EXAMINATION NO.:_____

THE MALAWI NATIONAL EXAMINATIONS BOARD

2000 MALAWI SCHOOL CERTIFICATE OF EDUCATION EXAMINATION

BIOLOGY

Subject Number: M022/II

Thursday, 21 December

Time Allowed: 2 hours
2:30 - 4:30 pm

PAPER II

(100 marks)

Theory

1. **This paper contains 13 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 Section A and B. Answer all questions in both 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.

1. Figure 1A and 1B are diagrams showing side views of two skulls of different animals. Use them to answer the questions below.

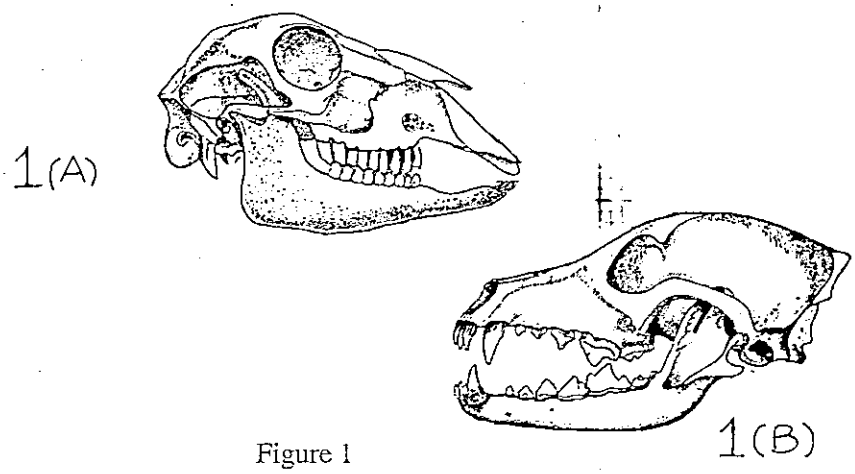


Figure 1

a. State the kind of food eaten by the animals with skulls shown in Figures 1A and 1B giving reasons for your answer.

Skull	Food	Reason
A		
B		

(4 marks)

b State **two** differences in the dentition that you can see between skull A and skull B.

Skull A	Skull B
1.	
2.	

(2 marks)

2. Lemna is a simple water plant. Lemna plants were grown in two sized tubes, large and small. The number of leaves in each tube were counted at weekly intervals. The number of Lemna leaves in the large tube have been plotted on the graph in Figure 2. The results of the smaller tube are in Table 1. Use Fig 2 and Table 1 to answer questions that follow.

