



EXAMINATION NO.: _____
THE MALAWI NATIONAL EXAMINATIONS BOARD
2011 MALAWI SCHOOL CERTIFICATE OF EDUCATION

BIOLOGY

Subject Number: M022/1

Monday, 4 July

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			
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5			
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9			
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11			
12			
13			
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16			

Section A (20 marks)

Answer **all** questions in this section.

1. a. Define "lymph".

(1 mark)

b. State any **one** difference between lymph and plasma.

(1 mark)

c. Explain how inspirational movement of the chest wall helps in the flow of lymph.

(3 marks)

2. **Figure 1** shows part of a chemical equation of a biological process. Use it to answer the questions that follow.

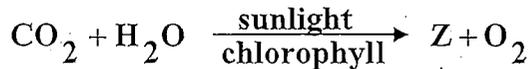


Figure 1

a. Write down the chemical formula of the substance represented by **Z**.

(1 mark)

b. Explain **one** use of the substance marked **Z** to a plant.

(3 marks)
Continued/...

2. (continued)

c. Explain how the process in **Figure 1** prevents global warming.

(2 marks)

3. At a certain school students developed rash on the skin and high fever. A doctor diagnosed them positive for a diarrhoeal disease.

a. (i) Name the disease.

(1 mark)

(ii) What is the causative agent of the disease?

(1 mark)

(iii) Mention any two ways in which the disease could have been transmitted.

(2 marks)

b. Explain what happens during incubation period of a disease.

(2 marks)

Continued/...

4. Figure 2 shows a cross section of the spinal cord. Use it to answer the questions that follow.

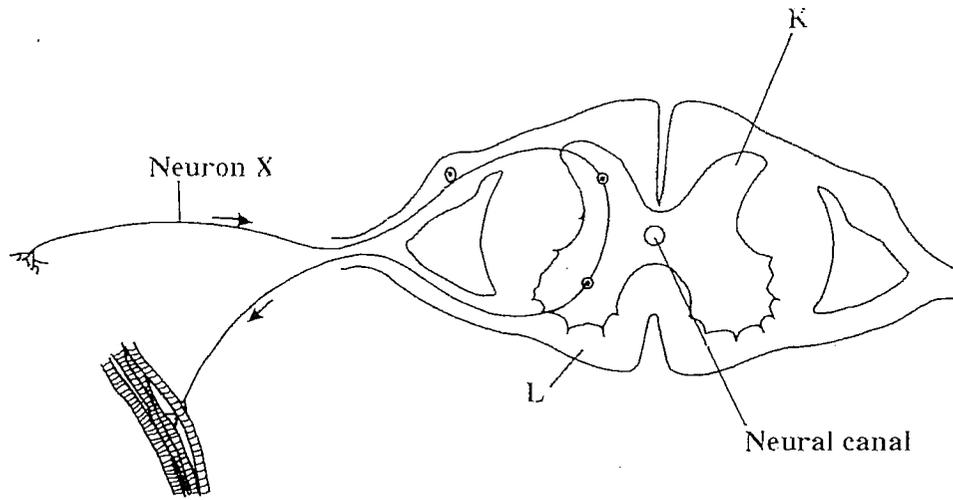


Figure 2

- a. Name the part marked K.

(1 mark)

- b. Mention one disease that attacks neurone X.

(1 mark)

- c. Give one function of the fluid found in the neural canal.

(1 mark)

Continued/...

Section B (60 marks)

Answer all the questions in this section.

5. Figure 3 is a diagram representing a cross section of a leaf. Use it to answer the questions that follow.

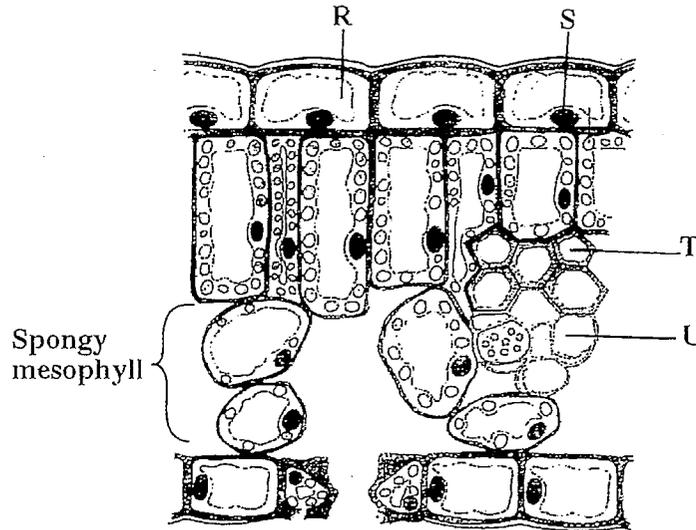


Figure 3

- a. Name the parts marked R and S.

