| Name | | | Index No/ |
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| * | | 9 | Candidate's Signature |
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233/3

PRE-MOCK MARCH - APRIL

Kenya Certificate of Secondary Education

CHEMISTRY
PRACTICAL
PAPER 3
TIME: 2½ HOURS

INSTRUCTIONS TO CANDIDATES

- Answer all questions in the spaces provided in this question paper.
- > You are NOT allowed to start working with the apparatus for the first 15 minutes of the 2½ 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 workings must be clearly shown where necessary.

For examiners use only

| Questions | Maximum score | Candidates score |
|-----------|---------------|------------------|
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| 3 | 09 | |
| TOTAL | 40 | |

This paper consists of 5 printed pages.

Candida as should check the question paper to ensure that all the pages are printed as indicated and that no questions are missing.

You are provided with:
Sulphuric (VI) acid solution J
 O.5M sodium hydroxide solution K
Magnesium ribbon labeled N.

You are required to:

- (i). Investigate the rate of reaction between solution J and metal N
- (ii). Determine the concentration of sulphuric (VI) acid in grams per litre.

PROCEDURE I

- (i). Using a ruler, make six marks at 2cm length interval on the magnesium ribbon provided. Cut of six equal pieces each 6 cm long
- (ii). Transfer 50.0cm³ of acid solution using a measuring cylinder into a clean dry 100ml beaker. Place 2.0cm length piece of magnesium ribbon into the beaker with the acid and immediately start a stop watch clock. Shake gently an note the time taken to for the piece of magnesium ribbon to react completely.
- (iii). Record in table I below. Place another piece of magnesium ribbon 2 cm to the same solution and again note the time taken.
- (iv). Repeat the procedure until all six pieces of magnesium ribbon have reacted with the same solution initially placed in the beaker.

KEEP THE SOLUTION OBTAINED IN THIS EXPERIMENT FOR USE IN PROCEDURE II

(vi). At the same time record the temperature of the solution at the time when magnesium ribbon just disappears.

(vi). Complete the table below.

(3 marks)

Table 1

| Piece of magnesium added | 1 | 2 | 3 | 4 | 5 | 6 |
|------------------------------|---|---|-------|---|-------|----|
| Time taken (seconds) | | | L + 0 | | | |
| Reciprocal of time 1/t (S-1) | 1 | | | | , s e | |
| Temperature of mixture (°C) | | | | 1 | | |
| Length of magnesium added | 2 | 4 | 6 | 8 | 10 | 12 |

| (b) (i). Plot a graph of total le | ngth of magr | nesium ribbon ad | ded against rec | procal of time | for the |
|--|--------------|------------------|-----------------|----------------|--------------|
| reaction to go to completion. | | | 7.0 | | (3 marks) |
| and the second s | . 10 | | | | (0 11111111) |

| completely. | n find the reciprocal | of time when | d 4.5 cm length of | magnesium nobon | reacts |
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| completely. | | | | | (1mark) |
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| (iv). Calc | ulate the m | ass per unit le | ngth of ma | gnesium rib | bon provid | led. | | (11 |
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| | · · · · · · · · · · · · · · · · · · · | | | | | | | |
| (c) (i) R | ecord the in | itial temperate | omo of the | | 111.1 | | | •••• |
| ribbon. | ocora inc m | tuai temperan | ire of the a | cid before a | ddition of | the first pie | ce of the magn | iesiu |
| | | | | */ | | 1 | | (11 |
| , | *************************************** | | | •••••••• | | | | |
| | | | •••••• | | | | | |
| (ii). From | your answe | ers in the table | above and | the answer | in (c) (i) a | bove find A | and hence the | e |
| entnaipy o | hange for t | he reaction be | tween the | magnesium | ribbon and | the acid. | | (1n |
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PROCEDURE II

Titration

Final burette reading (cm³)

Place all the solution obtained in procedure I in a clean 250ml volumetric flask. Add distilled water to make 250cm³ solution.

Transfer all the solution into a beaker and shake well. Label it solution M. Fill the burette with solution K.

Pipette 25.0 cm³ of solution M into a conical flask. Add 2-3 drops of **phenol**phthalein indicator and titrate with solution K. Record your results in the table II below. Repeat the titration to obtain consistent values.

