

EXAMINATION NO.: _____



THE MALAWI NATIONAL EXAMINATIONS BOARD

2015 MALAWI SCHOOL CERTIFICATE OF EDUCATION EXAMINATION

BIOLOGY

Subject Number: M022/I

Tuesday, 23 June

Time Allowed: 2 h 30 mins
1:30 – 4:00 pm

PAPER I (100 marks)

Theory

1. This paper contains 12 printed 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			
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9			
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14			
15			
16			



Section A (20 marks)

Answer **all** questions in this section.

1. a. Define “photolysis”.

(1 mark)

- b. What role do the following elements play in photosynthesis?

(i) “potassium” _____

(1 mark)

(ii) “nitrogen” _____

(1 mark)

2. **Figure 1** shows muscles and joints of the human arm. Use it to answer the questions that follow.

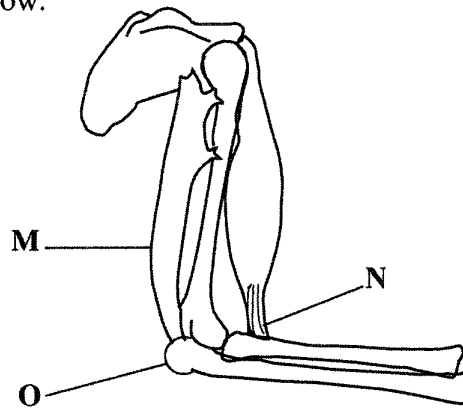


Figure 1

- a. Name the parts marked M and N.

M _____ N _____
(2 marks)

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

(1 mark)

2. (Continued)

- c. What type of a joint is found at O?

(1 mark)

- d. Explain how bending of the lower arm occurs.

(3 marks)

3. a. State any **two** physical factors of a fresh water ecosystem that may affect aquatic animals.

(2 marks)

- b. Explain any **one** way in which resources could be managed in a fresh water ecosystem.

(2 marks)

Continued/...

4. **Figure 2** shows **two** contraceptive methods. Use it to answer the questions that follow.

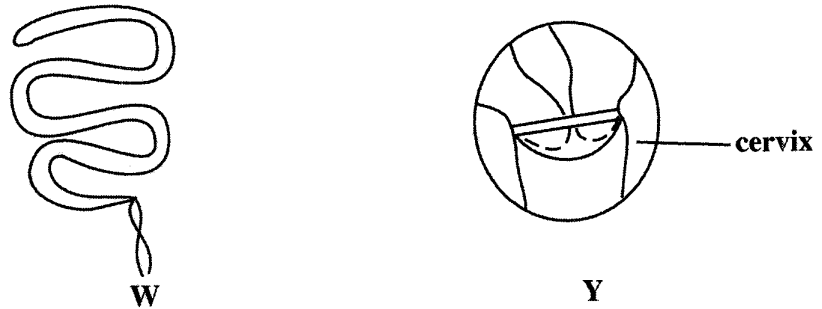


Figure 2

- a. Name the contraceptive methods **W** and **Y**.

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

- b. State how each of the contraceptive methods in **4a** works.

W: _____
_____ (1 mark)

Y: _____
_____ (1 mark)

5. Give any **two** differences between aerobic and anaerobic respiration.

_____ (2 marks)

Continued/...

Section B (60 marks)

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

6. Explain **one** way in which each of the following blood cells performs its function in infection prevention:

a. Phagocytes:

b. Lymphocytes:

(4 marks)

7. a. Explain how the medulla oblongata regulates breathing in the human body.

(5 marks)

b. Explain how inhalation occurs.

(5 marks)

Continued/...

8. **Figure 3** shows part of the human male and female reproductive systems. Use it to answer the questions that follow.

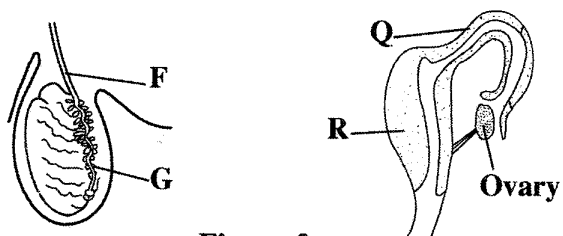


Figure 3

- a. Name the parts marked **F** and **R**.

F _____ **R** _____ (2 marks)

- b. State **one** function of each of the following parts:

G: _____
 _____ (1 mark)

Q: _____
 _____ (1 mark)

9. **Figure 4** shows the human circulatory system. Use it to answer the questions that follow.

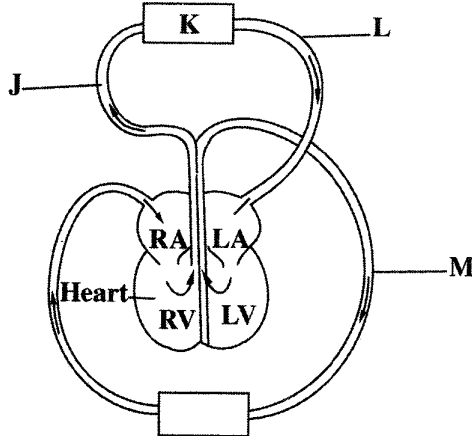


Figure 4

- a. Name the parts marked **K** and **L**.

