**NAME:** …… **INDEX NO:** ……..……

**SCHOOL:** ...…….

233/3
CHEMISTRY
PAPER 3
PRACTICAL
JULY / AUGUST 2010
2 ¼ HOURS

# KAKAMEGA NORTH DISTRICT JOINT EVALUATION TESTS

**Kenya Certificate of Secondary Education (K.C.S.E) 2010**

233 / 3
CHEMISTRY
PAPER 3

## INSTRUCTIONS TO CANDIDATES

- *Answer **all** questions in the spaces provided in the question paper.*
- *You are NOT allowed to work during the first fifteen minutes of this paper. This is supposed to enable you read through the question paper and verify that you have all the apparatus required for each experiment.*
- *Mathematical tables and electronic calculators may be used.*
- *All working must be clearly shown where necessary.*

**For Examiners Use Only**

| Questions | Maximum Score | Candidates Score |
|---|---|---|
| 1 | 14 | |
| 2 | 14 | |
| 3 | 12 | |
| Total | 40 | |

**This paper consists of 8 printed pages. Candidates should check the question paper to ensure that all the pages are printed as indicates and no questions are missing.**

1. You are provided with:

   - Solution S, made by dissolving 4.9g of $FeSO_4$ $(NH_4)_2SO_4 \bullet 6H_2O$ in 250.0$cm^3$ of solution.

- Solution R, a solution of Potassium Manganate(VII), $KMnO_4$ containing 0.002 moles in $100cm^3$ of solution.

You are required to determine the mole ratio of R to S and write a balanced ionic equation for the reaction that occur.

Procedure

Fill the burette with solution R. Pipette $25.0cm^3$ of solution S into a clean 250ml conical flask. Add about $5cm^3$ of 2M Sulphuric (VI) acid and titrate with solution R from the burette till the permanent pink colour appears. Repeat the procedure two more times and record your results in the table below.

**Table I**

| | I | II | III |
|---|---|---|---|
| Final burette reading ($cm^3$) | | | |
| Initial burette reading ($cm^3$) | | | |
| Titre ($cm^3$) | | | |

(4mks)

(a) **Calculate the:**

(i) Average of solution R used (1mk)

……

……

……

……

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

……

……

……

……

(iii) Number of moles of R used. (1mk)

……

……

……
……

(iv) Concentration of S in moles per litre. (2mks)

……
……
……
……

(v) Number of moles of S in 25.0 $cm^3$ (1mk)

……
……
……
……

(b) **Determine** the mole ratio of R to S (1mk)

……
……
……
……

(c) **Write** a balanced ionic equation for the reaction between solution R and solution S in the presence of 2M Sulphuric (VI) acid (K=19,Mn=55, O=16, Fe=56, S=32, N=14,H=1) (2mks)

……
……
……
……
……
……

2. You are provided with:
    - Magnesium ribbon labeled
    - 2.0M Sulphuric(IV) acid, solution.
    - You are required to determine the rate of reaction between Magnesium and Sulphuric(IV) acid at different concentrations.

Procedure

Place six test tubes on a test-tube rack and label them 1,2,3,4,5 and 6. Using a $10cm^3$ measuring cylinder, measure out volumes of 2.0M Sulphuric (VI) acid, solution N as shown in the table II below and pour them into the corresponding test tubes. Wash the measuring cylinder and use it to measure the volumes of distilled water as indicated in the table II and pour into corresponding test-tubes.

Cut out six pieces each of 1cm length of Magnesium ribbon. Transfer all of the solution in the test-tube 1 into a clean 100ml beaker. Place one piece of Magnesium into the beaker and start a stop watch immediately. Swirl the beaker continuously ensuring that magnesium is always inside the solution. Record in the table II the time taken for Magnesium ribbon to disappear. Wash the beaker each time and repeat the procedure for each of the solutions in the test-tubes 2,3,4,5 and 6

**Table II**

| Test-tube number | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Volume of solution N. ($cm^3$) | 10 | 9 | 8 | 7 | 6 | 5 |
| Volume of distilled water ($cm^3$) | 0 | 1 | 2 | 3 | 4 | 5 |
| Time taken (sec) | | | | | | |
| Rate of reaction, 1/time | | | | | | |
| Number of moles of N used | | | | | | |

(7mks)

(i) Plot a graph of rate of reaction, 1/time (Y-axis) against the volume of N used. (3mks)

# GRAPH PAPER

(ii) Using the graph, determine the time that would be taken for a 1cm length of magnesium ribbon to disappear if the number of moles of N used was 0.015

(2mks)

……

……

……

……

(iii)**State** and **explain** the shape of your graph. (2mks)

……

……

……

……

3. You are provided with solid M. carry out the tests below. Write your observations and inferences in the spaces provide.

(a) Place about half of solid M in a clean dry test-tube. Heat the solid gently and strongly. Test any gases produced with both blue and red litmus papers.

| Observations | Inference |
|---|---|
| (1mk) | (1mk) |

(b) Put the remaining of solid M in a test-tube. Add about $5cm^3$ of distilled water and shake the mixture well. (retain the mixture for use in test (c)

| Observations | Inference |
|---|---|
| (1mk) | (1mk) |

(c) (i) To about $2cm^3$ of the mixture in a test-tube add aqueous Ammonia dropwise until in excess.

| Observations | Inference |
|---|---|
| (1mk) | (1mk) |

(ii) To about $1cm^3$ of the mixture in a test-tube add about $1cm^3$ of Hydrogen peroxide followed by aqueous Ammonia dropwise until in excess.

| Observations | Inference |
|---|---|
| (1 ½ mks) | (1mk) |

(iii) To about $1cm^3$ of the mixture in a test-tube, add three drops of Barium Nitrate solution.

| Observations | Inference |
|---|---|
| (1mk) | (1 ½ mks) |

(iv) To a mixture obtained in (iii) above, add about $4cm^3$ of 2M aqueous Hydrochloric acid (c)

| Observations | Inference |
|---|---|
| ( ½ mk) | ( ½ mk) |