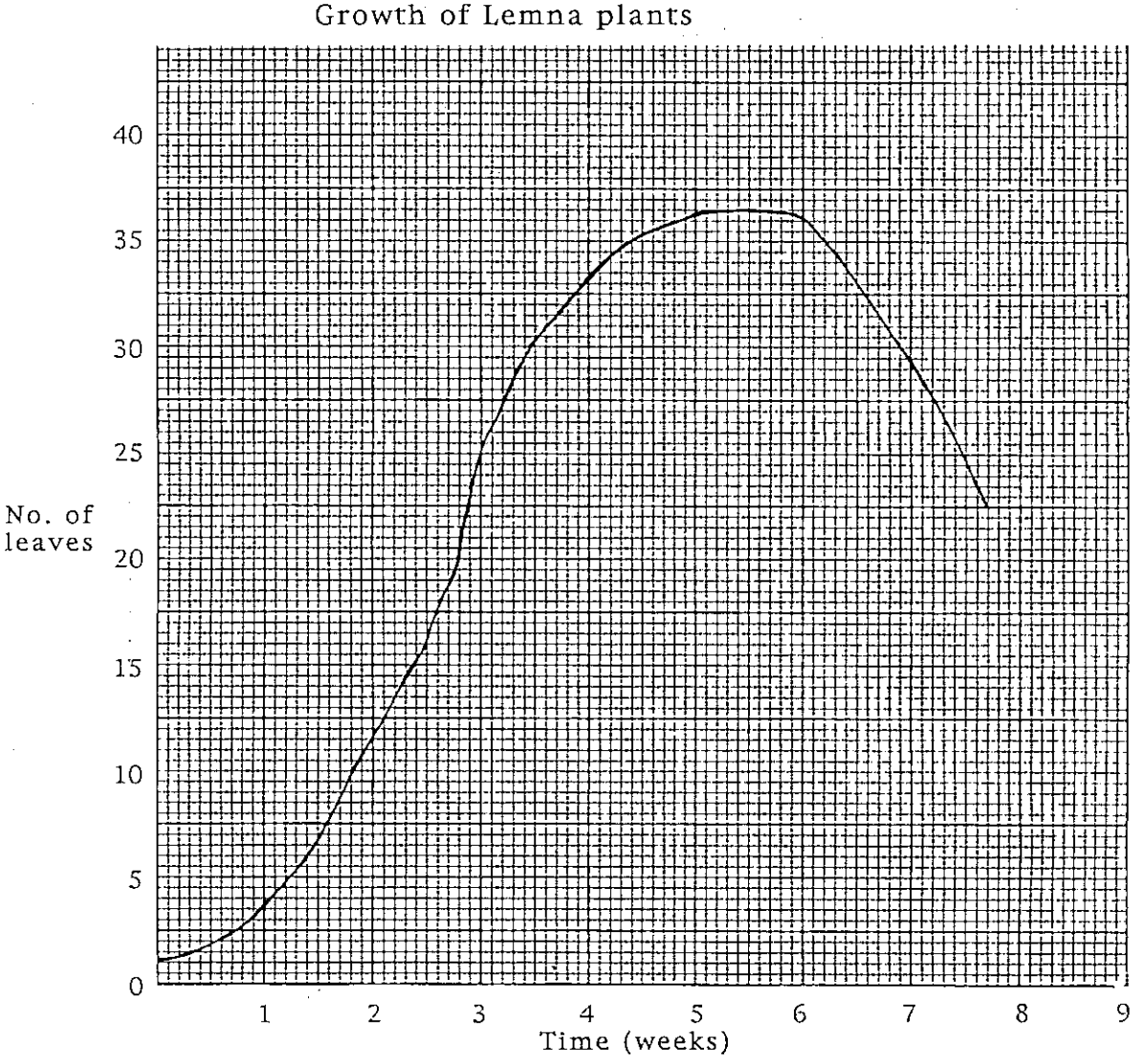


Figure 2 (4 marks)

Continued/...

Time in weeks	0	1	2	3	4	5
Number of leaves	2	4	8	16	15	7

Table 1

a. Describe the growth of the Lemna population in the large tube.

_____

_____

_____

_____

_____

(4 marks)

b. Plot in Figure 2 the results of Lemna growth in the small tube.

(3 marks)

c. How does the growth of Lemna population in large and small tubes compare?

Large tube	Small tube
(i)	
(ii)	

(2 marks)

d. What was the aim of this investigation?_____

_____

_____

(1 mark)

e. Name any **two** factors that need to be controlled in this investigation.

_____

_____

(2 marks)

Continued/...

