**Name:**....................................................................................**Index No.:** ........................................

 **Candidate’s Signature**: .................

 **Date**: ................................................

**233/3**

**CHEMISTRY**

**Paper 3**

**PRACTICAL**

**JUNE/ AUGUST 2016**

**Time: 2 hours 15 Minutes**

Kenya Certificate of Secondary Education

CHEMISTRY

Paper 3

**Instructions to Candidates**

* *Write your name and index number in the spaces provided above.*
* *Sign and write the date of the examination paper.*
* *Answer* ***ALL*** *the questions in the spaces provided in the question paper.*
* *ALL working* ***MUST*** *be clearly shown where necessary.*
* *Mathematical tables and silent electronic calculators may be used.*
* *Candidates should check the paper to ascertain that all the pages are printed as indicated and that no questions are missing.*



1. You are provided with:-

Solution A, 0.07M hydrochloric acid

1g solid B, Calcium hydroxide

You are required to determine the solubility of Ca (OH)2

Procedure:

Transfer all solid B into a 250cm3 volumetric flask. Measure accurately using a clean measuring cylinder 50 cm3 of water and transfer this carefully into the volumetric flask. Shake gently and measure a second portion of 40cm3 water and add this to the resulting solution in the volumetric flask. Filter the solution into a beaker and label this solution D.

Place solution A in the burette, pipette 25.0 cm3 of solution D into a 250 cm3 conical flask and titrate using methyl orange indicator. Record your result in table below and repeat the titration carefully to obtain consistent results.

|  |  |  |  |
| --- | --- | --- | --- |
| Table | 1 | 2 | 3 |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading (cm3) |  |  |  |
| Volume of A used (cm3) |  |  |  |

 (4mks)

 Calculate:

1. Volume of solution A used. ( 1mk)

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1. Number of moles of the solution A reacted. ( 1mk)

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1. Number of moles of solution D in the 25cm3 (2mks)

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1. Calculate mole of solution D in the 90 cm3 of the solution D. (1mk)

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1. Calculate the mass of calcium hydroxide that dissolved in 90cm3 of water. (2mks)

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1. Determine the solubility of calcium hydroxide at the room temperature. (2mks)

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1. You are provided with:-
* Solution Y contained 0.2M copper (II) sulphate per litre of solution
* Solid Z

You are required to determine the heat evolved when one mole of solution Y react with solid Z.

Procedure

Measure 40cm3 of solution y and place it into insulated 50 cm3 plastic beaker, stir the solution with the help of the thermometer and record its temperature after every half minute for 1 ½ minutes.

After exactly 2 minutes add all the solid Z provided and continue stirring the mixture while recording the temperature of solution and complete the table below.

Table

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time (min) | ½  | 1 | 1.5 | 2 | 2.5 | 3 | 3.5 | 4 | 4.5 | 5 | 5.5 | 6 | 6.5 | 7 |
| Temp 0c |  |  |  | X |  |  |  |  |  |  |  |  |  |  |

(b) (i) On the graph paper provided. Plot a graph of temperature against time. (4mks)

(ii) From your graph, determine the maximum temperature change. (1mk)

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 (c) Given that density of the solution is 1 g/cm3, determine the quantity of heat evolved when

the 40cm3 of solution Y is reacted completely with solid Z. Specific heat capacity of solution = 4.2 Jg-1K-1. (2mks)

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(d) (i) Given that solid Z is zinc powder. Write an ionic equation of the reaction which

occurs (1mk)

………………………………………………………………………………………………………………………………………………………………………………………………

 (ii) Determine the moles of copper (II) ions used up in the reaction. (1mk)

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(iii) Determine the amount of heat that would be evolved of one mole of copper (II) ions were used up. (1mk)

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1. You are provided with substance K. carry out the test below and record your observations and deductions in the table below.
2. Scoop a little of solid K with a clean metallic spatula and place it at the hottest part of a non-luminius flame.

|  |  |
| --- | --- |
| Observation  | Deductions |
|   (1mk) |   (1mk) |

1. Add about 10 cm3 of distilled water to the remaining solid K. divide the resulting mixture into 4 portions.
2. To the 1st portion add 3 drops of acidified K2Cr2O7

|  |  |
| --- | --- |
| Observation  | Deductions |
|   (1mk) |   (1mk) |

1. To the 2nd portion add 3 drops of bromine water and warm.

|  |  |
| --- | --- |
| Observation  | Deductions |
|   (1mk) |   (1mk) |

1. Add 2-3 drops of universal indicator to the 3rd portion and determine the pH of the solution

|  |  |
| --- | --- |
| Observation  | Deductions |
|  (1mk) |  (1mk) |

1. To the 4th portion add a spatula of sodium carbonate.

|  |  |
| --- | --- |
| Observation  | Deductions |
|  (1mk) |  (1mk) |

1. Dissolve one spatula endful of solid L in about 10cm3 of distilled water. Divide the solution in 3 portions.
2. To the 1st portion add NaOH(aq) dropwise until in excess.

|  |  |
| --- | --- |
| Observation  | Deductions |
|   (1mk) |   (1mk) |

1. To the 2nd portion add dilute ammonia solution dropwise until in excess.

|  |  |
| --- | --- |
| Observation  | Deductions |
|  ( 1mk)  |  (1mk)  |

1. To the 3rd portion add 2-3 drops of lead (II) nitrate solution and warm.

|  |  |
| --- | --- |
| Observation  | Deductions |
|  (1mk) |  ( 1mk) |