NAME: …………………………………. INDEX NUMBER: ……………………………….

SCHOOL: ………………………………. CANDIDATE'S SIGNATURE: …………………..

DATE: …………………………………………..

233/3
CHEMISTRY
PAPER 3
PRACTICAL
JUNE 2016
2 ¼ Hours

KASSU
JOINT EVALUATION TEST - 2016
Kenya Certificate of Secondary Education (K.C.S.E)

233/3
CHEMISTRY
Paper 3
Time: 2 ¼ Hours

INSTRUCTIONS TO CANDIDATES

- Write your name 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 in the question paper.
- All workings must be clearly shown where necessary. Mathematical tables and silent electronic calculators may be used.

For Examiners use only.

Question	Maximum Score	Candidates Score
1	1 4	
2	13	
3	13	

This paper consists of 6 Printed pages.
Candidates should check the question paper to ensure that all the Papers are printed as indicated and no questions are missing

1. You are provided with:

Solution **M** containing 3.95g Potassium Manganate (vii), ($KMnO_4$) per litre of solution.

Solution **N**, containing 49.0g of ammonium Ferrous Sulphate $(NH_4)_2SO_4. FeSO_4.6H_2O$ per litre of solution.

You are required to determine the reacting mole ratio of manganate (VII) Ions, MnO_4 with Iron (II) ions Fe^{2+}.

PROCEDURE:

Using and pipette filter transfer 25.0cm^3 of solution N into a conical flask. Titrate with solution M in the burette. No indicator is required for this experiment. Record your results in the table below. Repeat the procedure to obtain the accurate volumes.

Table I

	1st	**2nd**	**3rd**
Final burette readings cm^3			
Initial burette readings cm^3			
Volume of solution M used cm^3			

(4mk)

a) Determine the average volume of solution M used. (1mk)

b) Calculate:

i) The concentration of solution M in moles per litre. (K = 39, Mn = 55, O = 16) (1mk)

ii) The number of moles of solution M that reacted with N (2 mks)

iii) The concentration in moles per litre of solution N in moles per litre

(1mks) (Fe=56, S=32, N=14, H=1)

iv) The number of moles of solution N that reacted with solution M in this experiment (2mks)

c) Given that 1 mole of solution M gives 1 mole of Mno_4^- ions and 1 mole of solution N gives 1 mole of Fe^{2+} ions. Calculate the reaction mole ratio of Fe^{2+} ions to MnO_4^- ions (3mks)

2. You are provided with:
Solution WI – containing 40g of substance Y per litre.
Solution WII – 1M hydrochloric acid solution.
You are required to investigate experimentally the rate of reaction of Y with hydrochloric acid. Y reacts with hydrogen ions in the hydrochloric acid to give a final yellow precipitate. You will in each experiment measure at room temperature, the time taken to produce a certain amount of precipitate that will make the cross on the white piece of paper just invisible.

PROCEDURE

On the white piece of paper, make a cross using a pen. Measure $10cm^3$ of solution W_I using a $10cm^3$ measuring cylinder provided and put into $100cm^3$ glass beaker provided and place on the cross. The cross should be visible through the solution from a view point directly above the beaker. Using another measuring cylinder transfer $10cm^3$ of the acid W_{II} to the beaker containing W_I and start the stopwatch immediately after the addition. Looking from above the beaker, stop the watch as soon as the cross becomes invisible. Enter the time taken in the table below. Repeat the experiment using the volumes indicated in the table below each time adding appropriate quantity of distilled water to make up the volume to $10cm^3$ before adding $10cm^3$ of solution W_{II}.

xpt. No	Vol. of W_I used cm^3	Vol. of water cm^3	Vol. of W_{II} cm^3	Time Seconds
1	10	0	10	
2	8	2	10	
3	6	4	10	
4	4	6	10	
5	2	8	10	

(4mks)

a) Plot a graph of volume W_I against time in seconds (provided graph paper) (3mks)

b) From your graph, state how the volume of W_I varies with time (1mk)

c) What time would $7.0cm^3$ of W_I take to react with $10cm^3$ of W_{II} (1mk)

d) State two factors which must be kept constant during the experiment (1mks)

e) Could the time taken for experiment be shorter or longer if temperature of reacting mixture was at (i) 50^0C? Sketch a graph on the same axis that would appear for this experiment.(3 mks)

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

a) Place about half of solid F on a metallic spatula and burnt it using a non-luminous flame

Observations	inferences
(1mk)	(1mk)

b) Place the remaining solid F in a clean boiling tube and add about $10cm^3$ of water and shake thoroughly.

i) To about $2cm^3$ of the solution F, put the universal indicator solution provided.

Observations	inferences
(½ mk)	(½ mk)

ii) To about $2cm^3$ of solution F, add $2cm^3$ of acidified potassium dichromate (VI) and warm to boiling

Observations	inferences
(1mk)	(1mk)

iii) To about $2cm^3$ of solution F, add three drops of bromine water

Observations	inferences
(1 mk)	(1mk)

You are provided with solid P. Carry out the tests below and record your results in the table.

1. (i) Place all solid P in a boiling tube. Add about 10 cm^3 of distilled water and shake vigorously, filter and keep both the residue and filtrate.

Observations	Inferences
(½ mk)	(½ mk)

(ii) To about 2 cm^3 of the filtrate add sodium hydroxide dropwise till in excess.

Observations	Inferences

(½ mk)	(½ mk)

2. (a) (i) To about 2 cm^3 of the filtrate add ammonia solution till in excess.

Observations	Inferences
(½ mk)	(½ mk)

(ii) To about 2 cm^3 of the filtrate add four drops of solution K (lead (II) Nitrate)

Observations	Inferences
(½ mk)	(½ mk)

(b) Carefully transfer the residue into a test tube and add 5 cm^3 of dilute niric (V) acid.

(i) To about 2 cm^3 of the solution add a few drops of dilute sulphuric (VI) acid.

Observations	Inferences
(½ mk)	(½ mk)

(ii) T o about 2 cm^3 of the solution add ammonia solution drop wise till in excess.

Observations	Inferences
(½ mk)	(½ mk)