3. Figure 3 is a diagram showing an open stoma. Use it to answer questions that follow.

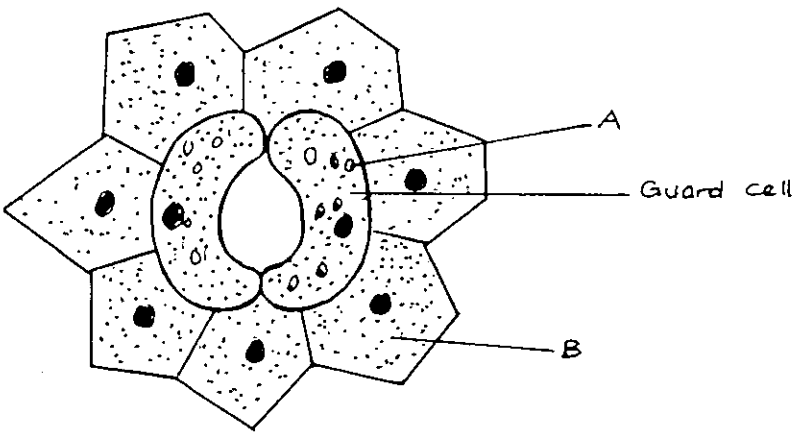


Figure 3

a. Name parts labeled A and Cell B

A. _____

B. _____

(2 marks)

b. Give two differences between guard cells and the Cell labeled B.

Guard Cell	Cell B

(2 marks)

c. Stomates are open during day time and closed at night. Of what advantage is this to the plant?

_____

_____

_____

_____

_____

(3 marks)

Continued/...

4. Table 2 shows the antigens and antibodies in different blood groups. Use it to answer questions below.

Blood group	Antigen	Antibody
A	A	Anti-B
B	B	Anti-A
AB		
O		

Table 2

a. Complete the table by filling in the antigens and antibodies of blood groups AB and O. (4 marks)

b. Where in the blood are the antibodies and antigens found?

Antibodies _____

Antigens _____

(2 marks)

c. State with reasons what would happen in each of the cases below.

(i) A person of blood group AB is given blood of group A.

_____

_____

_____

(2 marks)

(ii) A person of blood group O is given blood of group B.

_____

_____

_____

(2 marks)

(iii) A person of blood group A is given blood of group O.

_____

_____

_____

(2 marks

Continued/...

5. Figure 4 is a diagram showing the distribution of rods and cones in the retina.

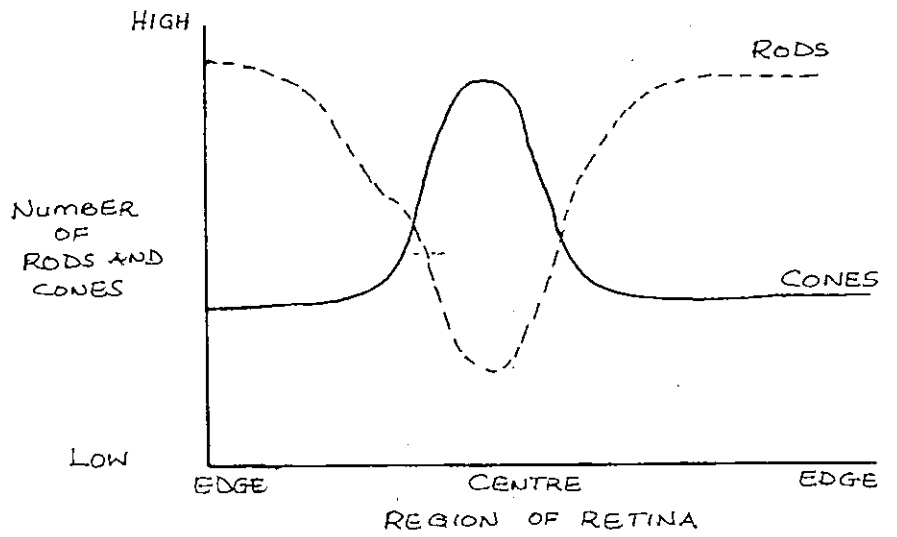


Figure 4

a. Which part of the retina is efficient at detecting dim light?_____

(1 mark)

Give reason _____

_____

_____

(1 mark)

b. Which part of the retina is efficient at detecting Colour?_____

(1 mark)

Give reason _____

_____

_____

(1 mark)

c. Describe the distribution of rods and cones on the retina.

rods _____

_____

_____

(2 marks)

cones _____

_____

_____

(2 marks)

Continued/...

d. Name a vitamin which is needed for the proper functioning of the retina.

