Candidate Name	Centre Number	Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

BIOLOGY

4025/3

PAPER 3 Practical Test

1 hour 30 minutes

JUNE 2024 SESSION

Candidates answer on the question paper

Additional materials:
As listed in Instructions to Supervisors
Electronic calculator
Ruler (cm/mm)
Pencil (B or HB is recommended)
Soft clean eraser

INSTRUCTIONS TO CANDIDATES

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

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	

This question paper consists of 8 printed pages.

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Candidate Name	Centre Number	Candidate Number

*Answer **all** questions.*
Write your answers in the spaces provided on the question paper.
Use a sharp pencil for your drawings.
*Coloured pencils and crayons should **not** be used.*

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1. You are required to investigate the effect of insulation on temperature loss in mammals using a model.

You are provided with:
two test tubes
a thermometer
insulating materials **X** and **Y**
hot water
two beakers
a measuring cylinder
a stop watch

Proceed as follows:
Place the insulating material **X** into a beaker.
Completely cover all the sides of the beaker.
Place the test tube in the middle of the beaker, make sure it is covered by the insulating material as shown in **Fig. 1.1**.
Measure 15 cm^3 of hot water, put it into the test tube.
Measure the initial temperature and record it in **Table 1.1**.
Read and record the temperature at **two** minute intervals for 10 minutes.
Repeat the procedure using insulating material **Y**.

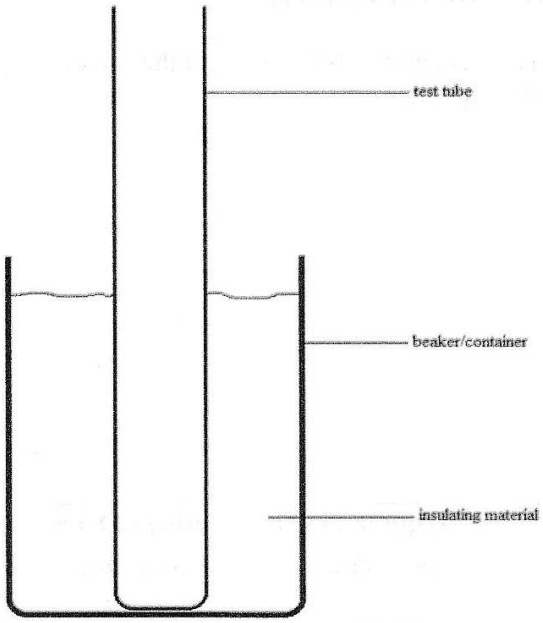


Fig. 1.1

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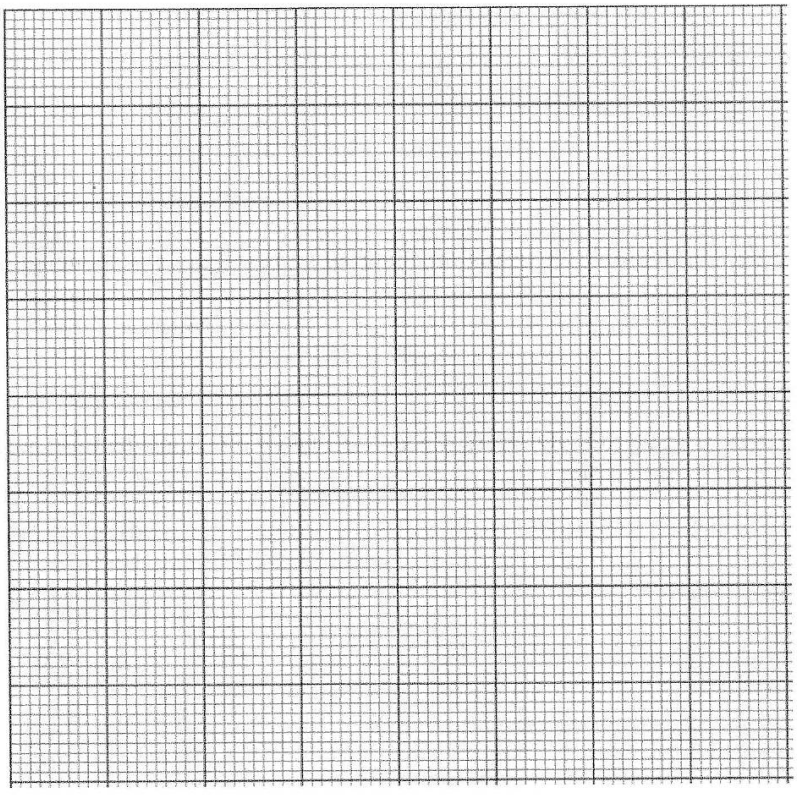
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(a) (i) Table 1.1

time /min	test tube surrounded by X	test tube surrounded by Y
0		
2		
4		
6		
8		
10		

[6]

(ii) Plot a graph of temperature (vertical axis) against time (horizontal axis) for the results for insulating material **Y**.



[4]

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(iii) Describe the results in **Table 1.1**.

.....

.....

.....

.....

[2]

(iv) Explain the difference between the results for insulating material **X** and insulating material **Y**.

.....

.....

.....

[2]

(b) (i) Identify the insulating material more effective in reducing heat loss.

.....

[1]

(ii) Suggest any safety precautions taken into consideration during the procedure.

.....

.....

.....

.....

[2]

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(iii) State, with a reason, **one** improvement to the procedure to obtain more accurate results.

improvement,

.....

.....

reason.

.....

.....

[2]

(iv) Identify any **one** limitation of the set up in representing real insulation process in mammals.

.....

.....

[1]

[Total: 20]

2. You are required to investigate the presence of protein in different food samples.
You are provided with the following:

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four food samples labelled as **S1**, **S2**, **S3** and **S4**.

sodium hydroxide solution

four test tubes

a syringe

means of labelling glassware

a dropper

copper sulphate solution

a test tube rack

access to a stop watch/clock

Proceed as follows:

Label four test tubes as **A**, **B**, **C** and **D**.

Add 2 cm^3 of **S1** into test tube **A**.

Add 2 cm^3 of **S2** into test tube **B**.

Add 2 cm^3 of **S3** into test tube **C**.

Add 2 cm^3 of **S4** into test tube **D**.

Add 2 cm^3 of sodium hydroxide to each of the test tubes **A**, **B**, **C** and **D**.

NB: Sodium hydroxide solution is corrosive, avoid skin contact.
Add two drops of dilute copper sulphate solution to each of test tubes **A**, **B**, **C** and **D**. Shake the test tubes gently.
Place the tubes in a test tube rack and leave for two minutes.
After **two** minutes, record the observations and conclusions made in **Table 2.1**.

(a) **(i)** **Table 2.1**

food	**observation on adding sodium hydroxide and copper sulphate**	**conclusion**
test tube **A**		
test tube **B**		
test tube **C**		
test tube **D**		

[8]

(ii) State a reason for shaking the test tubes.

.....

.....

[1]

(iii) Identify, with a reason, the test tube with the highest protein concentration.

.....

.....

.....

.....

[2]

(iv) State, with a reason, the test tube serving as the control.

test tube .....

reason .....

.....

[2]

(v) Recommend, with a reason, the food source most suitable for a child showing symptoms of kwashiorkor.

food source .....

reason .....

.....

[2]

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(b) **(i)** Plan and organise an investigation on the presence of lipids in any of the food sources in **(a)**.

.....

.....

.....

.....

.....

..... [4]

(ii) State a safety precaution taken when carrying out the investigation in **(b)(i)**.

.....

.....

..... [1]

[Total: 20]

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