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|---------------|------------------|--|--|--|--|--|--|--|--|--|
| Centre Number | Candidate Number |  |  |  |  |  |  |  |  |  |
|               |                  |  |  |  |  |  |  |  |  |  |

Candidate Name \_\_\_\_\_

**EXAMINATIONS COUNCIL OF ZAMBIA**  
**Joint Examination for the School Certificate**  
**and General Certificate of Education Ordinary Level**

**BIOLOGY**  
**PAPER 2 Theory**

**5090/2**

**Monday**

**9 NOVEMBER 2009**

**1 hour 45 minutes**

**Additional materials:**  
**Answer Booklet**

**TIME: 1 hour 45 minutes**

**INSTRUCTIONS TO CANDIDATES**

Write your name, centre number and candidate number in the spaces at the top of this page and on the Answer Paper used.

There are **ten** questions in this paper.

**Section A**

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

**Section B**

Answer any **three** questions.

Write your answers in the Answer Booklet provided.

At the end of the examination:

1. fasten the Answer Booklet used securely to the question paper,
2. **enter** the numbers of the Section B questions you have answered in the grid on the right.

**INFORMATION FOR CANDIDATES**

The intended number of marks is given in brackets [ ] at the end of each question or part question.

You are advised to spend no longer than one hour on Section A and no longer than 45 minutes on Section B.

**Cell phones are not allowed in the examination room.**

| FOR EXAMINER'S USE |  |
|--------------------|--|
| Section A          |  |
| Section B          |  |
|                    |  |
|                    |  |
|                    |  |
| Total              |  |

**This question paper consists of 7 printed pages**

1 Figure. 1.1 shows some cells taken from a vascular tissue of a plant.

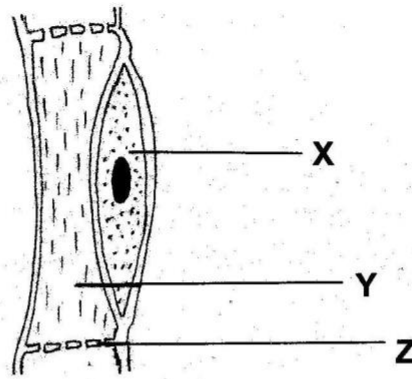


Figure 1.1.

(a) Identify the cells X and Y and structure labelled Z.

Cell X .....

Cell Y .....

Structure Z ..... [3]

(b) What are the functions of the cells labelled

(i) X .....

..... [1]

(ii) Y .....

..... [1]

(iii) What structure, in the human body, performs a similar function as structure Y?

.....

..... [1]

(c) What **two** conditions are necessary for osmosis to take place?

1 .....

