



EXAMINATION NO.: _____

THE MALAWI NATIONAL EXAMINATIONS BOARD

2006 MALAWI SCHOOL CERTIFICATE OF EDUCATION EXAMINATION

BIOLOGY

Monday, 16 October

Subject Number: M022/I

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

LIBRARY
2003-03-20
PAPER I
(100 marks)

Theory

1. This paper contains 12 pages. Please check.
2. Before beginning 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.

Section A (20 marks)

1. Figure 1 is a diagram representing gas exchange between a leaf and the atmosphere. Use it to answer the questions that follow.

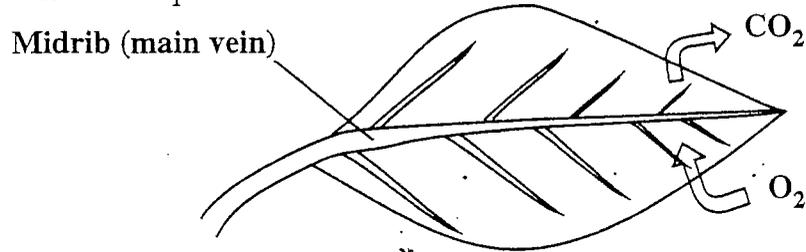


Figure 1

- a. What process in the leaf leads to this gas exchange shown in Figure 1?

_____ (1 m)

- b. List two characteristics of a leaf that enable gas exchange shown in Figure 1.

_____ (2 ma)

- c. What is the function of the midrib?

_____ (1 m)

2. a. Name the agglutinating proteins in plasma of a person with blood group O.

_____ (2 ma)

- b. Explain why a person with blood group O is a universal donor.

_____ (2 ma)

3. Figure 2 is a photograph showing blood cells.

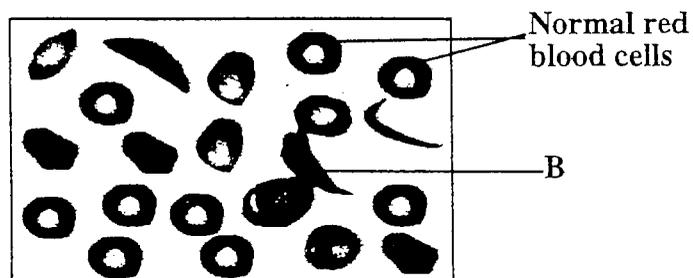


Figure 2

- a. (i) Name the condition of the cell marked B.

_____ (1 m)

Continued/...

3. a. (Continued)

(ii) How are red blood cells with this condition affected?

(1 mark)b. What is the cause of the condition of the cell marked **B**?

(1 mark)c. Name the disease to which a person with the blood sample shown in **Figure 2** is resistant.

(1 mark)4. **Table 1** shows results of an experiment where a person was blindfolded and asked to locate the direction of sound produced by a clock placed at different distances.

Table 1

DIRECTION OF SOUND	DISTANCE FROM EARS (cm)			
	60	80	100	120
Up	✓	✓	X	✓
Down	✓	X	✓	X
Left	✓	✓	X	X
Right	✓	✓	✓	X

Key: ✓ = correctly located sound direction

X = incorrectly located sound direction

a. What **two** variables were kept constant in this experiment?

(2 marks)

b. What was the aim of the experiment?

(1 mark)c. What conclusion can be drawn from the results shown in **Table 1**?

(1 mark)

5. a. Cancerous cells carry out many cellular functions as normal cells. What characteristics distinguish them from normal cells?

(1 mark)

Continued/...

5. (Continued)

b. Why is cancer **not** contagious?

_____ (1 m)

c. Explain **two** ways of reducing the risk of developing cancer.

_____ (2 m)

Section B (50 marks)

Answer **all** questions in this section.

6. **Figure 3** is a diagram showing a vessel of the circulatory system. Use it to answer the questions that follow.

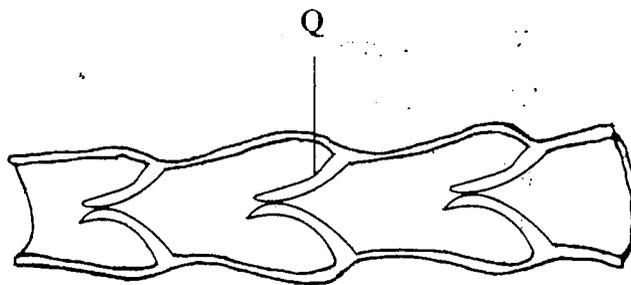


Figure 3

a. Identify the structure marked Q.

Q: _____ (1 m)

b. Name **two** vessels in the human body which have the structure labelled Q.

