

EXAMINATION NO.: \_\_\_\_\_  
**THE MALAWI NATIONAL EXAMINATIONS BOARD**  
2016 MALAWI SCHOOL CERTIFICATE OF EDUCATION EXAMINATION

## BIOLOGY

Subject Number: M022/I

Tuesday, 28 June

Time Allowed: 2 h 30 mins  
8:00 – 10:30 am

### PAPER I (100 marks)

### Theory

#### Instructions

1. This paper contains 10 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			
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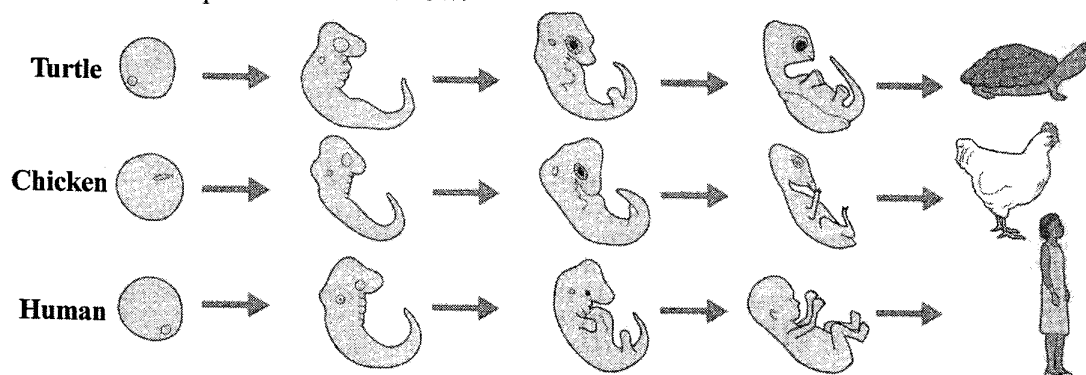


**Section A (20 marks)**Answer **all** questions in this section.

1. a. Name the enzyme that is found in saliva.  
\_\_\_\_\_ (1 mark)
- b. State any **two** properties of enzymes.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2 marks)
- c. Give any **two** chemical elements that make up protein molecules.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2 marks)
2. a. Give **two** differences between diffusion and active transport.  
(i) \_\_\_\_\_  
\_\_\_\_\_  
(ii) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2 marks)
- b. Mention any **two** characteristics of plasmolysed cells.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2 marks)
- c. Describe the importance of the DNA molecule to an organism.  
\_\_\_\_\_  
\_\_\_\_\_ (2 marks)

Continued/...

3. **Figure 1** shows different stages of development in turtle, chicken and human. Use it to answer the questions that follow.



**Figure 1**

- a. What name is given to this evidence of evolution?

(1 mark)

- b. Explain how this evidence proves the theory of evolution.

(2 marks)

4. State any **one** principle of mendalian genetics.

(1 mark)

5. a. State the importance of immunity to the human body.

(1 mark)

- b. Classify the following diseases according to their causative agents in the table below: Ringworm, Pneumonia, Cholera, Athlete's foot

Fungal diseases	Bacterial diseases

(4 marks)  
Continued/...

## Section B (60 marks)

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

6. a. Define the term “environmental stress”.

\_\_\_\_\_  
\_\_\_\_\_  
(1 mark)

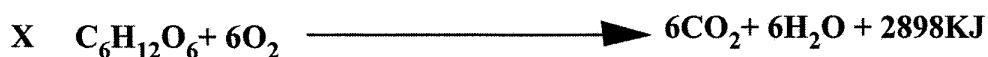
- b. Explain how floods could be caused in an ecosystem.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
(3 marks)

- c. Explain the impact of alien species of plants and animals on the local environment.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
(2 marks)

7. **Figure 2** shows chemical equations for two types of respiration in human beings. Use them to answer the questions that follow.

**Figure 2**

- a. (i) Give any **two** differences between X and Y.

\_\_\_\_\_  
\_\_\_\_\_  
(2 marks)

- (ii) Mention **one** similarity between X and Y.

\_\_\_\_\_  
\_\_\_\_\_  
(1 mark)  
Continued/.

