EXAMINATION NO:_____

THE MALAWI NATIONAL EXAMINATIONS BOARD

2010 MALAWI SCHOOL CERTIFICATE OF EDUCATION

BIOLOGY

Subject Number: M022/I

Monday, 2 August

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

PAPER I
(100 marks)

Theory

1. **This paper contains 16 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.

Question Number	Tick if answered	Do not write in these columns	
1			
2			
3			
4			
5			
6			
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8			
9			
10			
11			
12			
13			
14			
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17			

Section A (20 marks)

Answer all questions in this section.

1. **Figure 1** shows some structures of a leaf as seen under an electron microscope. Use it to answer the questions that follow.

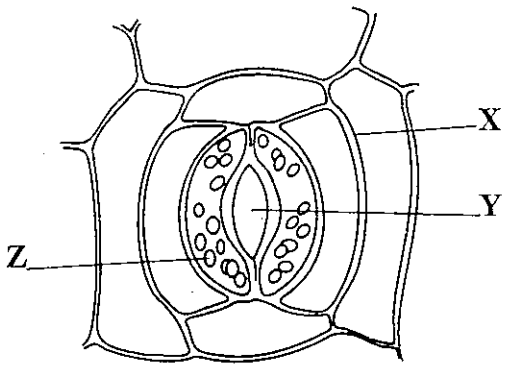


Figure 1

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

X: _____ **Y:** _____ **(2 marks)**

b. Explain how magnesium is important for the function of part marked **Z**.

_____

_____

_____

(3 marks)

Continued/...

2. Figure 2 shows the respiratory structure of an insect. Use it to answer the questions that follow.

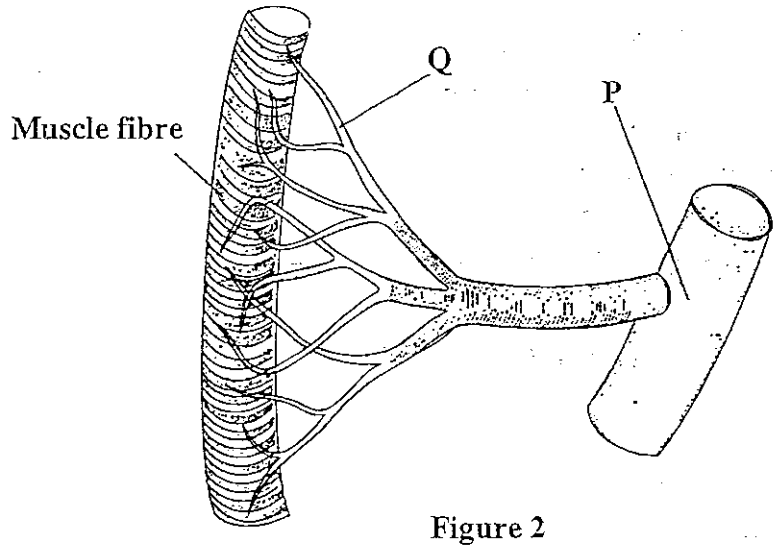


Figure 2

a. Name the part marked **P**.

_____

_____

(1 mark)

b. State **one** adaptation of the part marked **Q** to its function.

_____

_____

(1 mark)

c. Explain how oxygen moves from part marked **Q** to the muscle fibre.

_____

_____

(2 marks)

Continued/...

3. **Figure 3** shows the carbon cycle. Use it to answer the questions that follow:

