EXAMINATIONS COUNCIL OF ZAMBIA

Examination for General Certificate of Education Ordinary Level

Biology

Paper 2 Theory

Wednesday 6 JULY 2016

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 Booklet 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 bottom right side corner.

Information for Candidates

The 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.
Section A  [44 marks]

Answer all the questions in the spaces provided on the question paper.

1  **Figure 1.0** shows the set up to an experiment used to investigate the effect of a biological catalyst on the decomposition of hydrogen peroxide to produce oxygen.

![Diagram of experiment setup]

**Figure 1.0**

Three experiments were carried out under different conditions as shown in the table below.

<table>
<thead>
<tr>
<th>Experiment number</th>
<th>Volume of hydrogen peroxide</th>
<th>Number of potato discs used</th>
<th>Nature of potato discs used</th>
<th>Volume of oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5cm³</td>
<td>0</td>
<td>-</td>
<td>1.5cm³</td>
</tr>
<tr>
<td>2</td>
<td>5cm³</td>
<td>5</td>
<td>Boiled</td>
<td>1.5cm³</td>
</tr>
<tr>
<td>3</td>
<td>5cm³</td>
<td>5</td>
<td>Raw</td>
<td>10.0cm³</td>
</tr>
</tbody>
</table>

(a)  (i) What is the general name given to a biological catalyst?  ................................................................. [1]

(ii) Give a reason for boiling the potato discs in experiment 2.

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

(iii) Explain the difference in results obtained between experiments 1 and 3.

...................................................................................................................................................................................................................................................................................................................................................................................... [2]
(b) Predict what would be the result of:

(i) increasing the number of potato discs in 5cm$^3$ of hydrogen peroxide.

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

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

(ii) heating the mixture of 5cm$^3$ of hydrogen peroxide with five potato discs.

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

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

(c) Suggest two other characteristics of a biological catalyst not demonstrated in (a) and (b) of this question.

1 ..........................................................................................................................

..........................................................................................................................

..........................................................................................................................

2 ..........................................................................................................................

..........................................................................................................................

..........................................................................................................................

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

[Total: 8]
2 Figure 2.0 shows cells taken from a vascular tissue in a plant.

![Diagram of a cell with labeled parts: A, B, C, D, E.]

**Figure 2.0**

(a) (i) Identify the specialised cell in figure 2.0.

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

..........................................................................................................................

(ii) Name one feature in figure 2.0 which enabled you to identify the specialised cell in (a) (i) above.

..........................................................................................................................

..........................................................................................................................

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

(iii) Which letters on figure 2.0 correspond to the following structures?

1 nucleus .................................................................................................

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

(b) Give two functions of the cell labelled B.

1 ...................................................................................................................

2 ................................................................................................................. [2]
(c) With reference to the specialised cell in figure 2.0:

(i) Name the process by which substances are transported in the specialised cell.

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

.................................................................................................................

(ii) Suggest two substances transported by the specialised cell.

1 .............................................................................................................

.................................................................................................................

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

.................................................................................................................

[Total: 9]
Figure 3.0 shows a diagram of a tooth.

![Diagram of a tooth](image)

**Figure 3.0**

(a) (i) Identify the type of tooth shown in figure 3.0 above and state its function.

**Type of tooth** .................................................................

**Function** ........................................................................

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

(ii) Label on the diagram the following parts of a tooth.

1 Blood capillaries
2 Dentine ........................................................................ [2]

(b) (i) Mention two elements or ions which enable part F to perform its functions more efficiently.

**Element or ion 1.** ...............................................................[2]

**Element or ion 2.** ...............................................................[2]

(ii) Suggest how tooth decay can be brought about.

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

(iii) Give one way in which tooth decay can be prevented.

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

[Total: 9]
Figure 4.0 shows feeding relationship of organisms in an ecosystem.

![Diagram of food web with arrows indicating relationships between Hawk, Mice, Snake, Grass, and Grasshopper.]

**Figure 4.0**

(a) Which of the named organisms represents?

(i) a producer .................................................................

(ii) a primary consumer ................................................... [2]

(b) What is the primary source of energy in figure 4.0 above?

Source of energy ............................................................... [1]

(c) (i) State the form in which energy flows from one trophic level to another.

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

(ii) Explain what happens to the energy named in (c)(i) as it passes from one trophic level to the next.

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

(d) (i) Identify two organisms in figure 4.0 which are both secondary consumers and tertiary consumers.

Organism 1. .................................................................

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

(ii) Using named organisms in figure 4.0 construct the longest food chain.

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

[Total: 9]
5 Table 5.0 below shows a cross between a brown male pig labelled pig B, with two female pigs brown (pig A) and white, pig C.

<table>
<thead>
<tr>
<th>Pig</th>
<th>Phenotype</th>
<th>Offspring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>White</td>
</tr>
<tr>
<td>B</td>
<td>Brown male</td>
<td>Nil</td>
</tr>
<tr>
<td>A</td>
<td>Brown female</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>White female</td>
<td>8</td>
</tr>
</tbody>
</table>

   Table 5.0

   (a) Explain why pig B had no offspring.

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

   (b) From the results in table 5.0 and using the symbol B for dominant allele and b for recessive allele,

   (i) Identify the recessive phenotype of the skin colour of the pigs.

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

   (ii) Suggest the genotypes of pigs A and C

   **Genotype pig A** ..............................................

   **Genotype pig C** ............................................ [2]

   (c) Using a genetic diagram, show the results of crossing pig B with pig C.

   [5]

   [Total: 9]
Section B [36 marks]
Answer any three questions.
All answers should be in sentence form in paragraphs.

6  (a) What are the characteristics of the alveolus as a respiratory surface? [5]
    (b) Describe the mechanism involved in inspiration in human beings. [7]
    [Total: 12]

7  (a) (i) Explain the causes of coronary heart disease. [8]
    (ii) Discuss how coronary heart disease can be prevented. [2]
    (b) Describe the functions of lymph nodes in disease prevention. [2]
    [Total: 12]

8  The following are parts associated with the skeletal system.
    1  Vertebrae column
    2  Skull
    3  Skeletal muscle
    Describe
    (a) their characteristics. [6]
    (b) their functions. [6]
    [Total: 12]

9  (a) What is meant by tropic response? [2]
    (b) Discuss the role of auxins in a
        (i) shoot receiving light from one side. [5]
        (ii) radicle growing horizontally. [5]
    [Total: 12]

10 (a) Explain how flowering plants get rid of excess and unwanted substances from their bodies. [4]
    (b) Discuss the importance of homeostasis in mammals. [8]
    [Total: 12]
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