**233/3**

**CHEMISTRY**

**PAPER 3**

**TIME: 2 HOURS 15 MINUTES**

**2021 TRIAL 3 OCT/N0VEMBER INTERNAL EXAMINATION**

**Kenya certificate of secondary education (K.C.S.E)**

**233/3**

**CHEMISTRYPRACTICAL**

**PAPER 3**

**2 HRS 15 MINUTES**

**OCT/NOVEMBER 2021**

**Name………………………………………………………. Adm No……………….**

**Stream……………………………………………………. Date ………………………….**

**Sign ..............................................................................**

**CHANIA ZONT INTER-SCHOOLS EVALUATION TEST (CZJISET)**

**INSTRUCTIONS TO CANDIDATES**

 ***[a]Answer ALL questions in the spaces provided in each question.***

***[b] Mathematical tables and electronic calculators may be used for calculations.***

***[c]all working must be clearly shown where necessary.***

**FOR EXAMINERS ONLY**

|  |  |  |
| --- | --- | --- |
| **QUESTION** | **MAXIMUM SCORE** | **CANDIDATES SCORE** |
| **1** | **15** |  |
| **2** | **13** |  |
| **3** | **12** |  |
| **Total** | **40** |  |

1. You are provided with

* 2.0M NaoH solution labelled B
* Sulphuric(VI)acid solution labelled A `

You are to:

[a] Prepare a dilute solution of NaoH solution.

[b] Determine the concentration of in moles per litre.

**PROCEDURE 1**

* 1. Using a pipette 25.0cm3 of solution B and place it into 250cm3 volumetric flask.
	2. Add about 200cm3 of distilled water and share well.
	3. Add more water to make up to 250cm3mark. Label this solution C

[a] Calculate the concentration of the dilute solution C in moles per litres. [2mks]

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**PROCEDURE 2**

1. Fill the burette with solution A and record the readings in the table below.
2. Pipette 25cm3 of dilute solution C and place it into 250ml conical flask.
3. Add 2-3 drops of phenolphthalein indicator.
4. Titrate with solution A.
5. Record your results in the table below.
6. Repeat the titration two or more times and complete the table.

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| --- | --- | --- | --- |
|  | I | II | III |
| Final burette reading (cm3) |  |  |  |
| Initial burette reading(cm3) |  |  |  |
| Volume of solution A(cm3) |  |  |  |

 [4mks]

[a] Determine average volume of the acid (solution A) used. [1mk]

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[b] Determine moles of dilute solution C in the volume used. [2mks]

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[c] Write an equation for the reaction taking place. [1mk]

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[d] Determine the number of moles of A used. [2mks]

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[e] Determine the concentration of A in moles per litre. [2mks]

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2. You are provided with the following

* 2M sodium hydroxide solution, solution B
* 2M hydrochloric acid, solution D

You are required to determine the molar enthalpy of neutralization of the acid using sodium hydroxide.

**PROCEDURE**

[i] Measure out 20cm3 of acid into a clean plastic beaker.

[ii] Record the temperature of this solution in the table below

[iii] Measure 5cm3 of sodium hydroxide and add it to the hydrochloric acid.

[iv] Stir with the thermometer and record the maximum temperature reached.

[v] Repeat the above procedure adding 5cm3 portions of sodium hydroxide until the total volume of the solution is 50cm3.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| Volume of acid(cm3) | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Volume of NaoH added cm3 | 0 | 5 | 10 | 15 | 20 | 25 | 30 |
| Temperature($°C$)of solution |  |  |  |  |  |  |  |

 [3mks]

You are required to:

[a]. Plot a graph of temperature rise against sodium hydroxide added. [3mks]



[b]From your graph determine:

[i] maximum temperature change.  [1mk]

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[ii] the volume of NaOH that is required for complete neutralization  [1mk]

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[iii] Calculate the molar enthalpy of neutralization for this reaction. (C=4.2J/g/$K$) assume density of solution is 1gcm-3) [2mks]

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[iii] The theoretical molar heat of neutralization is -57.2kj/mol-1.Compare your value in [ii] above with the theoretical value. Give the reasons for any differences noted between these two values. [2mks]

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3. You are provided with solid N carry out the tests below and record your observations and inferences.

[a] Place a spatula of N in a test tube and add 5cm3 of water and shake well divide the solution in to three portions.

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| **OBSERVATION (1mk)** | **INFERENCE (1mk)** |
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|  |  |

[b] Add sodium hydroxide to the first portion drop wise while observing till in excess

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| --- | --- |
| **OBSERVATION (1mk)** | **INFERENCE (2mks)** |
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[c] Add ammonia solution to the second portion drop wise until in excess.

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| **OBSERVATION (1mk)** | **INFERENCE (1mk)** |
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[d] Add four drops of potassium iodide solution to the third portion.

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| **OBSERVATION (1mk)** | **INFERENCE (1mk)** |
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[e] Add three drops of acid barium nitrate to the fourth followed by 5 drops of nitric acid.

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| **OBSERVATION (2mks)** | **INFERENCE (1mk)** |
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