K _____ **L** _____ (2 marks)

Continued/...

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9. (Continued)

- b. (i) Give any **one** difference in composition of blood in **J** and in **M**.

_____ (1 mark)

- (ii) Explain your answer to 9(b)i.

 _____ (2 marks)

10. **Figure 5** shows part of the human digestive system. Use it to answer the questions that follow:

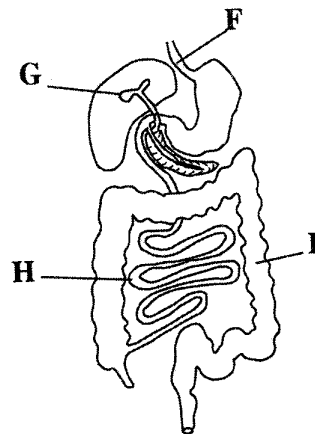


Figure 5

- a. Name the parts marked **F** and **G**.

F _____ **G** _____ (2 marks)

- b. State **two** observable adaptations of part marked **H** to its function.

 _____ (2 marks)

- c. Describe the function of part marked **I**.

 _____ (2 marks)

Continued/...

11. **Table 1** shows secretory organs, hormones and their effects. Use it to answer the questions that follow.

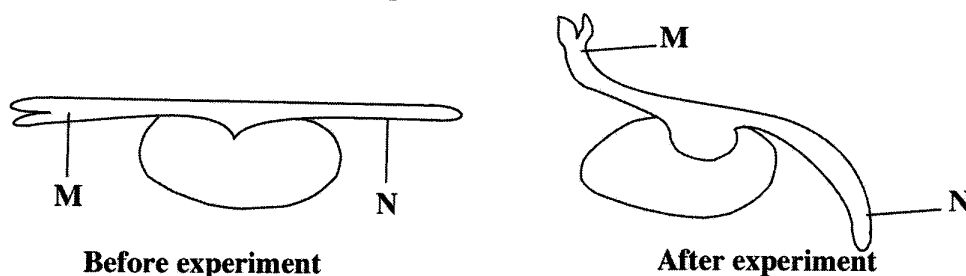
Table 1

Secretory organ	Name of hormone	Effect
(i) R	Thyroxine	Regulates metabolic reactions
Pancreas	(ii) S	Stimulates conversion of glucose into glycogen
Oestrogen	Ovary	(iii) T

- a. Fill the parts marked **R**, **S** and **T** in the table. (3 marks)
- b. Which food nutrient is required for the formation of thyroxine?

(1 mark)

12. **Figure 6** is a diagram of an experiment on effect of auxins on growth of a bean seedling. The bean seedling was placed on a moist surface horizontally for two days. Use it to answer the questions that follow.

**Figure 6**

- a. Apart from gravity, mention **two** other stimuli to which the seedling could respond.

(2 marks)

- b. Explain the effect of auxins on N.

(4 marks)

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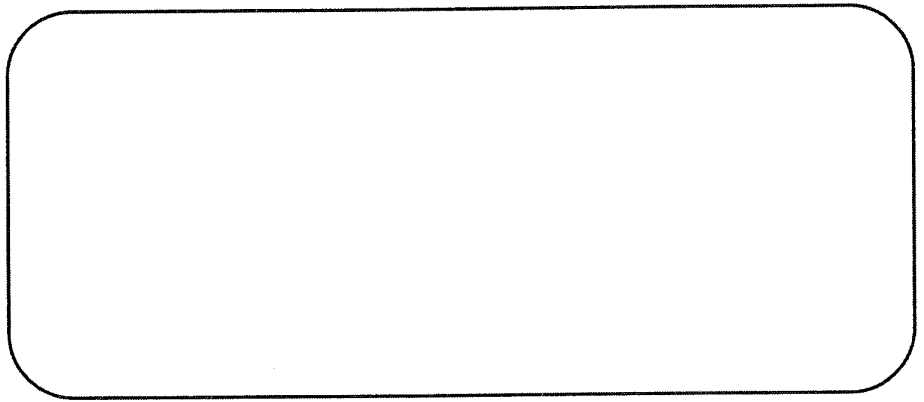
13. a. Albino maize plants have white leaves. Explain why these plants die a few days after germination.
- _____
- _____
- _____ (3 marks)
- b. Explain any **one** way in which a mutation may be beneficial to an organism.
- _____
- _____ (2 marks)
- c. Give any **two** ways in which knowledge of genetics is used in plant and animal breeding.
- _____
- _____
- _____ (2 marks)
14. a. Using a genetic diagram, explain how sex of a baby is determined at fertilization.

(7 marks)

Continued/...

14. (Continued)

- b. In an ecosystem, a student split a log of dead wood and she found many termites feeding on it. Soon after she had left, birds came to pick the termites. Use this information to answer the questions that follow.
- (i) Draw a well labelled pyramid of numbers to represent this information.



(4 marks)

- (ii) Why does the pyramid in 14(b)i have such a shape?

(3 marks)

Continued/...

Continued/...