R _____ S _____ (2 marks)

- b. (i) Which tissue is the main site for photosynthesis in the leaf?

_____ (1 mark)

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

 _____ (1 mark)

- c. State two structural differences between the parts marked T and U.

 _____ (2 marks)

Continued/...

5. (continued)

- d. Explain how a steady flow of carbon dioxide is maintained between the atmosphere and mesophyll cells in a leaf during day time.

(3 marks)

6. Figure 4 shows structure of a food substance. Use it to answer the questions that follow.

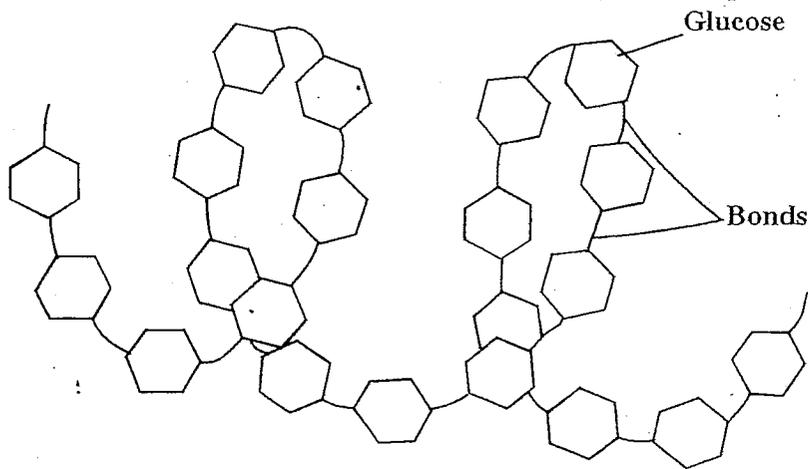


Figure 4

- a. Name the food substance.

(1 mark)

- b. Explain how the food substance is produced.

(2 marks)

- c. Mention **two** enzymes that could digest the food substance in humans.

(2 marks)

Continued/...

7. Figure 5 shows cross sections of blood vessels M and N. Use it to answer the questions that follow.

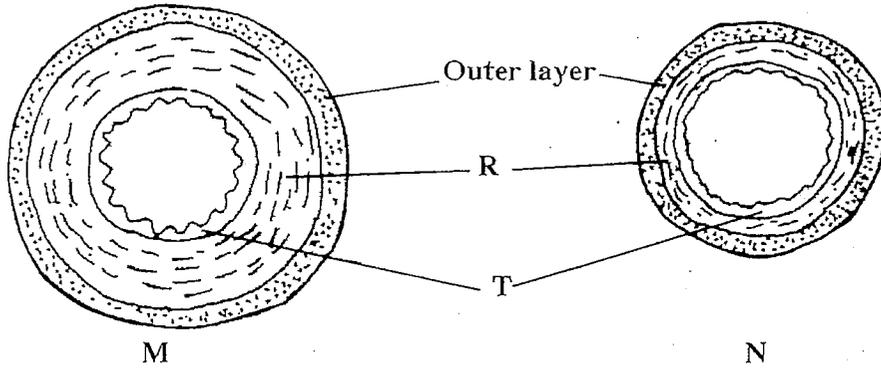


Figure 5

a. Name the parts marked R and T.

R _____ (1 mark)

T _____ (1 mark)

b. List any two structural differences between vessels M and N.

(2 marks)

c. Explain any one way in which blood is transported in vessel N.

(3 marks)
Continued/...

8. Figure 6 shows levels of some hormones during the menstrual cycle. Use it to answer the questions that follow.

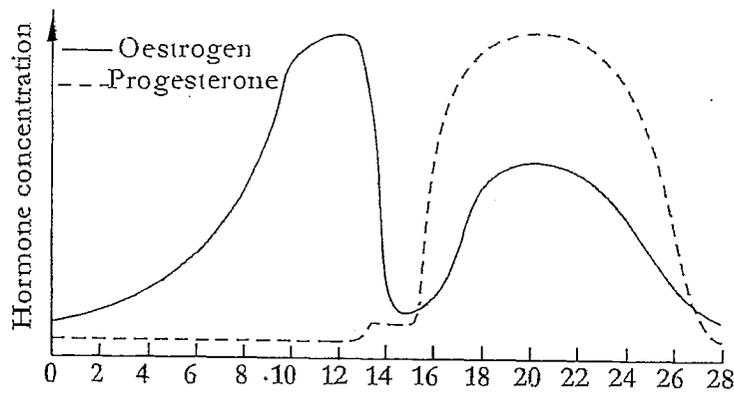


Figure 6 Time in menstrual cycle/days

a. (i) During which period is fertilisation more likely to occur?

