Name: ……Adm. no ……

School: ……

233/3

CHEMISTRY

PAPER 3

JUNE, 2019

FORM 4

TIME: 2 ¼ HOURS

MOKASA JOINT EXAMINATION 2019

Kenya Certificate of Secondary Education (K.C.S.E.)

INSTRUCTIONS TO THE CANDIDATES:

- ***Write your name and index number in the spaces provided***
- ***Sign*** *and write the* ***date*** *of examination in the spaces provided*
- ***Answer all the questions in the spaces provided.***
- *Mathematical tables and electronic calculators may be used.*
- *All working* ***MUST*** *be clearly shown where necessary.*
- *Use the first 15minutes of the 2 ¼ hours to ascertain you have all the chemical and apparatus that you may need.*

For Examiner's Use Only

Question	Maximum score	Candidate's score
1	20	
2	12	
3	8	

This paper consists of 10 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing

1. You are provided with.

- Solid A
- 2M hydrochloric acid solution B
- 0.1M sodium hydroxide solution D

You are required to determine the enthalpy change for the reaction between solid A and one mole of hydrochloric acid.

PROCEDURE A

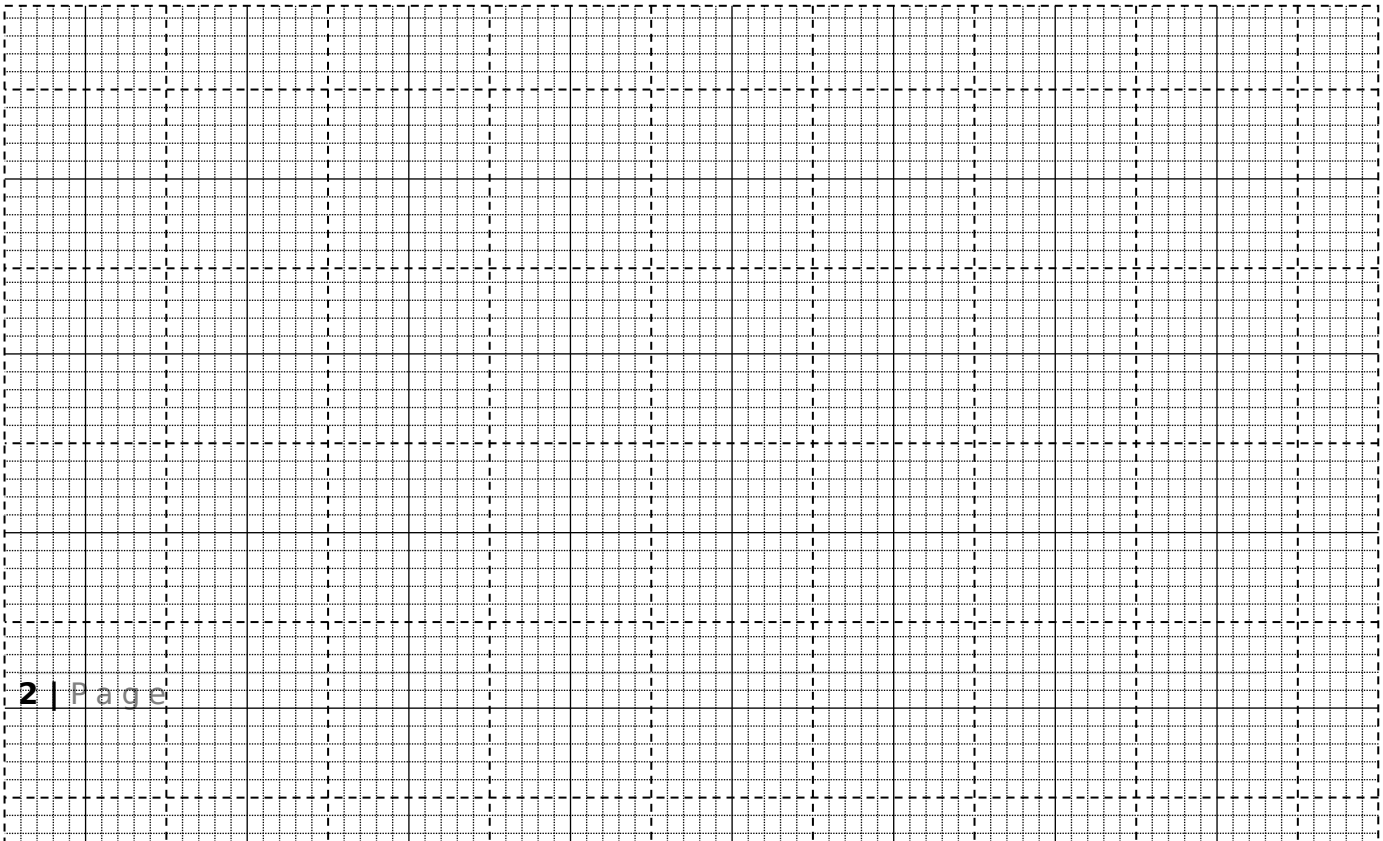
Using a burette, place 20 cm^3 of 2M Hydrochloric acid, solution B in 100ml beaker. Measure the temperature of the solution after every one minute and record the values in the table. At exactly 2 ½ minutes add all solid A to the acid. Stir the mixture gently with the thermometer. Measure the temperature of the mixture after every half a minute and record the values in the table. **RETAIN THE MIXTURE TO BE USED IN PROCEDURE 2**