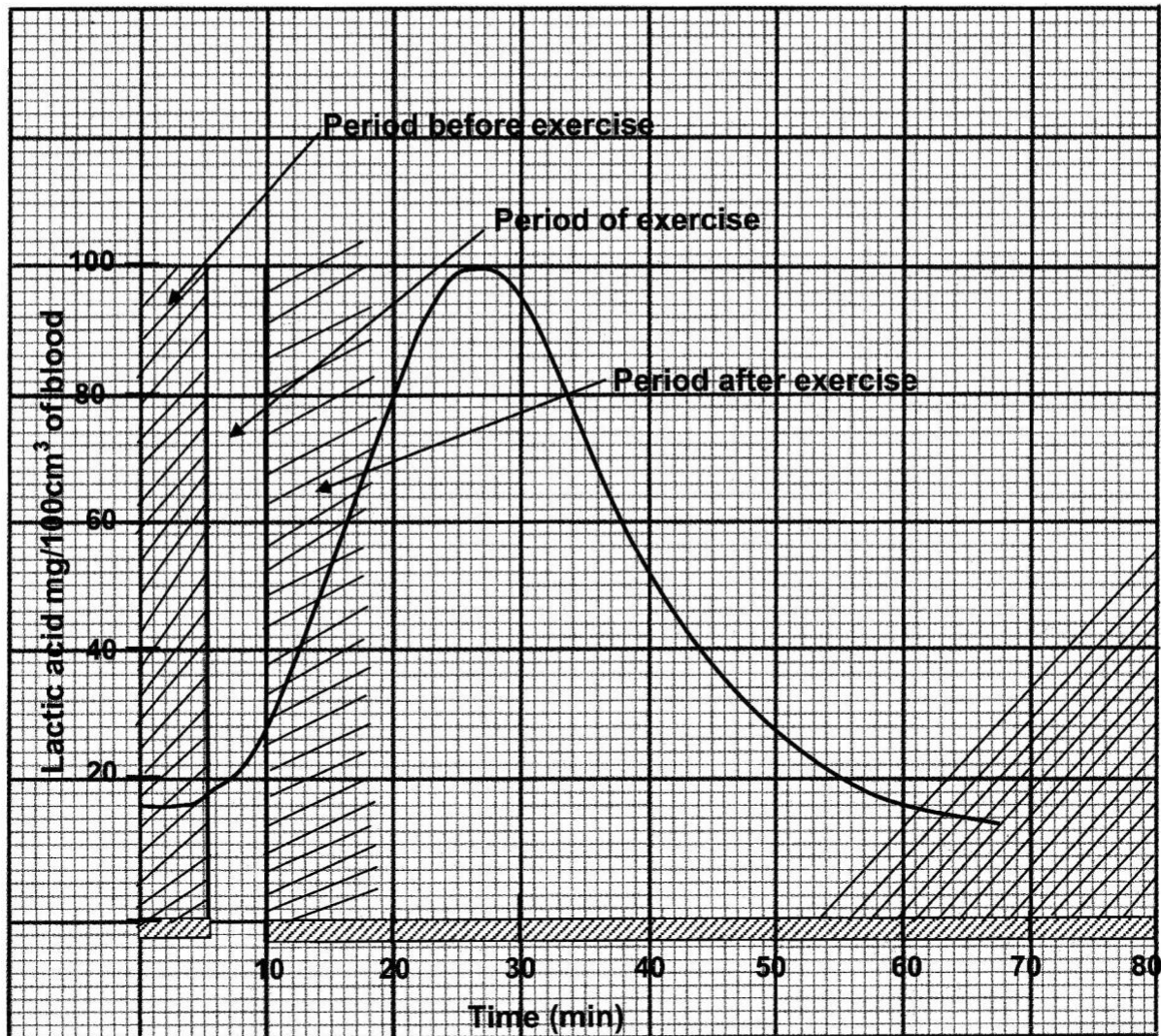
.....

2 .....

..... [2]

[Total 8]

- 2 (a) **Figure 2.1** shows the amount of lactic acid in the blood before, during and after a heavy exercise.



**Figure 2.1**

- (a) (i) What was the level of lactic acid in the blood before the exercise?

..... [1]

- (ii) How much lactic acid was produced at 20 minutes after the exercise?

..... [1]

- (iii) How long did it take for the lactic acid to reach its highest level after the exercise had began?

..... [1]

(b) (i) What is the reason for the build up of lactic acid in the blood?

.....  
 ..... [1]

(ii) What are the effects of the build up of this lactic acid on the person?

.....  
 ..... [2]

(iii) Compare the products of the process taking place during the heavy exercise to that which takes place in yeast cells?

.....  
 .....  
 ..... [2]

(c) Suggest **two** uses of the process identified in **b (i)**

1 .....  
 .....  
 2 .....  
 ..... [2]

[Total 10]

3 (a) Complete the **Table 3.1**, by filling in the blank spaces.

|       | HORMONE   | SOURCE        | ACTION                                     |
|-------|-----------|---------------|--|
| (i)   |           | Ovary         | Begins rebuilding the lining of the uterus |
| (ii)  | Thyroxine | Thyroid gland |  |
| (iii) |           | Adrenal gland |  |

**Table 3.1**

[4]

(b) What happens to the hormones after completing their action in target organs?