_____ (1 mark)

(ii) Give a reason for your answer to 8 a (i).

_____ (1 mark)

b. State any two things that may happen to the wall of the uterus between days 5 and 10.

 _____ (2 marks)

c. Explain why the level of progesterone increases from day 16 to 20.

 _____ (3 marks)

Continued/...

9. a. What causes sleeping sickness?

_____ (1 mark)

- b. Explain any two ways of preventing transmission of sleeping sickness.

_____ (4 marks)

10. Figure 7 is a diagram showing a synapse between two nerve cells. Use it to answer the questions that follow.

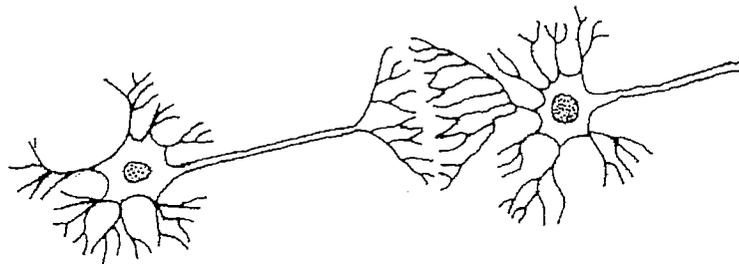


Figure 7

- a. Use an arrow to indicate the direction of the nerve impulse in the diagram. (1 mark)

- b. State any **one** function of the synapse to the work of neurones.

_____ (1 mark)

- c. Explain **one** effect of smoking Indian hemp to the nervous system.

_____ (2 marks)

Continued/...

11. Figure 8 shows occurrence of light and dark varieties of peppered moth in an industrial area before and after industrial revolution in England. Use it to answer the questions that follow.

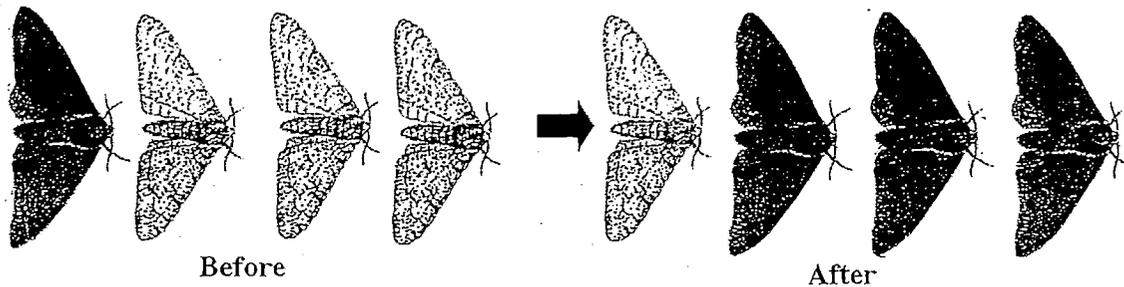


Figure 8

- a. (i) In the table provided, state two differences in the population of moths before and after industrial revolution.

Before	After

(2 marks)

- (ii) Explain how the population of dark peppered moth could have arisen before industrial revolution.

(3 marks)

Continued/...

11. (continued)

b. Table 1 shows a cross between a pure breeding red cow and a pure breeding white bull. Use it to answer the questions that follow.

Parents		red RR		
white rr	↓	Gametes	R	R
		r	Rr	P
		r	Rr	Rr

} offsprings

Table 1

(i) Complete the table by filling the genotype of the offspring marked P. (1 mark)

(ii) What term is used to describe the genotype of the offspring?

_____ (1 mark)

(iii) If R and r are codominant, determine the phenotype of the offspring.