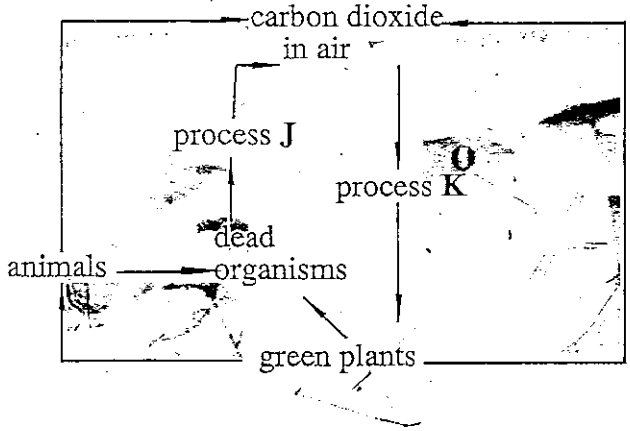


Figure 3

a. Name the processes **J** and **K**

(i) **J:** _____

(ii) **K:** _____

(2 marks)

b. Mention **one** environmental problem that is caused by increased amounts of carbon dioxide in the atmosphere.

_____

(1 mark)

4. **Figure 4** shows a mode of transmission of some diseases. Use it to answer the questions that follow.

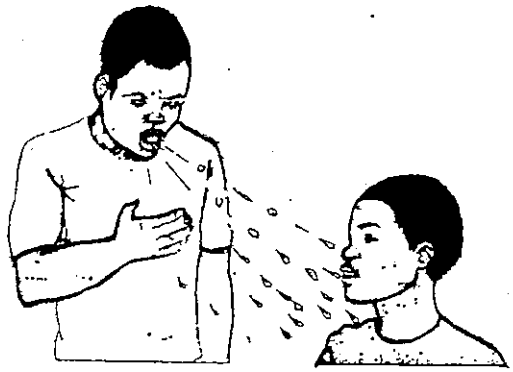


Figure 4

a. Identify the mode of transmission.

_____

(1 mark)

Continued/...

4. (Continued)

b. Name any **two** diseases that can be transmitted by the mode shown in **figure 4.**

_____

_____

(2 marks)

c. Explain **one** way of preventing transmission of diseases through the mode shown in the **figure 4.**

_____

_____

(2 marks)

5. **Figure 5** shows processes in human reproduction. Use it to answer the questions that follow:

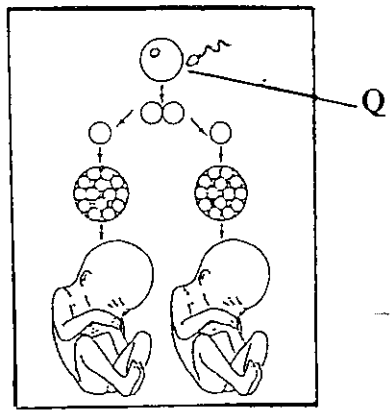


Figure 5

a. Name the process represented by letter **Q**.

_____

(1 mark)

b. (i) What type of twins are produced in **figure 5**?

_____

(1 mark)

(ii) Give a reason for your answer in 5b(i).

_____

_____

(1 mark)

Continued/...

Section B (50 marks)

Answer all the questions in this section.

6. a. Define "passive immunity".

_____

(1 mark)

b. Explain how each of the following helps the body to defend itself against infection.

(i) platelets _____

_____

(2 marks)

(ii) stomach _____

_____

(2 marks)

c. How does the "Human Immunodeficiency Virus" (HIV) weaken immunity of the human body?

_____

_____

(2 marks)

7. **Table 1** shows parts of blood for three people **F**, **G** and **H**. Use it to answer the questions that follow:-

PART OF BLOOD (mm^3)	F	G	H
Red blood cells	7,500,000	5,500,000	2,000,000
White blood cells	5,000	6,000	5,000
Platelets	250,000	255,000	5,000

Table 1

a. (i) Which person is most likely to suffer from anaemia?

_____

(1 mark)

(ii) Give a reason for your answer to 7a(ii).

_____

(1 mark)

Continued/...

7. (Continued)

b. Calculate the ratio of white blood cells to platelets in the blood of person F. Show your working.

