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233/3

CHEMISTRY

PAPER 3

PRACTICAL

JUNE 2013

2 *4 HOURS

B UNYORE - MARANDA JOINT EXAMS

Kenya Certificate of Secondary Education

233/3

CHEMISTRY

PAPER 3

INSTRUCITONS TO CANDIDATES

- ☐ Answer ALL questions in the spaces provided in the question paper
- ◆> You are not allowed to start working with the apparatus for the first 15 minutes of the 2 % hours allowed for this paper.
- ☐ This time is to enable you read through the question paper and make sure you have all the chemicals and apparatus that you may need
- ***All the working must be clearly shown where necessary
- ***Electronic calculators and mathematical table s may be used.

For Examiners use Only

Question	Maximum Score	Candidates Score
1	18	
2	14	
	08	
Total	40	

1. You are provided with
 - Sulphuric acid, solution M
 - 0.5m Sodium hydroxide, solution N
 - Zinc powder, Solid Q

You are required to determine the concentration of Sulphuric acid in moles per litre

Procedure I:

Measure 50cm³ of solution M using a measuring cylinder and place it in a 100cm³ plastic beaker. Stir the solution gently with a thermometer and take it's temperature after every thirty seconds. After 90 seconds add all of solid Q at once and stir gently using the thermometer.

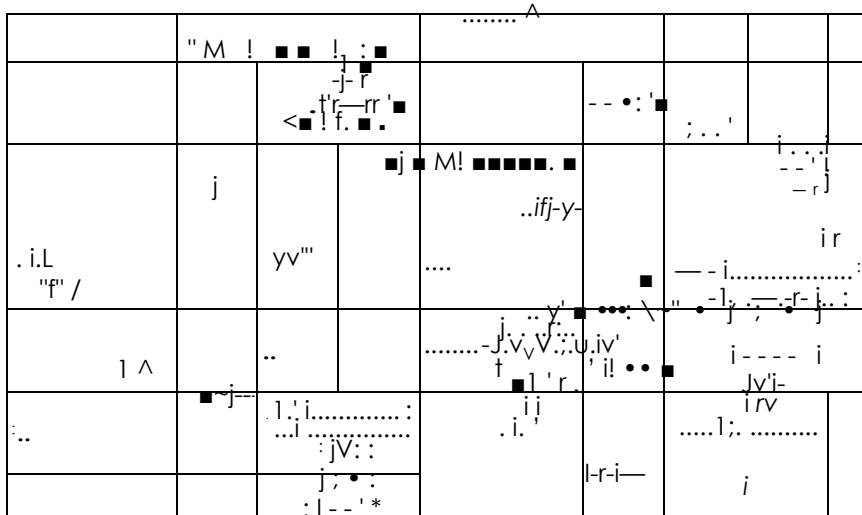
Record the temperature of the mixture after every 30 seconds. Retain the solution for use in procedure II.

(a)

Time (sec)	0	30	60	90	120	150	180	210	240	270	300	330
Temperature °C												

(3 marks)

- (b) Plot a graph of temperature against time on the plane provided (3 marks)



- (c) Using the graph, determine the highest change in temperature ΔT (1 mark)
- (d) Calculate the heat change for the reaction given that the specific heat capacity for water is 4.2J/gK and that the density of resulting solution is 1g/cm³.
_____ (1 mark)

- (e) Given that the molar heat of reaction of Sulphuric acid with solid Q is 323KJmol^{-1}
 1. Calculate the number of moles of Sulphuric acid that were used during the reaction. (1 mark)

- (f) Procedure II
 Place all the solution obtained in procedure I in a clean 1000cm^3 measuring cylinder. Add distilled water to make 100cm^3 solution. Transfer the solution into a beaker and shake well. Label the resulting solution as B. fill the burette with solution N. pipette 25.0cm^3 of solution B into a conical flask and add 2-3 drops of phenolphthalein indicator. Titrate solution N and record the results in the table below.

	I	II	III
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of N used (cm^3)			

(4 marks)

- (g) Determine the average volume of solution N used (1 mark)

- (h) Calculate the number of moles of sodium hydroxide solution N used (1 mark)

- (i) Determine

- (i) The number of moles of Sulphuric acid in 25.0cm^3 of solution B (1 mark)

- (ii) Number of moles of Sulphuric acid in 100cm^3 of solution B (2 marks)

(iii) Using the results from (e) and (i) and (ii) above calculate the total number of moles of Sulphuric acid in the 50cm³ of solution M. (1 mark)

(iv) Calculate the concentration of the original Sulphuric acid, solution M in moles per litre. (1 mark)

2. You are provided with solid A. You are required to carry out the tests below and write your observations and inferences in the spaces provided. Identify any gas or gases produced.

Divide solid A into equal portions:

(a) Place one portion of solid A into a dry test tube. Heat gently then strongly. Allow to cool.

Observations	Inferences
(2 marks)	(1 mark)

(b) (i) Place the remaining portion of solid A into a test tube. Add 2m nitric acid dropwise until all the solid dissolves then add 4cm³ of distilled water, Shake well and divide the solution into three equal portions.

Observations	Inferences
(1 mark)	(1 mark)

(ii) To the first, add aqueous sodium hydroxide until in excess.

Observations	Inferences
(1 marks)	(2 marks)

(iii) To the second, portion, add aqueous ammonia dropwise until in excess.

Observations	Inferences
(1 mark)	(1 mark)

(iv) To the third portion, add 4 drops of 2M sulphuric acid.

Observations	Inferences
(1/2 mark)	(1 mark)

b) You are provided with solid Y. carry out the following tests and record your observations and inferences.

(i) Put a spatula end - full of solid Y in a clean dry boiling tube. Add about 10ml of distilled water and shake. Divide the solution into four portions.

Observations	Inferences --
(1/2 mark)	(1/2 mark)

(ii) To the first portion, add all the solid sodium hydrogen carbonate provided.

Observations	Inferences
(1/2 mark)	(1/2 mark)

(iii) To the second portion, add equal amount of absolute ethanol, followed by 2 drops of concentrated sulphuric acid and warm

Inferences

(1 mark)

Observations	Inferences
(1 mark)	(1 mark)

Observations	Inferences
(1 mark)	(1mark)

Observations	Inferences
(1/2 mark)	(1/2 mark)