_____ (1 mark)

12. Figure 9 shows an experimental set up in a laboratory. Use it to answer the questions that follow.

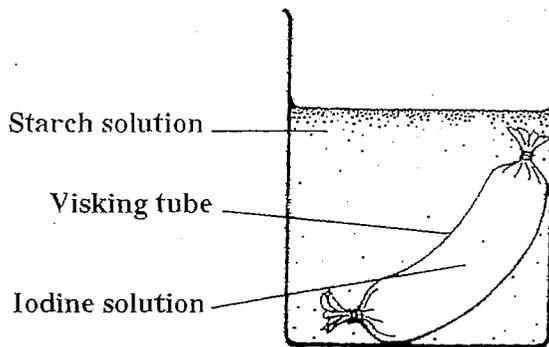


Figure 9

a. What type of membrane is the visking tubing?

_____ (1 mark)

Continued/...

12. (continued)

b. (i) What results would be obtained after sometime?

(2 marks)

(ii) Explain your answer to 12 b (i).

(3 marks)

13. Figure 10 is a graph showing the population of bacteria and amount of oxygen in a stream after sewage is discharged into it. Use it to answer the questions that follow.

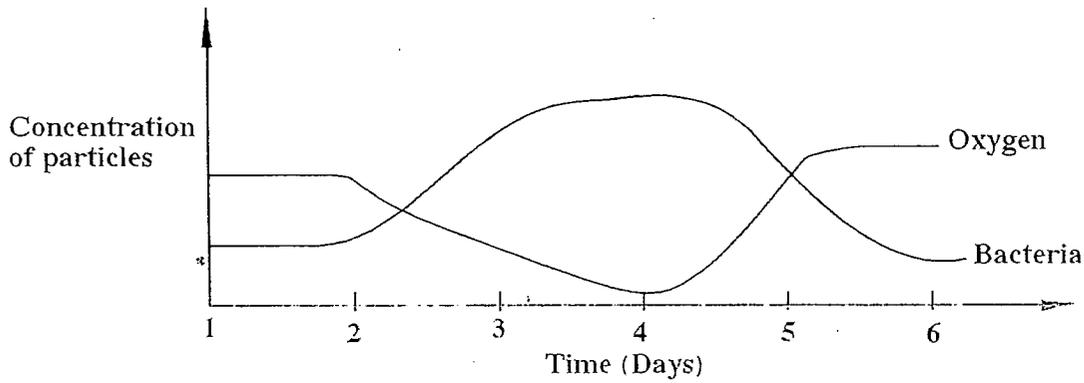


Figure 10

a. When was sewage discharged into the stream?

(1 mark)

Continued/...

13. (continued)

- b. (i) What happened to the amount of oxygen between day 2 and day 4?

(1 mark)

- (ii) Explain your answer given in 13 b (i).

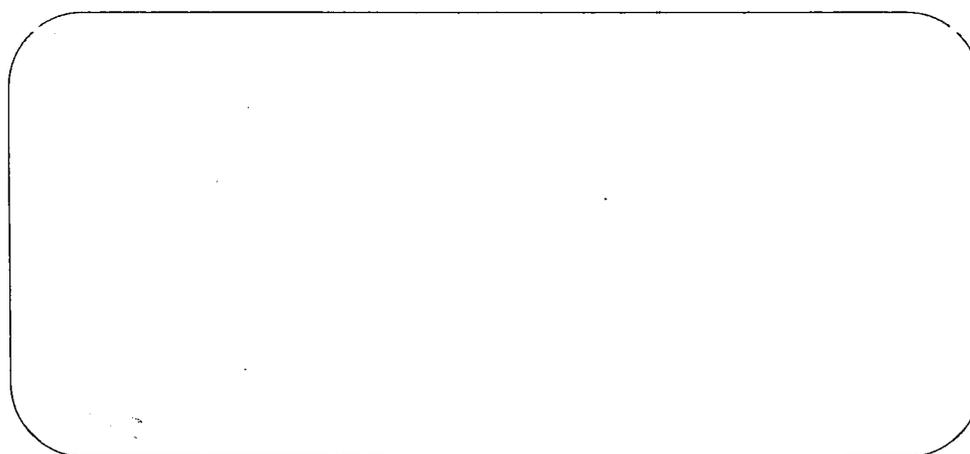
(2 marks)

14. Table 2 shows the number of children that were infected by tuberculosis after being exposed to two different treatments. Use it to answer the questions that follow.

Table 2

Treatment	Number of Children	Number of Infected Children
vaccinated	500	20
unvaccinated	500	350

- a. Calculate the percentage of vaccinated children that were not infected. Show your working.



(3 marks)

Continued/...

14. (continued)

b. Explain how the vaccine protected some children from tuberculosis.

(2 marks)

Continued/...