Table II

(3 marks)

2

| Initial burette reading (cm ³) | | | | |
|--|-------------------|--------------------|--|----------|
| Volume of solution K used (cm ³) | | - | | - |
| (d). Determine the average volume o | f solution K used | | | l (1mark |
| | | | | |
| 6) Charles of | | | | |
| (c) Calculate the number of moles of | sodium hydroxi | | | (1mark) |
| | | | | |
| | | | | |
| (i) Calculate: (i) the number of moles of sulphuric (| VI) acid in 25.0 | cm³ of solution M. | | (Imark) |
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| (ii) Thumber of moles of sulphuric | | The second second | | (1mark) |
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| acid in 50.0cm ³ solution J. | | | (1mar |
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| (h). Calculate the concentration of the | he original sulphur | ic (VI) acid in moles n | er litre: (2 mark |
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| | | | |
| 2. You are provided with 10cm ³ of so | olution II | | |
| Soldon H contains two cations and | two anions Corry | out the tests below and | - 1 |
| obsevations and inferences in the sp | aces provided | out the tests below and | record your |
| | | | 2 . 1 " |
| (a) idd 15cm ³ of 2M sodium hydro | xide to all of solut | ion H provided Chales | True d |
| intea boiling tube. Retain the filtrat | e. | ion in provided. Shake | well. Filter the mixture |
| OMERVATIONS | and the state of the state of | INFERENCES | |
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| | (1mark) | | (1mark) |
| (b) To about 2cm ³ of the filtrate a | add 2M nitric acid | dropwise until in exces | s. Retain the mixture |
| OERVATIONS | | | |
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| | (lmark) | INFERENCES | |
| Die the mixture in (b) (i) above in | (lmark) | INFERENCES | (1mark) |
| Dit the mixture in (b) (i) above in (ii) the first portion add agreeus | (lmark) | INFERENCES | |
| | (lmark) | INFERENCES | |
| Dit the mixture in (b) (i) above in (ii) the first portion add agreeus | (lmark) | INFERENCES | |
| Dit the mixture in (b) (i) above in (ii) the first portion add agreeus | (lmark) | INFERENCES | |
| Dit the mixture in (b) (i) above in (ii) the first portion add agreeus | (lmark) | INFERENCES | |
| Dit the mixture in (b) (i) above in (ii) the first portion add agreeus | (lmark) | INFERENCES | |
| Dit the mixture in (b) (i) above in (ii) the first portion add agreeus | (1mark) to two portions. sodium hydroxide | INFERENCES | |
| Dit the mixture in (b) (i) above in (ii) the first portion add agreeus | (lmark) | INFERENCES | (1mark) |
| Dit the mixture in (b) (i) above in (ii) the first portion add agreeus | (1mark) to two portions. sodium hydroxide | INFERENCES | |
| Dit the mixture in (b) (i) above in (ii) the first portion add agreeus | (1mark) to two portions. sodium hydroxide | INFERENCES | (1mark) |
| Dit the mixture in (b) (i) above in (ii) the first portion add agreeus | (1mark) to two portions. sodium hydroxide | INFERENCES | (1mark) |

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| (iii). To the second portion a | add agueon | ommonia i | | |
| OBSERVATIONS | ad aqueou. | s aminoma dro | pwise till in excess. | |
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| 1 | 2 | (1/ 1) | | 1. |
| (c). To 2cm ³ of the filtrate, a | dd 4 drops | (½ mark) | | (½ mark) |
| OBSERVATIONS | dd 4 drops | of acidified ba | rium chloride | |
| | | | INFERENCES | |
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| lo. | | | | |
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| | | (1/ 1) | | |
| (d). To 2cm ³ of the filtrate ad | d about law | (½ mark) | | (½ mark) |
| (d). To 2cm ³ of the filtrate ad of aluminium foil. Warm the | miytura ca | or aqueous | sodium hydroxide follo | wed by a small piece |
| of aluminium foil. Warm the papers. | mixture ger | my and carefu | lly. Identify any gases of | evolved using litmus |
| OBSERVATIONS | | | | |
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| | 2.0 | | | A second |
| | 19.4 | (1/1) | a finite pa | a day, in |
| | | (½ mark) | <u> Rojeki C</u> | (½ mark) |

