2018

2 ¼ HOURS

INSTRUCTIONS TO CANDIDATES.

- Write your name and index number in the spaces provided above.
- Answer all the questions in the spaces provided.
- You are not allowed to start working with the apparatus for the first 15 minutes of the $2\frac{1}{4}$ hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus that you may need.
- Mathematical tables and silent electronic calculators may be used.

FOR EXAMINERS' USE ONLY

Questions	Maximum score	Candidate 's score
1.	$19\frac{1}{2}$	
2.	$11\frac{1}{2}$	
3.	9	
Total score	40	

You are provided with;

- A monobasic acid **solid T**.
- Sodium Hydroxide **Solution B**.
- 0.0 M **solution R** of a dibasic acid H₂A.

You are required to:

- i. Prepare a saturated solution of **solid T**.
- ii. Standardize sodium hydroxide **solution B**.
- iii. Determine the solubility of **solid T** in water at room temperature

PROCEDURE.

- a) Place all the **solid T** provided into a dry conical flask. Measure out 100cm³ of distilled water using a measuring cylinder and add it to solid **T**. Shake thoroughly and leave it to stand.
- b) Fill the burette with solution **B** pipette 25cm³ of solution **R** into a conical flask. Add **2** or **3** drops of phenolphthalein indicator and titrate against solution **B** until a permanent pink colour appears. Record the readings in the table below. Repeat to obtain three accurate readings.

Table A. (4mks)

	1	2	3
Final burette reading (cm ³)			
Initial burette reading (cm ³)			
Volume of solution B used (cm ³)			

(a) Calculate the average titre. (1mk)

(b) i) Write the equation for the reaction of the dibasic acid and sodium hydroxide. (1mk)

ii) Calculate the concentration of sodium hydroxide, solution **B** in moles per litre. (3mks)

c) Measure the temperature of the solution of solid **T**. using a dry filler paper and dry filter funnel filter the solution into a dry conical flask. Pipette 25cm³ of the filtrate into a conical flask. Add **2** or **3** drops of phenolphthalein indicator and titrate against sodium hydroxide, solution **B** until a permanent pink Colour appears. Record the readings in the table below. Repeat to obtain three accurate readings.

Temperature of the solution of solid T =..... °C. (1mk)

	1	2	3
<i>Final burette reading (cm³)</i>			
<i>Initial burette reading (cm)³</i>			
Volume of solution B used (cm³)			

(4mks)

d) Calculate the average titre. (1mk)

e)

Calculate:

- i) the number of moles of acid T in 25cm³ of the filtrate. (2mks)
- ii) the number of moles of acid T in 100cm³ of solution of acid **T**. (1mk)
- iii) Given that the molecular formula of acid T is C₉H₆O₂, calculate the solubility of the acid in grammes per 100cm³ of water.
(C=12.0, H = 1.0, O=16.0) (1¹/₂ marks)

2. You are provided with solid **F**. Solid **F** is suspected to be sodium sulphate. Use materials provided below to show the steps you would follow to test for sodium and sulphate ions.

- 2M ammonia solution.
- 2M Nitric acid.
- 2M Sodium hydroxide solution.
- Aqueous Barium Nitrate solution
- Glass rod.
- Non luminous Bunsen flame
- Distilled water.

Describe the procedure and the expected observations.

<i>Procedure</i>	<i>Expected Observation.</i>
(½mk)	(½mk)
(½mk)	(½mk)
(½mk)	(½mk)
(½mk)	(½mk)
(1mk)	(1mk)

5. b) Use the materials provided to carry out the tests you have described in (a) above.

i)	Test 1		
	Observations		Inferences
		($\frac{1}{2}$ mark)	($\frac{1}{2}$ mark)
ii)	Test 2		
	Observations		Inferences
		($\frac{1}{2}$ mark)	($\frac{1}{2}$ mark)
iii)	Test 3		
	Observations		Inferences
		($\frac{1}{2}$ mark)	($\frac{1}{2}$ mark)
iv)	Test 4		
	Observations		Inferences
		($\frac{1}{2}$ mark)	($\frac{1}{2}$ mark)

v) Test 5

Observations	Inferences
(1mark)	(½mark)

3. You are provided with solid **H**. Carry out the tests described and note down your observations and inferences.

a) Place a spatulaful of solid **H** in a clean boiling tube. Add about 6cm³ of distilled water and shake to dissolve. Divide the resulting solution into **5** portions.

Observations	Inferences
(½ mark)	(½ mark)

b) To the 1st portion add **2-3** drops of acidified potassium chromate VI.

Observations	Inferences
(1mk)	(1mk)

c) To the second portion add **2-3** drop of acidified potassium manganate (VII)

Observations	Inferences
(1mk)	(1mk)

d) To the **3rd** portion add **2-3** drops of Bromine water.

Observations	Inferences

(1mk)

(1mk)

e) Place a quarter spatulaful of sodium hydrogen carbonate in a dry test tube. Add the **4th** portion to the NaHCO₃ in the test tube.

Observations	Inferences

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

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

f) Determine the PH of the **5th** portion.

Observations	Inferences

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

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

<<< **E N D** >>>