_____ (2 m)

c. **On the diagram** shown in **Figure 3** put an **arrow** which indicates the direction of flow o

_____ (1 m)

d. Describe what is likely to happen if structure Q were damaged.

_____ (1 m)

e. What enables blood to move along this vessel?

_____ (1 m)

7. Figure 4 is a diagram of a longitudinal section of a villus. Use it to answer the questions that follow.

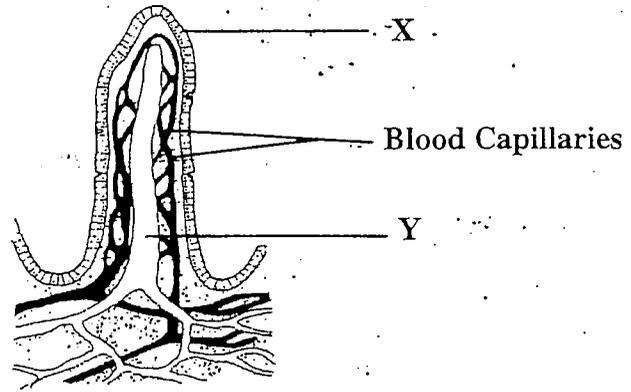


Figure 4

a. Name the parts labelled X and Y.

X: _____

Y: _____ (2 marks)

b. State one end-product of digestion which is transported by the part labelled Y.

(1 mark)

c. Explain one adaptation of the villus which enables it to perform its functions efficiently.

(2 marks)

8. a. Give two examples of sex-linked characteristics.

(2 marks)

b. Complete Table 2 by indicating the categories of the given genotypes.

Table 2

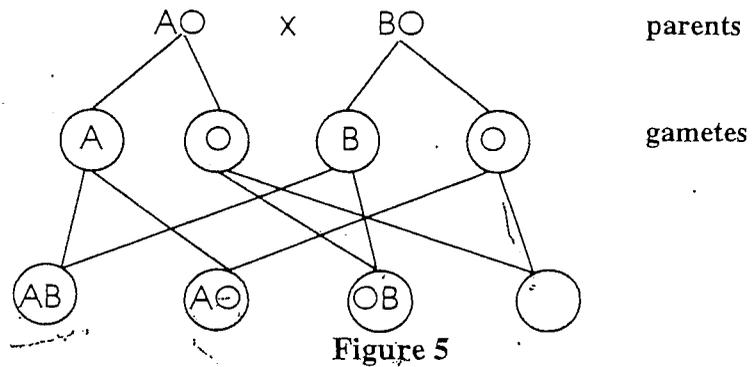
GENOTYPE	CATEGORY
Gg	
GG	Homozygous dominant
gg	

(2 marks)

Continued/...

8. (Continued)

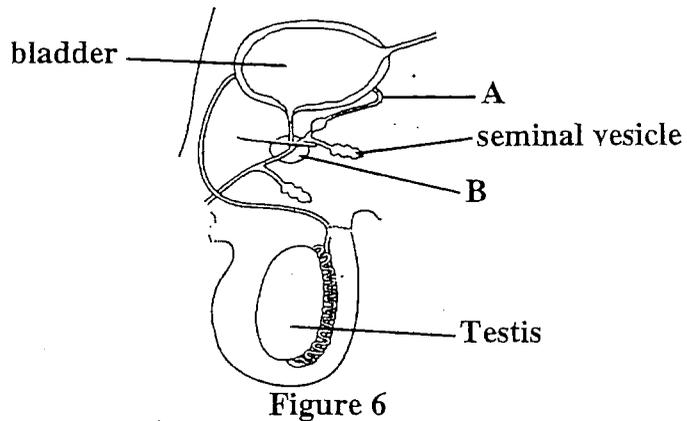
- c. **Figure 5** shows a cross diagram between a woman of blood group A married to a man of blood group B.



- (i) Complete the **cross-diagram** by **filling in** the genotype of the remaining offspring. (1 mark)
- (ii) What is the total number of blood groups of the offsprings?

_____ (1 mark)

9. **Figure 6** is a diagram showing part of the male reproductive system. Use it to answer the question that follow.



- a. Name the parts labelled A and B.

A: _____ (1 mark)

B: _____ (2 marks)

- b. Name the hormone produced by the testis.

_____ (1 mark)

- c. Explain why a contraceptive method which involves cutting of part labelled A is more effective.

_____ (2 marks)

10. Figure 7 is a diagram showing some of the varieties of cichlid fish (mbuna) found in Lake Malawi. Use it to answer the questions that follow.