3. You are provided with **liquid** G. Carry out the tests below. Record your observations and inferences in the spaces provided

| (a). Place three or four drops OBSERVATIONS | of liquid O | | |
|---|--|------------------------------|---------------------|
| OBSERVATIONS | or inquid G on a watch | glass. Ignite the liquid us | ing a Bunsen burner |
| # 10 A T | | INFERENCES | g a Dansen burner. |
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| 1 . | 16. | | * P = 4 |
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| 4 | (½ mark) | | |
| (b) To about 1cm ³ of liquid G | in a test tube III i | | (½ mark |
| (b) To about 1cm ³ of liquid G OBSERVATIONS | in a test tube, add abou | ert 1 cm3 of distilled water | and chake |
| 3.55 | | INFERENCES | und Shake. |
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| | | 1. | |
| (c). To about 1 cm3 of limit of | (½ mark) | | |
| ORSEDVATIONS | in a test tube, add a sn | nali amount of solid and | (½ mark |
| (c). To about 1 cm ³ of liquid G OBSERVATIONS | | INFERENCES | m carbonate |
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| | | a begin a | |
| (d) To at 11 3 | (½ mark) | N. R. M. C. C. C. C. C. | |
| (d). To about 1 cm ³ of liquid G i | n a test tube add 3 dre | F | (½ mark) |
| OBSERVATIONS | add 5 dre | ps of universal indicator | solution. |
| | al straight | INFERENCES | |
| V. + | | | · . |
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| (c) To about 2 cm3 of liquid G: | (½ mark) | | (1/1) |
| (e). To about 2 cm ³ of liquid G in OBSERVATIONS | a test tube, add 3 drop | os of acidified notassium | (½ mark) |
| | | INFERENCES | nanganate (VII). |
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| f) Ta about 2 3 ass | (½ mark) | | 1.77 |
| f).To about 2 cm ³ of liquid G in a DERVATIONS. | test tube, add 3 drops | ofhum | (½ mark) |
| DISERVATIONS | | of bromine water | |
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| | (½ mark) | | (1) |
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| h). To about 2 cm ³ of G add the whole of solution S [Ethanoic acid with 3 drops of concentrated beservations] INFERENCES INFERENCES | (g). To about 2 cm ³ of liquid of dichromate (VI)]. Warm the n OBSERVATIONS | mature gently and allo | INFERENCES | minute. |
|---|--|-------------------------|------------------------|-----------------------|
| ulphuric (VI) acid]. (½ mar ulphuric (VI) acid]. (½ mar ulphuric (VI) acid]. | | | TEREFICES | |
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| lphuric (VI) acid]. BSERVATIONS (½ mar (½ mar (VI) acid). | | | | |
| DERVATIONS |). To about 2 cm ³ of C add th | (½ mark) | | * .* |
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| INFERENCES | apituric (VI) acid]. | solution 8 | Ethanoic acid with 3 c | rops of concentrated |
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NYAMBARE SECONDARY SCHOOL PRE-MOCK MARCH - APRIL

Kenya Certificate of Secondary Education

CHEMISTRY PRACTICAL PAPER 3 CONFIDENTIAL

- About 50 cm³ of 2M sulphuric (VI) acid solution labeled J;
- About 60 cm³ of 0.5M sodium hydroxide solution;
- 12 cm long magnesium ribbon;
- A 100ml measuring cylinder;
- A 10ml measuring cylinder;
- A 100ml glass beaker;
- A stop watch/ clock;
- A burette;
- A 25 cm3 pipette;
- A clamp;
- Phenolphthalein indicator;
- A 110°C thermometer;
- Distilled water;
- 2 conical flasks;
- A white tile:
- Solution **H** in a boiling tube: 10 cm³ of solution made by mixing 75g of hydrated copper (II) sulphate with 15g of zinc nitrate and dissolving the mixture in 800cm³ of distilled water and making it to 1 litre of solution;
- Solution G: 12 cm3 of absolute ethanol.
- Filter paper and funnel;
- Blue and red litmus paper strips;
- A wooden splint;
- Means of heating;
- 5 clean dry test tubes;
- A piece of aluminium foil;
- Test tube folder;
- A pH chart;

Bench solutions.

- Sodium hydroxide solution
- Aqueous ammonia
- 2M nitric (V) acid
- Acidified barium chloride solution.
- Bromine water;
- Acidified potassium manganate (VII);
- Solution R [acidified potassium dichromate (VI)]
- Solution S [Ethanoic acid with 3 drops of concentrated sulphuric (VI) acid].
- Universal indicator solution;