EXAMINATION NO.:_____

THE MALAWI NATIONAL EXAMINATIONS BOARD

2013 MALAWI SCHOOL CERTIFICATE OF EDUCATION

BIOLOGY

Subject Number: M022/I

Tuesday, 2 July

Time Allowed: 2 h 30 mins
8:30 – 11:00 am

PAPER I
(100 marks)

Theory

Question Number	Tick if answered	Do not write in these columns	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

1. **This paper contains 14 pages. Please check.**

2. Before you begin, **fill** in your **Examination Number** at the top of the question paper and on all other sheets.

3. This paper contains sections **A**, **B** and **C**. Answer **all** questions in all the sections. Some can be answered quickly, but others require considerable thought and may take longer.

4. Write your answers on the question paper in the spaces provided. The maximum number of marks for each answer is indicated against each question.

5. In the table provided on this page, **tick** against the question number you have answered.

6. You should hand in your question paper to the invigilator when time is called to stop writing.

Section A (20 marks)

Answer **all** questions in this section.

1. A child developed the following signs and symptoms: high fever, rash inside the mouth and a cough.

   a. (i) Name the disease that the child could be suffering from.

   _____ **(1 mark)**

   (ii) How is the disease transmitted?

   _____

   (1 mark)

   b. Explain **one** way of preventing the disease in **1a(i).**

   _____

   _____

   (2 marks)

2. **Figure 1** shows an experiment that was set up to investigate the movement of water in plant tissues. Use it to answer the questions that follow.

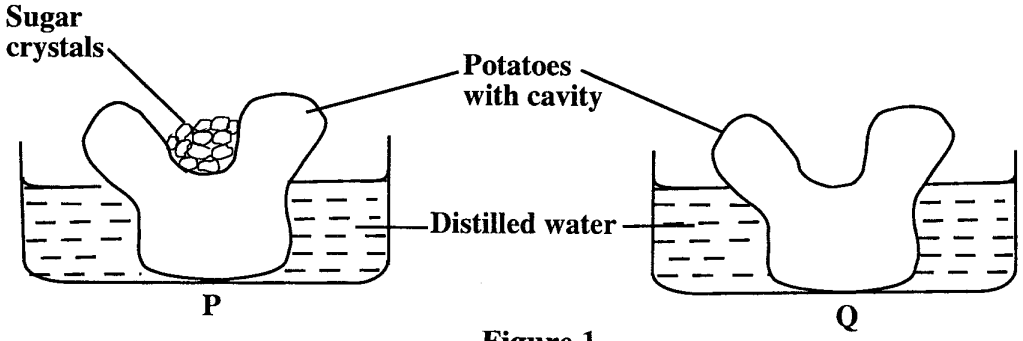


Figure 1

   a. (i) What would be observed in **P** after 1 hour?

   _____

   _____

   (1 mark)

   (ii) Give a reason for your answer in **2a(i).**

   _____

   _____

   (2 marks)

Continued/...

2. (Continued)

b. Which set up is a control?

_____ **(1 mark)**

c. Name any **one** variable that was kept constant in the investigation.

_____

_____

(1 mark)

3. **Figure 2** is a diagram of a fish gill. Use it to answer questions that follow.

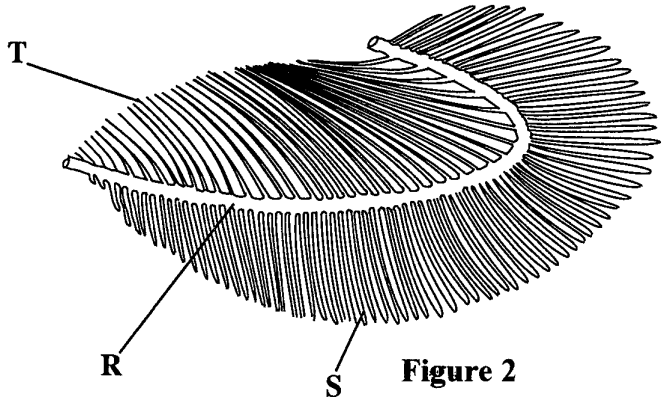


Figure 2

a. Name the part marked **T**.

_____ **(1 mark)**

b. What is the function of part marked **R**?

_____

(1 mark)

c. Give any **two** adaptations of part marked **S** to its function.

_____

_____

_____

(2 marks)

Continued/...

4. **Figure 3** shows the structure of a bone. Use it to answer the questions that follow.

