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 .....

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

i. Using a pipette 25.0cm^3 of solution B and place it into 250cm^3 volumetric flask.

ii. Add about 200cm^3 of distilled water and share well.

iii. Add more water to make up to 250cm^{3}mark. Label this solution C

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

[2mks]

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PROCEDURE 2

i. Fill the burette with solution A and record the readings in the table below.

ii. Pipette 25cm^3 of dilute solution C and place it into 250ml conical flask.

iii. Add 2-3 drops of phenolphthalein indicator.

iv. Titrate with solution A.

v. Record your results in the table below.

vi. Repeat the titration two or more times and complete the table.

	I	II	III
Final burette reading (cm^3)			
Initial burette reading(cm^3)			

Volume of solution A(cm^3)			

[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 20cm^3 of acid into a clean plastic beaker.

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

[iii] Measure 5cm^3 of sodium hydroxide and add it to the hydrochloric acid.

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

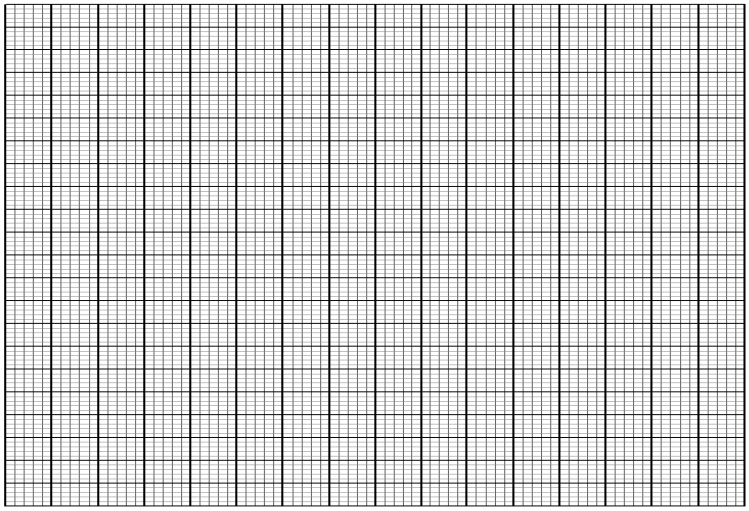
[v] Repeat the above procedure adding 5cm^3 portions of sodium hydroxide until the total volume of the solution is 50cm^3.

Volume of acid(cm3)	20	20	20	20	20	20	20
Volume of NaoH added cm^3	0	5	10	15	20	25	30
Temperature()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/) 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 5cm^3 of water and shake well divide the solution in to three portions.

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

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

OBSERVATION (1mk)	INFERENCE (2mks)

[c] Add ammonia solution to the second portion drop wise until in excess.

OBSERVATION (1mk)	INFERENCE (1mk)

[d] Add four drops of potassium iodide solution to the third portion.

OBSERVATION (1mk)	INFERENCE (1mk)

[e] Add three drops of acid barium nitrate to the fourth followed by 5 drops of nitric acid.

OBSERVATION (2mks)	INFERENCE (1mk)