.Name……Index No……/……

School……Adm No……Stream……

Date……Sign……..

233/3
CHEMISTRY
Paper 3
(PRACTICAL)
DECEMBER 2021
TIME: 2 HOURS

SAMIA SUB-COUNTY JOINT EXAMINATION-2021

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

CHEMISTRY PAPER 3

INSTRUCTIONS TO CANDIDATES

- *Write your **name**, **School** and **Index Number** in the spaces provided above.*
- ***Sign** and **write date** of examination in the spaces provided above.*
- *Answer **ALL** questions in the spaces provided.*
- *You are not allowed to start working with the apparatus for the first 15 minutes of the 2¼ 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 electronic calculators may be used.*
- *All working **MUST** be clearly shown where necessary.*
- *This paper contains 9 printed pages*

For Examiner's Use Only

Questions	Maximum score	Candidate's Score
1	23	
2	08	
3	09	
Total Score	40	

1. You are provided with :

   Solution **Q**, 2M Hydrochloric acid.
   Solution **P**, 0.15M Sodium thiosulphate
   Solution **R**, Sodium carbonate

Procedure 1

Measure $20cm^3$ of 0.15M Sodium thiosulphate (solution **P**) into a $100cm^3$ a glass beaker. Place the beaker on a white piece of paper with **ink mark 'X'** on it. Measure $20cm^3$ of 2M hydrochloric acid solution **Q** using a $50cm^3$ measuring cylinder. Put the acid into the glass beaker containing Sodium thiosulphate and immediately start off the stop watch. Determine the time taken for the **marks 'X'** to become invisible/obscured when viewed from above. Repeat the procedure by measuring different volumes of the acid and adding the volume of the distilled water to complete table 1 below.

Table 1

Volume of acid(cm^3)	**Volume of water(cm^3)**	**Volume of sodium thiosulphate (cm^3)**	**Time taken for mark 'X' to be invisible/obscured(seconds)**	**Reciprocal of time (sec^{-1}) $\frac{I}{t}$**
20	0	20		
18	2	20		
16	4	20		
14	6	20		
12	8	20		
10	10	20		

a. Complete the table below (6mks)
b. Plot a graph of $\frac{I}{t}$ **(rate)** against volume of acid used. (3mks)

c. Explain the shape of your graph (1mk)

……

……

……

d. From the graph determine;

i. Time taken for the cross to be obscured/invisible when the volume of the acid is:

$15cm^3$ (1mk)

……

……

$8cm^3$ (1mk)

……

……

ii. The volume of the acid used if the time taken for the cross to be obscured/invisible is:

40seconds (1mk)

……

……..

43 seconds (1mk)

……

……

Procedure 2

Using a $10cm^3$ measuring cylinder, place $10cm^3$ of solution **Q** into a **250ml** volumetric flask. Add about $200cm^3$ of distilled water. Shake well. Add more distilled water to top up to the mark. Labeled this solution **T**. Fill the burette with solution **T**. using a pipette and pipette filler, pipette $25cm^3$ of solution **R** into a conical flask. Add **3 drops** of phenolphthalein and titrate with solution T.

- Record your results in the table
- Repeat the titration two more times and complete the table

Table 2

	I	II	III
Final burette reading(cm^3)			
Initial burette reading(cm^3)			
Volume of solution T (cm^3) added			

(4mks)

a. Determine the :

Average volume of solution **T** used (1mk)

……

……

……

Moles of the acid in the average volume of solution **T** used. (2mk)

……

……

……

Concentration of solution **R** in moles per litre. (2mks)

……

……

……

……

2.

a. Put a spatula end-full of **solid A** into a boiling tube and about $10cm^3$ of distilled water. Shake the mixture well. Divide the resultant solution into **4 equal** portions.

Observation	**Inferences**
(½mk)	(1mk)

b. To the first portion, add a little calcium hydroxide solid and warm. Test any gases produced using both blue and red litimus paper.

Observation	**Inferences**
(1mk)	(1mk)

c. To the second portion, **add 4** drops of hydrogen peroxide solution. Test the gas produced using a glowing splint.

Observation	**Inferences**
(1mk)	(1mk)

d.

i. The solution is also suspected to contain sulphite ions. Using Barium nitrate solution and dilute hydrochloric acid solution. **Describe** how you would confirm presence of the sulphite ions.

Observation	**Inferences**
(1mk)	(1mk)

ii. Carry out the actual test as described in (d) (i) above

Observation	**Inferences**
(1mk)	(1mk)

3. You are provided with solid **B**. carry out the tests below and record your observation and inferences in the spaces provided.

i. Place one third of solid **B** on a metallic spatula. Burn it in a non-luminous flame of the Bunsen burner.

Observation	**Inferences**
(1mk)	(1mk)

ii. Place the remaining solid in a test-tube. Add about **6cm^3** of distilled water and shake the mixture well. Divide the resulting mixture into 4 portions.

Observation	**Inferences**
(½mk)	(½mk)

a. To the first portion, **add 2** drops of acidified potassium manganite (VII)

Observation	**Inferences**
(1mk)	(1mk)

b. To the second portion, **add 3** drops of acidified potassium dichromate (VI) and warm

Observation	**Inferences**
(1mk)	(1mk)

c. To the third portion, **add 1g** of solid sodium hydrogen carbonate.

Observation	**Inferences**
(½mk)	(½mk)

d. To the fourth portion, **add 5 drops** of ethanol followed by few drops of dilute sulphuric (VI)acid and warm

Observation	**Inferences**
(½mk)	(½mk)

THIS IS THE LAST PRINTED PAGE