



EXAMINATIONS COUNCIL OF ESWATINI
Eswatini General Certificate of Secondary Education

CANDIDATE
NAME

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CENTRE
NUMBER

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CANDIDATE
NUMBER

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BIOLOGY

6884/04

Paper 4 Alternative to Practical

October/November 2021

1 hour

Candidates answer on the Question Paper.

Additional Materials: ruler in millimetres.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces provided.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do **not** use staples, paper clips, glue or correction fluid.

Do **not** write on the barcode.

Answer **all** questions.

You may use an electronic calculator.

You may lose marks if you do not show your working or if you do not use appropriate units.

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 document consists of 7 printed pages and 1 blank page.

- 1 An investigation is carried out to determine the role of fur in regulating body temperature in mammals. Cotton wool is used to represent the fur and boiling tubes with hot water to represent mammals.

The investigation is carried out as follows:

- boiling tube **A** is completely wrapped with cotton wool and boiling tube **B** is left unwrapped
- the same volume of hot water at 90 °C is poured into boiling tubes **A** and **B** so that they are completely filled
- both boiling tubes are quickly closed with rubber stoppers fitted with thermometers
- the temperatures of the water in each boiling tube are read and recorded every 2 minutes for 10 minutes.

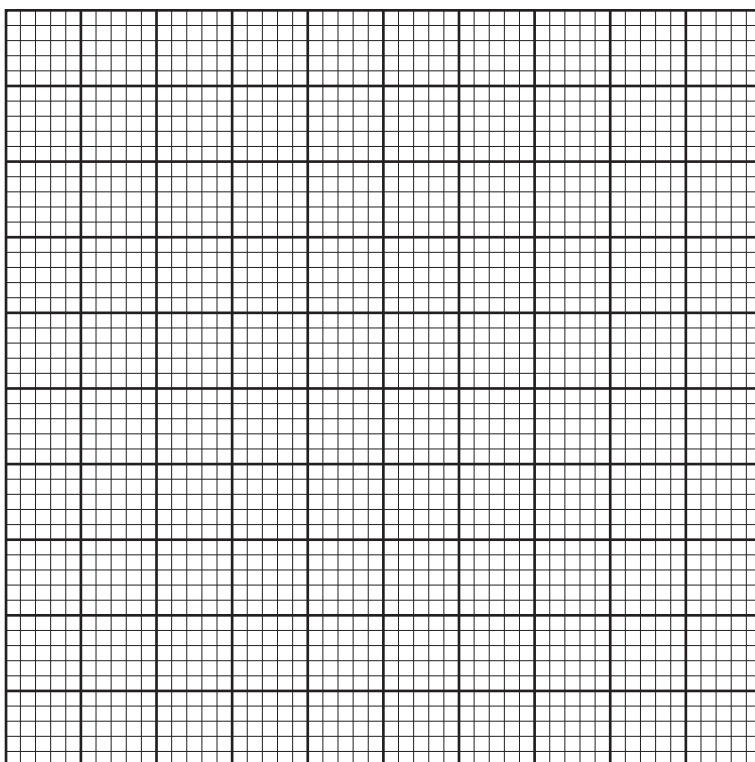
The results of the investigation are shown in Table 1.1.

Table 1.1

time/min	(i)	
	A	B
0	(ii)	
2	88	85
4	86	80
6	84	75
8	82	70
10	80	73

- (a) (i) Complete Table 1.1 by filling in the correct heading in the space provided. [1]
- (ii) Record the temperatures at 0 minutes for **both** boiling tubes in Table 1.1. [1]

- (b) On the grid, construct line graphs of the results for boiling tubes **A** and **B** in Table 1.1 on the same axes. Join your points with ruled lines.



[5]

- (c) State, using your graph, the temperature of the water in boiling tube **A** at 5 minutes.

Show on the graph how you obtained your answer.

..... [2]

- (d) Explain the importance of:

- (i) completely wrapping boiling tube **A** with cotton wool

.....

..... [1]

- (ii) closing each boiling tube quickly with the rubber stopper.

.....

..... [1]

- (e) State the dependent variable in this investigation.

..... [1]

- (f) Describe and explain the observed results in Table 1.1.

.....

.....

.....

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..... [5]

- (g) Describe **two** ways to improve the method of this investigation to ensure that the results are reliable.

1

.....

2

..... [2]

- (h) A larger boiling tube, without cotton wool round it, was completely filled with hot water at 90 °C, stoppered and the temperature of the water measured every 2 minutes for 10 minutes. The readings were compared with those of the smaller boiling tube **B**.

Predict and explain what the results might tell you about heat loss in larger and smaller mammals.

prediction

.....

explanation

.....

.....

..... [2]

[Total: 21]

- 2 Fig. 2.1 is a photograph of a peanut seed, opened to show its internal structures.



Fig. 2.1

- (a) (i) State a feature of the peanut seed in Fig. 2.1 that indicates that it comes from a dicotyledonous plant.

..... [1]

- (ii) Make a large drawing of the half of the seed that contains the embryo.

[3]

Label on your drawing:

- the part that develops into the root system of the new plant as **C**
- the part that provides nutrients to the growing embryo as **D**
- the part that protects the seed while in dormancy as **E**

[3]

(b) A student carries out an investigation to compare the content of fat in the cotyledons and the embryo of a germinating peanut seed using the following procedure:

- the embryo is carefully removed and chopped into small pieces using a scalpel knife
- the chopped pieces are put into test-tube **F**
- the scalpel knife is thoroughly rinsed in clean water
- the cotyledon is chopped into fine pieces and put into test-tube **G**
- the contents of **F** and **G** are tested for fat

(i) Suggest a reason for chopping the cotyledon and embryo before they are tested for fats.

.....

..... [1]

(ii) State the importance of thoroughly rinsing the scalpel knife before chopping the cotyledon.

.....

..... [1]

(iii) Describe how the student carries out the test for fats.

.....

.....

..... [2]

(iv) The student concludes that the cotyledon contains fats while the embryo has no fats.

State what the student observed in the two test-tubes that led to these conclusions.

observation in test-tube **F**

.....

observation in test-tube **G**

..... [2]

(v) Suggest why the embryo does not contain fats while the cotyledons have them.

.....

..... [1]

- (c) Design an experiment that you could carry out to compare the amount of reducing sugars in peanuts and maize seeds.

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..... [5]

[Total: 19]

