

Name \_\_\_\_\_ Index No. \_\_\_\_\_

Candidate's signature \_\_\_\_\_

Date \_\_\_\_\_

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

**FORM IV MID YEAR CONTINUOUS ASSESSMENT TEST**  
**Kenya Certificate of Secondary Education**  
**CHEMISTRY**  
**PAPER 3**  
**2 ¼ HOURS**

**INSTRUCTIONS TO CANDIDATES**

- (a) Write your name and index number in the spaces provided.
- (b) Sign and write the date of examination in the spaces provided
- (c) Answer ALL the questions in the spaces provided in the question paper
- (d) You are NOT allowed to start working with the apparatus for the first 15 minutes of the 2 ¼ 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 you may need.
- (e) All working MUST be clearly shown where necessary.
- (f) Mathematical tables and electronic calculators may be used.
- (g) Candidates should check the questions to ascertain that all pages are printed as indicated and that no questions are missing.

**FOR EXAMINER'S USE ONLY**

QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
1	20	
2	12	
3	08	
TOTAL	40	

*This paper consists of 7 printed pages*

**Turn Over**

1. You are provided with:

- Aqueous sulphuric (VI) acid labeled solution A
- Solution B containing 10.4g per litre of potassium carbonate
- A clean piece of magnesium ribbon
- Methyl orange indicator

You are required to determine the

- Concentration of solution A
- Rate of reaction between magnesium and sulphuric (VI) acid – solution A , at different concentration.

**PROCEDURE A:**

Using a measuring cylinder, place 25.0cm<sup>3</sup> of solution A into a 250ml volumetric flask. Add distilled water to make 250cm<sup>3</sup> of solution. Label this solution C.

Place solution C in a burette.

Using a pipette and a pipette filler, place 25.0cm<sup>3</sup> of solution B into a conical flask.

Add 2 drops of methyl orange indicator provided and titrate with solution C.

Record your results in table I below.

Repeat the titration two more times and complete the table.

Table I

	I	II	III
Final burette reading			
Initial burette reading			
Volume of solution C used (cm <sup>3</sup> )			

( 3 marks )

(a) Calculate the:

(i) Average volume of solution C used.

( 1 mark )

(ii) Concentration of potassium carbonate in solution B (C = 12.0, O = 16.0, K = 39.0)

( 1 mark )

(iii) Concentration of sulphuric (VI) acid in solution C.

( 2 marks )

(iv) Concentration of sulphuric (VI) acid in solution A.

( 2 marks )

**PROCEDURE B:**

- (i) Label five test-tubes 1, 2, 3, 4 and 5.
- (ii) Empty the burette and fill it with solution A.
- (iii) From the burette, place  $10\text{cm}^3$  of solution A into test tube number 1. From the same burette, place  $9\text{cm}^3$  of solution A into test-tube number 2. Repeat the process for test-tube numbers 3, 4 and 5 as shown in table II below.
- (iv) Using a 10ml measuring cylinder, measure  $1\text{cm}^3$  of distilled water and add it to test-tube number 2. Repeat the process for test-tube numbers 3, 4 and 5 as shown below.
- (v) Cut out five pieces exactly 1cm long of the magnesium ribbon.
- (vi) Transfer all the solution in test-tube number 1 into a clean 100ml beaker provided. Put one piece of the magnesium ribbon into the beaker and immediately start a stop watch
- (vii) Swirl the beaker gently to ensure the magnesium is always inside the solution
- (viii) Record in table II below time taken in seconds for magnesium ribbon to disappear.
- (ix) Pour away the final contents of the beaker and rinse it with water.
- (x) Repeat the procedure from (VI) for each of the remaining test-tube numbers 2, 3, 4 and 5 and complete the table below.

Table II

Test tube number	1	2	3	4	5
Volume of solution A added ( $\text{cm}^3$ )	10	9	8	7	6
Volume of distilled water added ( $\text{cm}^3$ )	0	1	2	3	4
Time taken (seconds)					
Rate of reaction ( $1/\text{time}$ )					

( 5 marks )

- (i) Plot a graph of volume of solution A added (Y-axis) against rate of reaction ( $1/\text{time}$ )

(ii) From the graph, determine the time that 1cm long magnesium ribbon would take to react with 5cm<sup>3</sup> of solution A used. ( 1 mark )

(iii) What is the relationship between the concentration of solution A and the rate of reaction ? Explain. ( 2 marks )

---

---

---

---

2. You are provided with solid D.

Carry out the following tests and write your observations and inferences in the spaces provided.

(a) Place about one – half of solid D in a dry test tube. Heat it strongly and test for any gas produced using a blue and red litmus paper.

Observations	Inferences
( 1 ½ mark )	( 1 mark )

(b) Place the rest of solid D in a boiling tube and add about 10cm<sup>3</sup> of distilled water. Shake well and use about 2cm<sup>3</sup> portions for each of the tests below.

(i) To one portion, add aqueous sodium hydroxide drop wise until in excess.

Observations	Inferences
( 1 mark )	( 1 mark )

(ii) To a second portion, add aqueous ammonia drop wise until in excess.

Observations	Inferences
( 1 mark )	( 1 mark )

(iii) To a third portion add about 5 drops of potassium iodide.

Observations	Inferences
( 1½ mark )	( 1 mark )

(iii) To a fourth portion, add dilute barium nitrate solution followed by dilute nitric acid.

Observations	Inferences
( 1 mark )	( 1 mark )

(iv) To a fifth portion, add lead (II) nitrate solution.

Observations	Inferences
( 1 mark )	( 1 mark )

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

(a) To about  $1\text{cm}^3$  of liquid E in a test tube, add about  $1\text{cm}^3$  of distilled water and shake thoroughly

Observations	Inferences
( 1 mark )	( 1 mark )

(b) To about  $2\text{cm}^3$  of liquid E in a test-tube, add about  $1\text{cm}^3$  of acidified potassium dichromate (VI). Warm the mixture gently and allow it to stand for about one minute.

Observations	Inferences
( 1 mark )	( 1 mark )

(c) To about  $2\text{cm}^3$  of liquid E in a test tube, add all the sodium carbonate provided.

Observations	Inferences
( 1 mark )	( 1 mark )

(d) To about  $2\text{cm}^3$  of liquid E in a test-tube, add about  $2\text{cm}^3$  of ethanoic acid followed by 2 drops of concentrated sulphuric (VI) acid.

Observations	Inferences
( 1 mark )	( 1 mark )