TABLE 1

Time(min)	**0**	**½**	**1**	**1 1/2**	**2**	**2 1/2**	**3**	**3 1/2**	**4**	**4 1/2**	**5**
Temperature (^{o}c)					**X**						

(5mks)

a. Plot the graph of temperature against time (3mks)



b. Using the graph determine the temperature change (1mk)

c. Calculate the heat change for the reaction. (Assume the specific heat capacity of the mixture is 4.2j/kg/k and density of the mixture is 1g/cm^3.) (1mk)

PROCEDURE B

Rinse the burette thoroughly and fill it with sodium hydroxide (D).Transfer all the contents of 100ml beaker used in procedure A into 250ml volumetric flask. Add distilled water up to the mark. Label the solution C. using pipette and pipette filler place 25cm3 of solution C into 250ml conical flask. Add 2 to 3 drops of phenolphthalein indicator and titrate against sodium hydroxide. Record the results in the **table 2**. Repeat **titration two more times** and complete the table 2

TITRATIONS	**1**	**2**	**3**
Final burette reading (cm^3)			
Initial burette reading (cm^3)			

Volume of solution C used (cm^3)			

(4mks)

i. Calculate the average volume used
(1mk)

ii. Calculate the number of moles of sodium hydroxide used
(1mk)

iii. Calculate the number of moles of hydrochloric acid in 25cm3 of solution C (1mk)

iv. Calculate the number of mole of hydrochloric acid in 250cm3 of solution C (1mk)

v. Calculate the number of moles of hydrochloric acid in 20cm3 of solution B (1mk)

vi. Calculate the number of moles of hydrochloric acid that reacted with solid A (1mk)

2. (a) You are provided with solid E which is suspected to be zinc carbonate. Using reagents below describe how you can confirm its presence

- Solid E
- Dilute nitric (v) acid
- Aqueous sodium hydroxide
- Aqueous ammonia solution
- Wooden splint

Test 1	Expected observations
(1mk)	(1mk)

Test 1	Expected observations
(1mk)	(1mk)

Test 1	Expected observations
(1mk)	(1mk)

(b) Carry out the actual tests described above.

Test 1

Observations	inferences
(1mk)	(1mk)

Test 2

Observations	inferences
(1mk)	(1mk)

Test 3

Observations	inferences
(1mk)	(1mk)

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

i. Put half spatula full of **solid F** and burn on non-luminous flame of the Bunsen burner.

Observations	inferences
(1mk)	(1mk)

ii) To the remaining portion of solid F, add about 10cm^3 of distilled water in a boiling tube and divide into two portions

Observations	inferences
(1mk)	(1mk)

iii) To the first portion add acidified potassium manganate (VII) and shake

Observations	inferences
(1mk)	(1mk)

iv) To the second portion add all the solid sodium hydrogen carbonate provided.

Observations	inferences
(1mk)	(1mk)