



**ZIMBABWE SCHOOL EXAMINATIONS COUNCIL**  
**General Certificate of Education Ordinary Level**

**COMBINED SCIENCE**  
PAPER 3 Practical Test

**4003/3**

**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	
<b>1</b>	
<b>2</b>	
<b>TOTAL</b>	

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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  $5.0\text{ cm}^3$  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.

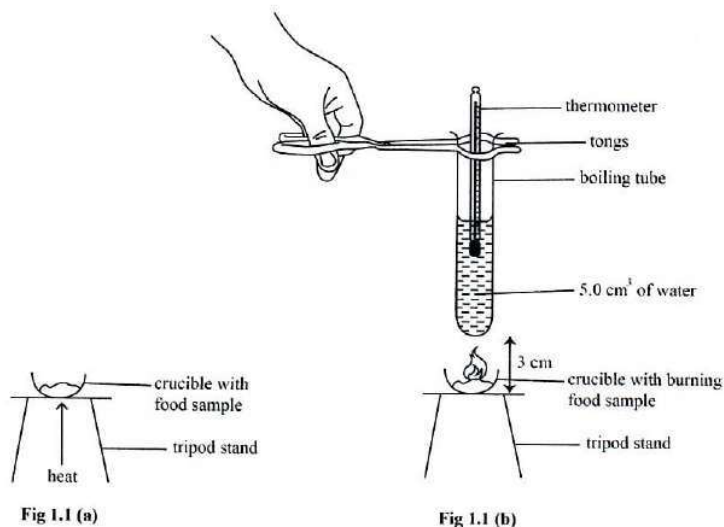
Support the boiling tube using a pair of tongs as shown in **Fig.1.1(b)** and immediately start a stop watch.

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.



(a) (i)

**Table 1.1**

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

[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  $5.0 \text{ cm}^3$  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]