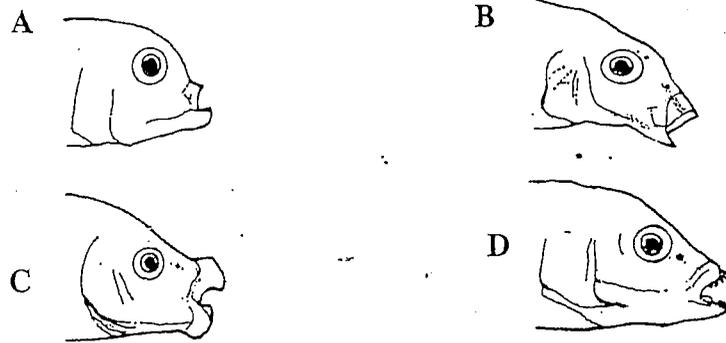


Figure 7

a. (i) Which cichlid fish is adapted for carnivorous feeding habits?

_____ (1 mark)

(ii) Explain your answer to a(i).

_____ (2 marks)

b. Explain briefly how the four varieties of the cichlid fish may have arisen from a common ancestor.

_____ (3 marks)

11. Figure 8 is a diagram showing part of a nephron. Use it to answer the questions that follow.

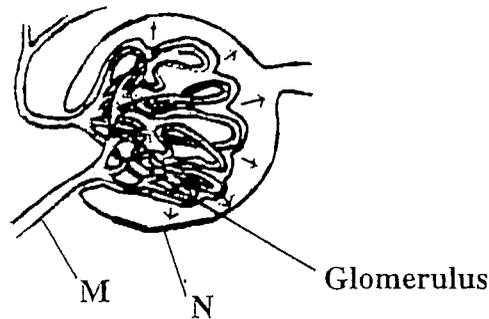


Figure 8

a. Name the parts marked M and N.

M: _____

N: _____

(2 marks)
Continued/...

11. (Continued)

b. (i) Mention the process represented by the arrows.

(1 mark)

(ii) Describe one adaptation of the figure to the process mentioned in b(i).

(2 marks)

c. Give one example of active transport which occurs in the nephron.

(1 mark)

12. Figure 9 is a diagram showing one of the relationships that exists among organisms in any ecosystem. Use it to answer the questions that follow.

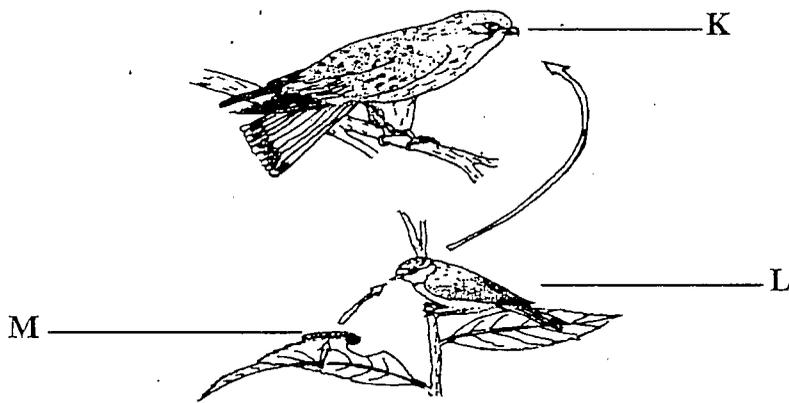


Figure 9

a. (i) Name the type of relationship shown in Figure 9.

(1 mark)

(ii) State two adaptations of organism K to survive in this relationship.

(2 marks)

b. Explain briefly how organism K would be affected if the population of organism M was reduced.

(2 marks)

Continue

12. (Continued)

c. Apart from pesticide application, mention **one** way of reducing the population of organism **M**.

(1 mark)

13. Figure 10 is a diagram showing antagonistic muscles of the arm.

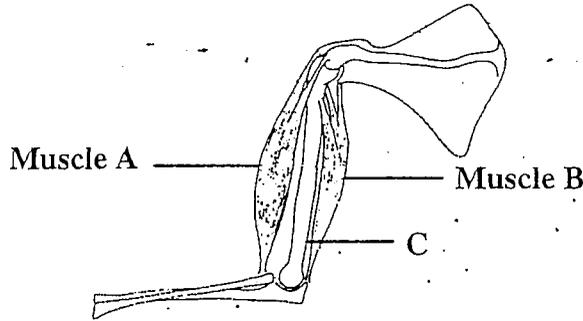


Figure 10

a. (i) What is the name of muscle **A**?

(1 mark)

(ii) Name the part marked **C**.

(1 mark)

b. How does contraction of muscle **B** affect the arm?

(1 mark)

c. State **two** physical changes that occur in muscle **A** when contracted.

(2 marks)

14. a. How does each of the following methods work in preventing malaria?

(i) spraying a layer of oil on stagnant water

(2 marks)

(ii) Breeding fish in slow running water

(2 marks)

b. Why does a malarial patient become anaemic?

(2 marks)

Continued/...