_____

(1 marks)

6. Not all the food eaten by animals is used in respiration and growth.
Table 3 shows how food is used in four animals. Use it to answer the questions that follow.

Animal	% food used in respiration	% food used in growth	% food not used
Caterpillar	18	23	59
Spider	57	27	
Cow	38	2	60
Owl	84	1	15

Table 3.

a. Explain why not all food eaten by animals is used in respiration and growth.

_____

_____

(1 mark)

b. Calculate the percentage of food that is not used by the spider.
Show your working.

_____

_____

_____

(2 marks)

c. (i) Which animals are not efficient in using the food they eat? _____

_____

(2 marks)

(ii) Explain why these animals are inefficient in their use of food.

_____

_____

_____

_____

(3 marks)

Continued/...

d. Which animal is very efficient at turning its food into body material?
Give a reason for your answer.

animal _____ **(1 mark)**

reason _____

_____

_____

(1 mark)

e. Give a reason why an owl uses more food for respiration than the other animals.

_____

_____

_____

(1 mark)

7. Organic fertilizers can be produced from waste. The basic things required are organic matter, earthworms, microorganisms and moisture.

a. What could be the source of organic matter from a household?

_____

(1 mark)

b. State **two** ways in which earthworms and bacteria contribute to the production of organic fertilizers.

(i) Earthworms _____

_____

_____

_____

_____

(2 marks)

(ii) Bacteria _____

_____

_____

_____

_____

(2 marks)

c. State **one** disadvantage in the production of organic fertilizers?

_____

_____

(1 mark)

Continued/...

d. State two advantages of organic fertilizers. _____

_____

_____

_____

_____

(2 marks)

e. Explain how in a natural forest the soil fertility remains more or less the same from year to year.

_____

_____

_____

_____

(3 marks)

8. Fig 5 is a diagram showing the chromosomes in a stomach cell of the fruit fly Drosophila melanogaster.

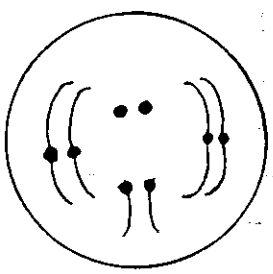


Figure 5

a. What function do chromosomes play in the cell? _____

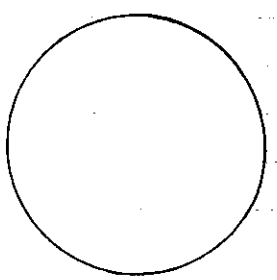
_____

_____

_____

(1 mark)

b. In the diagram below draw chromosomes in a sperm of Drosophila melanogaster.



(2 marks)

Continued/...

c. What nuclear division leads to production of sperms?

_____

(1 marks)

9. a. Which part of the body is attacked by HIV?

_____

(1 mark)

b. Explain why people with AIDS become susceptible to many diseases.

_____

_____

_____

_____

(2 marks)

c. Give reasons for the following:

(i) Before donating blood, the donor's blood is checked for haemoglobin content. _____

_____

_____

_____

(1 mark)

(ii) Donated blood is checked for HIV infection before transfusion.

_____

_____

(1 mark)

(iii) Donor's blood and the patient's blood are checked for blood group before transfusion. _____

_____

_____

_____

_____

_____

_____

(3 marks)

Continued/...

Section B

There are **two essay** questions in this section. Answer **both** questions.

10. Explain how a human being is able to maintain a constant body temperature.

(10 marks)

Continued/...

11. Malaria is transmitted by mosquitoes and one way of reducing its incidence in an area is to eliminate the mosquitoes from the area. Discuss the effect on the environment of the different ways that could be used to eliminate mosquitoes.

(10 marks)

END OF QUESTION PAPER.

NB: This paper contains 13 pages.