(2 marks)

8. Figure 6 is a graph showing urine output in a person after drinking 1 litre of water. Use it to answer the questions that follow:

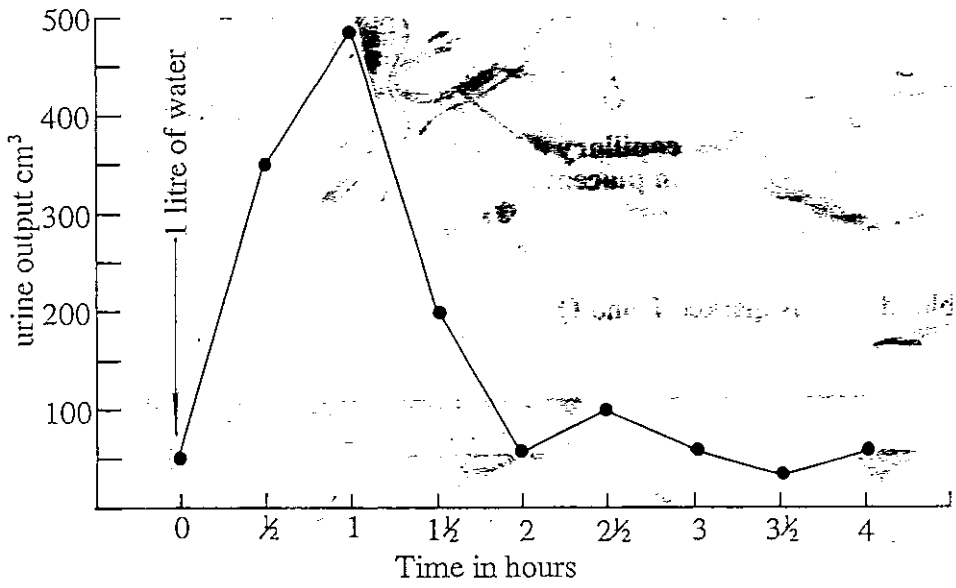


Figure 6

a. What was the maximum amount of urine produced?

_____

(1 mark)

b. What effect did drinking of the water have on urine output during the first hour of the investigation?

_____

(1 mark)

Continued/...

8. (Continued)

c. Explain how Anti-Diuretic Hormone (ADH) affected results of urine output between 1 hour and 2 hours.

_____

_____

(3 marks)

9. **Figure 7** is a diagram showing blood supply between an embryo and the placenta. Use it to answer the questions that follow:

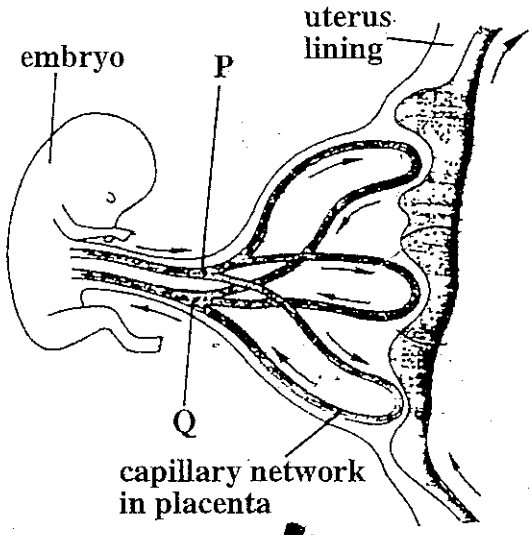


Figure 7

a. Name the blood vessels marked **P** and **Q**.

(i) **P:** _____

(ii) **Q:** _____

(2 marks)

b. Mention any **two** substances transported by blood vessel marked **P**.

(i) _____

(ii) _____

(2 marks)

c. Name **one** organ that starts to function immediately a child is born.

_____

(1 mark)

Continued/

9. (Continued)

d. Explain **one** adaptation of the placenta to its function.

