CHEMISTRY – 233/3

PAPER 3

PRACTICAL

2020 FORM 4 TERM 1 OPENER EXAMS

TIME: 2 ¼ HOURS

NAME:……ADM.NO: ……CLASS:……

INSTRUCTIONS:

a) Write your name, admission number and class.
b) Answer all the questions in the spaces provided.
c) Spend the first 15 minutes of the 2 ¼ hours to read the questions paper and ensure you have all the chemicals and apparatus that you may need.
d) All working must be clearly be shown where necessary.
e) Mathematical tables and silent calculators may be used
f) Answer all the questions in English language.

For examiner's use only

Questions	Maximum score	Candidates score
1	20	
2	20	
Total	40	

1. You are provided with:-
   a) 2.86g of solid E, $Na_2CO_3 \times H_2O$
   b) Solution W, 0.1M hydrochloric acid
   You are required to-

a) Prepare a dilute solution of $Na_2CO_3 . XH_2O$

b) Determine the value of X in $Na_2CO_3 . XH_2O$

Procedure:

Step 1

Place all the solid E in a 250ml volumetric flask. Add about 150ml of distilled water. Shake the mixture well until the solid dissolves. Add distilled water up to mark. Label this solution D.

Step 11

Using a pipette and pipette filler place 25.0cm^3 of solution D into a conical flask. Add two drops of the indicator provided. Fill the burette with solution W and titrate solution D. with solution W. Record your results in the table below. Repeat the titration two more times and complete the table below.

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

(4mks)

a) Calculate

i) Average volume of solution W used (1mk)

ii) Moles of solution W, hydrochloric acid used. (2mks)

b) The equation for the reaction that took place is:

$Na_2CO_{3(aq)} + 2HCl_{(aq)} \rightarrow 2\ NaCl_{(aq)} + CO_{2(g)} + H_2O_{(l)}$

Calculate:

i) Moles of solutionD, $Na_2CO_3 . XH_2O$ used (2mks)

ii) Moles of solutionD, $Na_2CO_3 . XH_2O$ in 250cm^3 of solution (2mks)

iii) Molarity of solutionD, $Na_2CO_3 . XH_2O$ (2mks)

iv) Relative formula mass of $Na_2CO_3 . XH_2O$ (3mks)

v) The mass in grams of the water of crystallization in a litre of solution Δ
(Na= 23, C=12, O = 16, H = 1) (2mks)

vi) The value of X in $Na_2CO_3 . XH_2O$ (2mks)

2. a) You are provided with solid Y. Carry out the tests below and identify the ions.

i) Add all solid Y in a boiling tube. Add about $10cm^3$ of distilled water. Divide the solution into 4 portions.

Observation	Inferences
(1mk)	(1mk)

ii) To the first portion add three drops of sodium hydroxide then in excess.

Observation	Inferences
(1mk)	(1mk)

iii) To the second portion add three drops of ammonium hydroxide then in excess

Observation	Inferences
(1mk)	(1mk)

iv) To the third portion add three drops of lead(II) nitrate and warm

Observation	Inferences
(1mk)	(1mk)

v) To the forth portion add three drops of hydrochloric acid.

Observation	Inferences

(1mk)	(1mk)

b) You are providedwith solid X. Carry out the tests below.

i) Scoop half of solid X using a spatula and heat over non-luminous flame.

Observation	Inferences
(1mk)	(1mk)

ii)Put the remaining solid X in a boiling tube and add about 10cm^3 of distilled water. Divide the solution into 3 portions.

Observation	Inferences
(1mk)	(1mk)

iii) To the first portion add 3 drops of universal indicator

Observation	Inferences

(1mk)	(1mk)

iv) To the second portion add sodium carbonate provided.

Observation	Inferences
(1mk)	(1mk)

v) To the third portion add three drops of acidified potassium manganate (VII) solution.

Observation	Inferences
(1mk)	(1mk)