.....  
 ..... [2]

- (c) State **two** ways in which hormones and nerve impulses differ in controlling body processes?

- 1 ..... [2]  
 2 ..... [2]

[Total 8]

- 4 **Figure 4.1** and **Figure 4.2** show pyramids of food relationship among organisms in a forest and a lake.

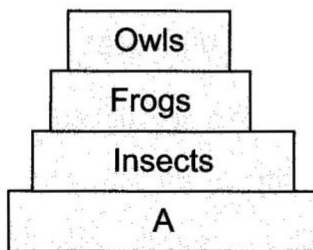


Figure 4.1 Forest

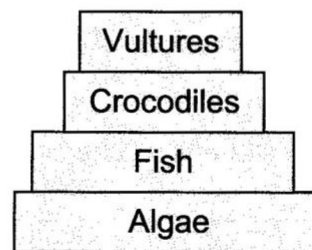


Figure 4.2 Lake

- (a) (i) Identify the organism found in trophic level labelled **A** in **Figure 4.1**.

..... [1]  
 .....

- (ii) What would happen if the population of insects in **Figure 4.1** reduced?

..... [2]  
 .....  
 .....

- (b) (i) What is the ultimate source of energy for both pyramids?

..... [1]

- (ii) Explain the differences in energy between trophic levels as you go up the pyramids.

..... [2]  
 .....  
 .....  
 .....

- (c) Traces of DDT applied on a nearby farm were washed by rain into the lake and were taken up by algae in **Figure 4.2**.

Why was there more DDT in organisms in the fourth trophic level of **Figure 4.2** than in those in the first trophic level?

.....

.....

.....

..... [2]

[Total 8]

- 5 (a) Haemophilia is an example of a sex-linked inherited disease arising from a blood disorder.

- (i) What is a sex-linked characteristic?

.....

..... [1]

- (ii) Explain why males are more likely to suffer from sex-linked diseases than female?

.....

.....

.....

..... [2]

- (b) Colour blindness is another sex-linked disease. Using a genetic diagram, show the chances of having a colour blind child from a couple made up of a normal male parent and a carrier female parent. (Use the symbols  $X^R$  and  $X^r$ ).

[7]

[Total 10]

**Section B**

Answer any **three** questions.

All answers should be in sentence form in paragraphs.

- (a) Explain how leaves are adapted to carry out photosynthesis. [4]
- 6 (b) How does a plant get and use the following elements:
- (i) Nitrogen
- (ii) Magnesium [4]
- (c) Explain how enzyme activity is affected by the pH and concentration of the substrate. [4]
- [Total: 12]
- 7 (a) (i) Explain the role of the kidney in excretion. [3]
- (ii) Explain the role of the kidneys in homeostasis. [3]
- (b) Describe the disadvantages of a kidney transplant. [3]
- (c) Explain why there is limited excretion of nitrogenous wastes and salts in plants. [3]
- [Total: 12]
- 8 (a) What are the advantages of sexual reproduction over asexual reproduction in flowering plants? [5]
- (b) Explain how asexual reproduction in a fungi, such as a Rhizopus, takes place. [3]
- (c) Describe the sequence of events which take place in a flower from pollination to fertilization. [4]
- [Total: 12]
- 9 (a) What is the importance of the following in relation to blood?
- (i) Leukemia
- (ii) Sickle cell anaemia [2]
- (b) Explain the role of house flies in disease transmission. [2]
- (c) Discuss the cause, signs, symptoms and prevention of malaria. [8]
- [Total: 12]
- 10 (a) (i) Explain the importance of transpiration. [3]
- (ii) Explain how **two** named environmental factors affect the rate of transpiration. [4]
- (b) Describe the role of blood in transporting materials in the body. [5]
- [Total 12 marks]