_____

_____

(2 marks)

10. **Figure 8** is a diagram of a nerve cell. Use it to answer the questions that follow:

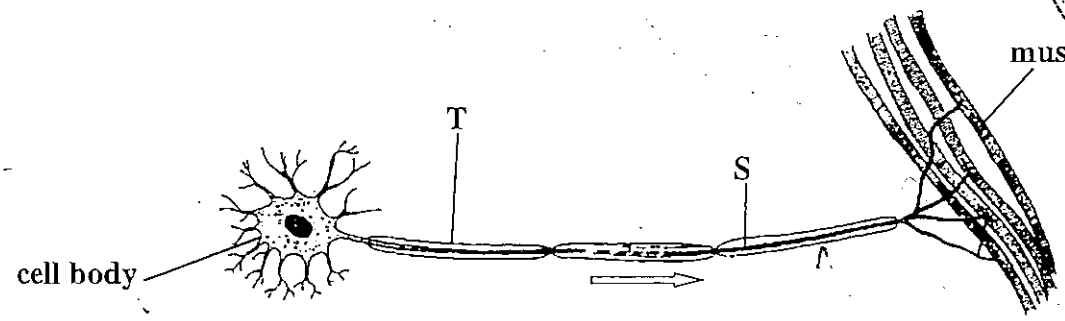


Figure 8

a. Name the parts marked T and S.

T _____ S _____

(2 marks)

b. Name the type of nerve cell shown in **figure 8.**

_____

(1 mark)

c Explain what could happen if the cell body was damaged.

_____

(2 marks)

d. Explain any **one** adaptation that enables the nerve cell to conduct impulses at high speed.

_____

_____

(2 marks)

Continued/...

11. **Figure 9** shows a bird in flight. Use it to answer the questions that follow:

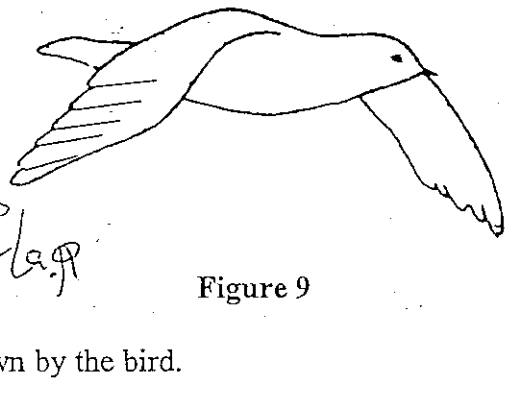


Figure 9

a. (i) Identify the stroke shown by the bird.

_____

(1 mark)

(ii) Explain how the stroke named in 11a(i) occurs.

_____

_____

(2 marks)

b. Explain how the shape of the wing helps to generate lift in the bird.

_____

_____

(2 marks)

Continued/...

12. Figure 10 shows a potometer with a leafy shoot. Use it to answer the questions that follow:

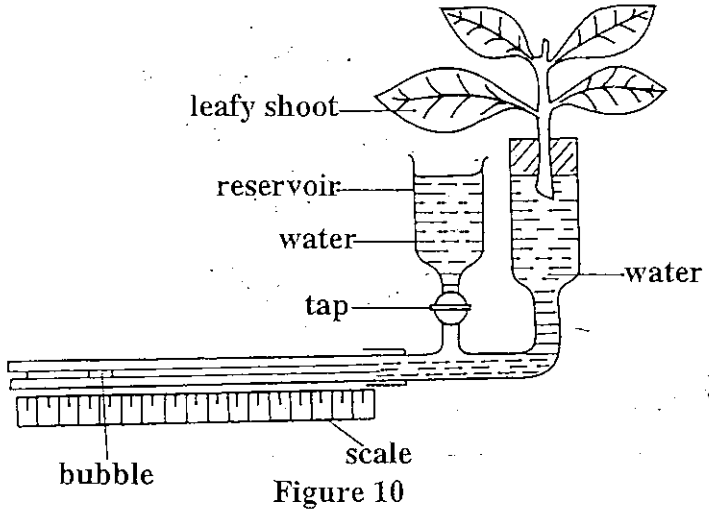


Figure 10

a. What effect would each of the following have on the movement of the bubble?

(i) increased temperature of the surrounding air

_____

(1 mark)

(ii) increased humidity of the surrounding air

_____

(1 mark)

b. Explain how **one** can measure rate of transpiration in the leafy shoot using the bubble.