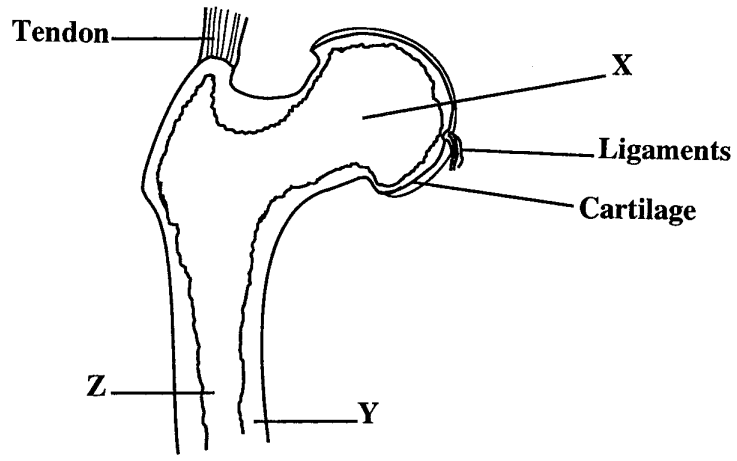


Figure 3

a. Name the parts marked **X and Y.**

X: _____ **(1 mark)**

Y: _____ **(1 mark)**

b. State the function of part marked **Z.**

_____

(1 mark)

5. **Figure 4** shows a biological process taking place in the body of a person. Use it to answer the questions that follow.

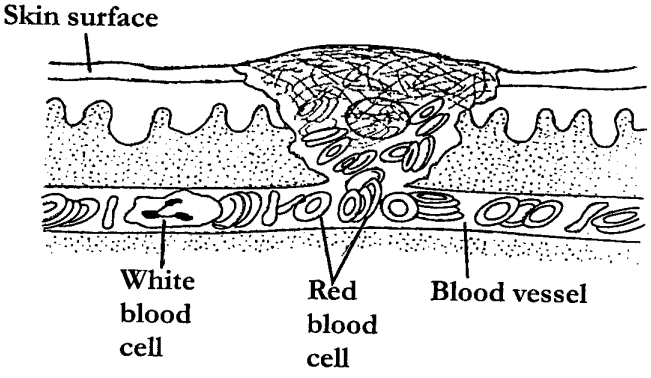


Figure 4

a. Name the process.

_____

(1 mark)

Continued/...

5. (Continued)

b. State any **one** enzyme which is involved in the process.

_____

_____

(1 mark)

c. Give **two** ways in which the process is important to the human body.

(i) _____

(1 mark)

(ii) _____

(1 mark)

Section B (60 marks)

Answer **all** the questions in this section.

6. a. Define "transpiration stream".

_____

_____

(1 mark)

b. (i) State any **two** ways in which transpiration is important to plants.

_____

_____

_____

_____

(2 marks)

(ii) Describe how the transpirational stream is caused.

_____

_____

_____

_____

(3 marks)

Continued/...

7. **Figure 5** shows a structure found in a plant cell. Use it to answer the questions that follow.

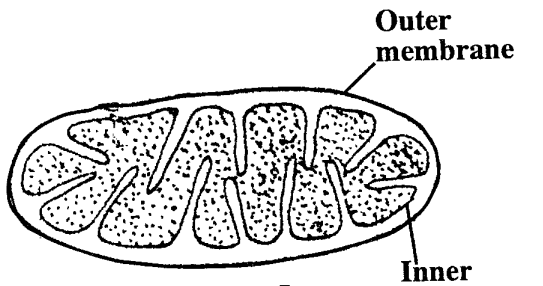


Figure 5

a. Name the structure.

_____

(1 mark)

b. State any **one** substance produced by the structure.

_____

_____

(1 mark)

c. Explain any **two** adaptations of the structure to its function.

_____

_____

_____

_____

(4 marks)

8. **Figure 6** shows a summarised reaction which occurs in the human body. Use it to answer the questions that follow.

Haemoglobin + Oxygen → **Z**

Figure 6

a. (i) Name the compound represented by **Z**.

_____ **(1 mark)**

(ii) In which organ does the reaction take place?

_____

(1 mark)

Continue

8. (Continued)

b. State any **two** food nutrients that are required for the formation of haemoglobin.

_____

_____

_____

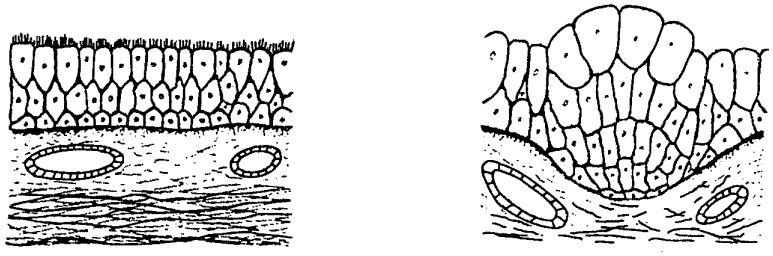
(2 marks)

c. Describe the behaviour of chromosomes during mitosis and meiosis at the stated stages.

Stage	Chromosome behaviour during mitosis	Chromosome behaviour during meiosis
prophase		
metaphase		

(4 marks)

9. **Figure 7** shows the normal lining of a lung in **W** and an infected lining in **X**. Use it to answer the questions that follow.



W **X**

Figure 7

a. Name the disease that causes the condition in **X.**

_____ **(1 mark)**

b. Explain how the disease is caused.

_____

_____

_____

(2 marks)

Continued/...

9. (Continued)

c. State any **two** ways of preventing the disease.

_____

_____

_____

(2 mar

10. **Figure 8** is a graph of number of maize cobs against their length. Use it to answer the questions that follow.

