ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMBINED SCIENCE 4003/3

PAPER 3 Practical Test

NOVEMBER 2019 SESSION 1 hour 30 minutes

Candidates answer on the question paper.

Additional materials:
As listed in instructions to Supervisors
Calculator (optional)

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **both** questions.

Write your answers in the spaces provided on the question paper.

Use a sharp pencil for your drawings. Coloured pencils or crayons should **not** be used.

You should show the essential steps in any calculation and record all experimental results in the spaces provided in the question paper.

INFORMATION FOR CANDIDATES
The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE	
1	
2	
TOTAL	

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1. You are required to compare energy values of two food samples.

You are provided with 1.0 g mealie meal in a crucible, 1.0 g sugar in a crucible, a thermometer, a boiling tube and a graduated syringe.

Method

Using a graduated syringe, measure 5.0 cm^3 of water and pour it in the boiling tube.

Measure the initial temperature of the water and record it in **Table 1.1**.

Heat the mealie meal as shown in **Fig.1.1(a)**.

Heat the mealie meal until it turns brown.

Remove the burner and ignite the mealie meal.

Support the boiling tube using a pair of tongs as shown in **Fig.1.1(b)** and immediately start a stop watch.

Heat the water for 15 seconds.

Stir the water in the boiling tube with a thermometer and record the temperature in **Table 1.1**.

Complete **Table 1.1** by calculating the temperature change.

Repeat the experiment using the 1.0 g of sugar.



Fig 1.1 (a)

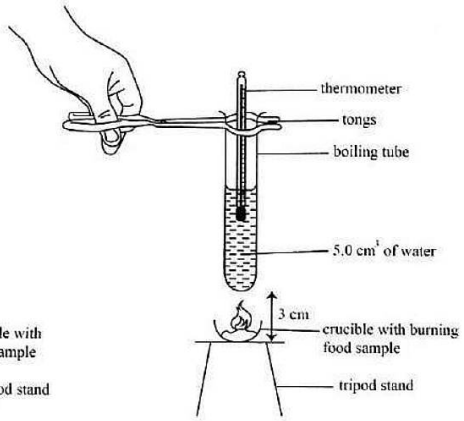


Fig 1.1 (b)

(a) (i)

Table 1.1

	mealie meal	sugar
final temperature of water/°C		
initial temperature of water/°C		
temperature change/°C		

[12]

(ii) State a reason for stirring the water before taking the temperature reading.

.....

[1]

(iii) Identify, with a reason, the food sample with a higher energy value.

food sample

.....

reason .....

[2]

(iv) Explain the difference in the energy values of the food samples.

.....

[1]

(v) Write a word equation for the burning of sugar.

.....

[2]

(b) (i) Suggest any **one** source of error in the experiment.

.....

.....

[1]

(ii) State any **one** precaution that needs to be taken during the experiment.

.....

.....

[1]

2. You are required to compare the reactivity of two metals based on their reaction with dilute hydrochloric acid. A liquid soap has been added to the dilute hydrochloric acid.

You are provided with two metals labelled M1 and M2, a test tube, a graduated syringe, dilute hydrochloric acid and a 30 cm ruler.

(a) (i) Measure 5.0 cm^3 of the dilute hydrochloric acid using a graduated syringe and place the acid into a test tube.

Place metal M1 into the test tube and immediately start the stop watch.

Measure the depth of the foam produced after 3 minutes and record it in **Table 2.1**.

Rinse the test tube.

Repeat the experiment using dilute hydrochloric acid and metal M2.

Measure and record the depth of the foam produced for metal M2 in **Table 2.1**.

Note: The metals used have the same number of moles.

Table 2.1

metal	depth of the foam/ mm
M1	
M2	

[10]

(ii) Identify, with a reason, which metal, M1 or M2, is more reactive.

metal .....

reason .....

[2]

(iii) Explain why copper **cannot** be one of the metals used in the experiment.

.....

.....

.....

[2]

(iv) Write a general word equation for the reaction of a metal and an acid.

.....

[2]

(v) State, with a reason, another way of comparing the reactivity of M1 and M2 when reacting with an a dilute acid.

.....

.....

.....

[2]

(b) (i) State **one** precaution that should be taken during the experiment.

.....

.....

[1]

(ii) Suggest **one** possible source of error during the experiment.

.....

.....

[1]