_____

_____

_____

(3 marks)

Continued/...

13. **Figure 11** is a diagram showing recycling of materials in an ecosystem. Use it to answer the questions that follow.

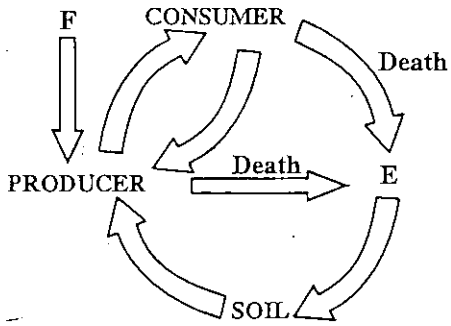


Figure 11

a. What does **F** represent?

_____

(1 mark)

b. Explain how the producer benefits from the activities of organisms represented by letter **E**.

_____

_____

(3 marks)

14. **Figure 12** is an evolutionary tree of an organism. Use it to answer the questions that follow:

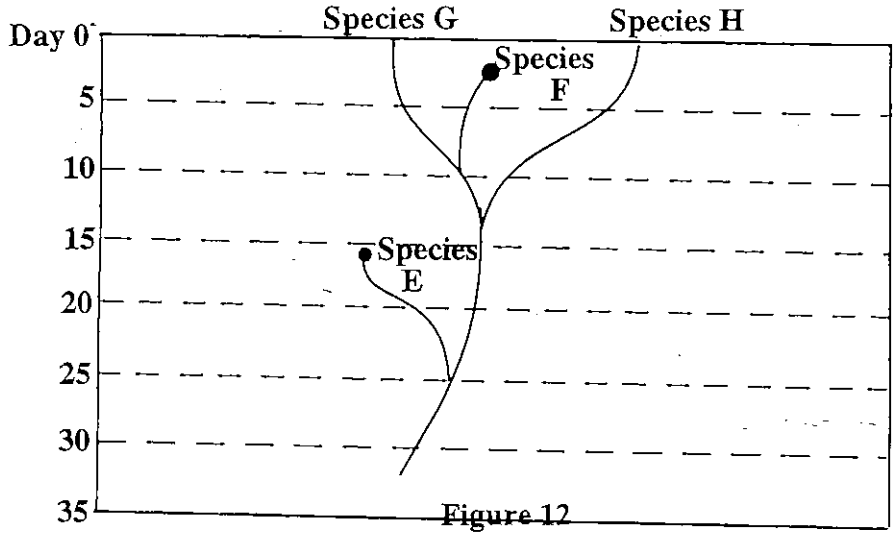


Figure 12

a. Name **two** species that have become extinct.

_____

(2 marks)

Continued/...

14. (Continued)

b. At what time did species **E** evolve?

_____

(1 mark)

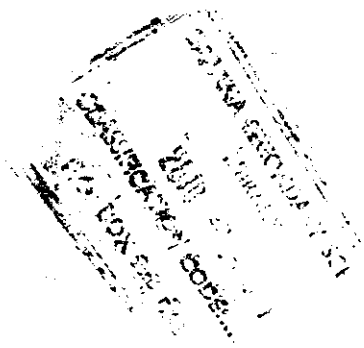
c. Explain how fossil records can be used to show that the species in the diagram have a common ancestor.

_____

_____

_____

(3 marks)



Continued/...

Section C (30 marks)

Essay Questions

Answer **all** questions in this section.

15. Describe how urine is formed in the kidneys of the human body. Write your answer in an essay form.

(10 marks)

Continued/...

16. Suppose you are a medical doctor and you have a patient who requires blood transfusion. Explain any **five** factors that you would consider before carrying out a blood transfusion. Your answer should be in an essay form.

(10 marks)

Continued/...

EXAMINATION NUMBER: _____

17. Describe an experiment that could be carried out to investigate the effect of exercise on breathing rate in human beings. Your essay should include procedure, expected results and conclusion.

(10 marks)

END OF QUESTION PAPER

This paper contains 16 pages.