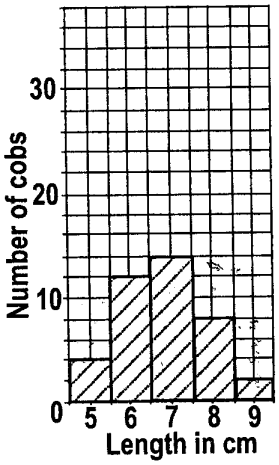


Figure 8

a. What is the range of the lengths of the maize cobs?

_____ **(1 mark**

b. Calculate the median length of the cobs. Show your working.

(4 ma

10. (Continued)

c. Mention the type of variation shown by maize cob length.

_____

_____

(1 mark)

11. **Figure 9** is a diagram of the human brain. Use it to answer the questions that follow.

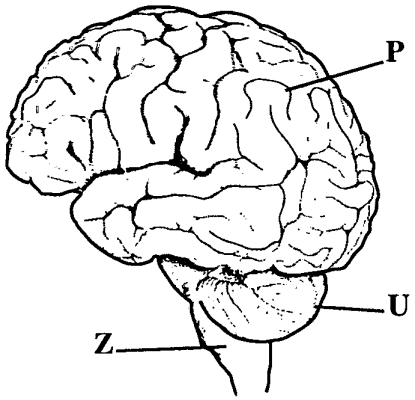


Figure 9

a. State any **one** function of part marked **P**.

_____

_____

(1 mark)

b. Why is part marked **P** highly folded?

_____

_____

(2 marks)

c. State any **two** differences in structure between parts **Z** and **U**.

_____

_____

(2 marks)

d. Explain why injury to part **Z** may cause death.

_____

_____

(2 marks)

Continued/...

12. **Figure 10** shows part of a nephron. Use it to answer the questions that follow.

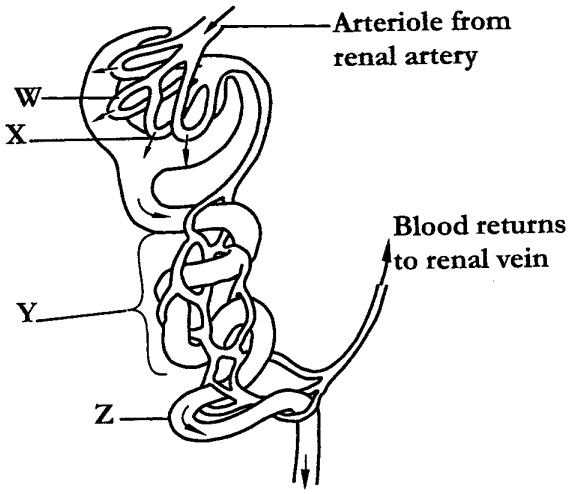


Figure 10

a. Name the parts marked **W** and **Z**.

W: _____ **(1 mark)**

Z: _____ **(1 mark)**

b. Name the process that occurs in region **Y**.

_____

(1 mark)

c. State any **two** substances that become part of the fluid shown by arrow **X**.

(i) _____ **(1 mark)**

(ii) _____ **(1 mark)**

d. Name the condition associated with presence of glucose in urine.

_____

(1 mark)

Continued/...

13. **Table 1** shows average quantities of food substances taken by three students in their meals per day. Use it to answer the questions that follow.

Table 1

Food Substance	Student A	Student B	Student C
Carbohydrates	690 g	750 g	710 g
Proteins	76 g	70 g	81 g
Fats	40 g	55 g	47 g
Roughages	15 g	3 g	12 g
Vitamins	0.11 g	0.14 g	0.03 g
Water	1 700 ml	420 ml	1 300 ml

a. (i) Which student is likely to suffer from constipation?

_____

(1 mark)

(ii) Give a reason for your answer in **13a(i).**

_____

_____

(2 marks)

b. Mention **two** other problems of the digestive system apart from constipation.

_____

_____

(2 marks)

c. If 1 g of carbohydrate gives 17 Kj of energy and 1 g of fat gives 39 Kj, calculate the energy gained by student **C**. Show your working.

(6 marks)

Continued/...

14. **Figure 11** is a diagram of a vector. Use it to answer the questions that follow.

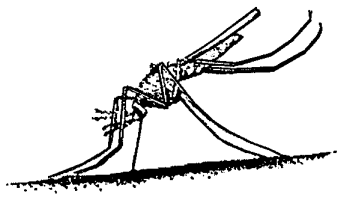


Figure 11

a. Name the disease that is transmitted by this vector.

_____ **(1 mark)**

b. (i) How does the vector transmit the disease?

_____

_____

_____

(2 marks)

(ii) Explain any **one** way in which the disease in **14b(i)** can be controlled.

_____

_____

_____

_____

(2 marks)

Continued/..

Section C (20 marks)

Essay Questions

Answer **all** questions in this section.

15. Describe any **five** characteristics that enable fresh water plants to survive in their habitat. Your answer should be in an essay form.

(10 marks)

Continued/...

16. State any **five** vitamins and their respective functions. Your answer should be in an essay form.

(10 marks

END OF QUESTION PAPER

NB: This paper contains 14 pages.