## 7. (Continued)

- b. Explain why a person left in a poorly ventilated room would breathe at a faster rate.

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(5 marks)

8. a. State any **two** problems associated with the circulatory system.

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(2 marks)

- b. Mention **two** ways of preventing problems associated with the circulatory system.

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(2 marks)

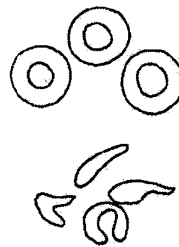
- c. State **two** ways in which blood clotting is important.

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(2 marks)

9. **Figure 3** shows a sample of human red blood cells. Use it to answer the questions that follow.



**Figure 3**

- a. (i) What genetic disease is shown in **Figure 3**?

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(1 mark)

Continued/...

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9. a. (Continued)

(ii) Give a reason for your answer in 9.a.(i).

(1 mark)

b. What advantage do people with this kind of genetic disease have over normal people?

(1 mark)

c. Explain how nature operates to remove genes responsible for this disease.

(3 marks)

10. a. Give **two** ways in which the mouth is suited for digestion.

(2 marks)

b. State any **one** way in which fatty acids and glycerols are used by the body after being absorbed.

(1 mark)

11. a. Where does gaseous exchange take place in fish?

(1 mark)

b. Why should the volume of mouth cavity and pharynx be increased in fish during inhalation?

(2 marks)

c. Give **two** adaptations of the respiratory surface in fish.

(2 marks)

d. Give a reason why fish die when taken out of water.

(1 mark)

Continued/

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12. a. Give **one** difference between birth rate and fertility rate.

\_\_\_\_\_  
\_\_\_\_\_  
(1 mark)

- b. Explain how the following affect fertility rate:

- (i) using contraceptives

\_\_\_\_\_  
\_\_\_\_\_  
(2 marks)

- (ii) average age of marriage

\_\_\_\_\_  
\_\_\_\_\_  
(2 marks)

- c. State any **two** components of an ecosystem.

\_\_\_\_\_  
\_\_\_\_\_  
(2 marks)

13. a. Give **two** causes of drag when the fish is moving in water.

\_\_\_\_\_  
\_\_\_\_\_  
(2 marks)

- b. Explain any **one** way in which the swim bladder controls depth of swimming in fish.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
(3 marks)

- c. (i) State **two** uses of the paired fins in fish when swimming.

\_\_\_\_\_  
\_\_\_\_\_  
(2 marks)

Continued/...

13. c. (Continued)

- (ii) Explain
- two**
- ways in which the caudal fin helps the fish to move forward.

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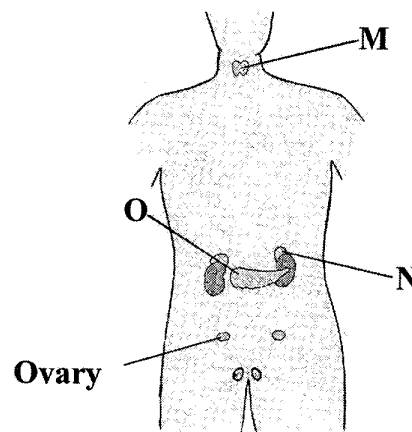
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(4 marks)

- 14.
- Figure 4**
- shows position of endocrine glands in the human body. Use it to answer the questions that follow.

**Figure 4**

- a. Name the hormone produced by part marked
- M**
- .

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(1 mark)

- b. Explain why the hormone produced by part marked
- N**
- is called the flight or fight hormone.

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(2 marks)

- c. (i) What would happen to the levels of glucose in the body if part
- O**
- was removed?

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(1 mark)

- (ii) Explain your answer in 14. c. (i).

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(3 mark)  
Continued



## Essay Questions

15. Explain **five** effects of exercise on breathing. Your answer should be in an essay form.

15. Explain **five** effects of exercise on breathing. Your answer should be in an essay form.

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper appears to be a standard notebook page.

Continued/...

16. Describe an experiment that could be carried out to show that leaves contain different types of pigments. In your answer include: procedure, expected results and conclusion in an essay form.

**(10 marks)**

**END OF QUESTION PAPER**

**NB: This paper contains 10 printed pages.**