TONGA SCHOOL CERTIFICATE
2018
BIOLOGY
QUESTION AND ANSWER BOOKLET

Time Allowed: 3 Hours

INSTRUCTIONS:
1. Write your Student Enrolment Number (SEN) on the top right hand corner of this page.
2. This paper consists of SIX QUESTIONS and is out of 70 Skill Level.

<table>
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<tr>
<th>QUESTIONS</th>
<th>TOPICS</th>
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<td>CIRCULATORY AND EXCRETORY SYSTEM</td>
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<td>DIGESTIVE SYSTEM AND SKELETAL SYSTEM</td>
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<td>FOUR</td>
<td>PLANT PHOTOSYNTHESIS AND GAS EXCHANGE</td>
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<td>FIVE</td>
<td>PLANT TRANSPORT</td>
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<td>SIX</td>
<td>PLANT REPRODUCTION AND GROWTH</td>
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<td>CELLS AND GENETICS</td>
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3. Answer ALL QUESTIONS. Write your answers in the spaces provided in this booklet.
4. Use a BLUE or BLACK ball point pen only for writing. Use a pencil for drawing if required.
5. If you need more spaces for answers, ask the supervisor for extra paper. Write your Student Enrolment Number (SEN) on each additional sheet, number the questions clearly and insert them in the appropriate places in this booklet.
6. Check that this booklet contains pages 2-23 in the correct order and that pages 21-23 has been deliberately left blank.

YOU MUST HAND IN THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.
QUESTION ONE: CIRCULATORY AND EXCRETORY SYSTEM.

a. Define the term **excretion**.

____________________________________________________________________________

The list below shows some of the malfunctions of the human body system.

<table>
<thead>
<tr>
<th>Gout</th>
<th>Kidney stone</th>
<th>Hypertension</th>
<th>Asthma</th>
<th>Constipation</th>
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b. Choose from the list above the malfunction of the excretory system.

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Fig 1.1 is a diagram of the red blood cells found in blood.

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c. Describe the structure and component of a red blood cell.

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d. Describe the role of the circulatory system in maintaining homeostasis.

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Fig 1.2. The diagram below shows the structure of a human heart.

![Diagram of the human heart]

e. **Explain** why the left ventricle has thicker walls than the right ventricle.

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QUESTION TWO: RESPIRATORY AND REPRODUCTIVE SYSTEM

Figure 2.1 below shows the structure of the human respiratory system.

a. Name structures X and Y.

X : _______________________

Y : _______________________

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Fig 2.2 below shows the structure of the alveoli that are found in the human lungs.

b. Describe the structural feature of the alveoli that allows it to function well.

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Fertilization is an important process in the life cycle of an organism and reproductive system of human.

c. Define the term fertilization.

____________________________________

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d. Give ONE (1) example of a disorder of the reproductive system.

____________________________________

____________________________________
QUESTION THREE: DIGESTIVE SYSTEM AND SKELETAL SYSTEM

Figure 3.1 shows the human digestive system.

![Digestive System Diagram]

a. Define **digestion**.

b. Describe why the process of digestion is important to humans.

c. Name the structure labelled **Z**.

d. Name the process that occurs at structure **Y**.
e. Structure X have important functions. Describe ONE (1) of its function.

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f. Name a hormone produced by structure X.

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g. Explain how structure Z are adapted for their functions in the human digestive system.

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Gout is a common type of malfunction of the skeletal system that affects the human joints.

h. Discuss what **causes** gout, the **effects** it has on the human skeletal system and the possible **treatments** of this type of malfunction.
QUESTION FOUR: PLANT PHOTOSYNTHESIS AND GAS EXCHANGE

a. Write the balanced chemical equation for photosynthesis in the box below.

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Figure 4.1 below shows the structure of a plant cell.

b. Identify the letter that represents the chloroplast.

______________________________________________________________________
Figure 4.2 below shows the structure of a leaf. Study the diagram carefully then answer the questions that follow.

**Structure of a Leaf**

- c. Identify the gases that are exchanged across the leaf surface.
  
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- d. Describe the role of the guard cells during gas exchange in plants.
  
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- e. Apart from the gases named above, state **TWO** (2) other factors that affect the rate of photosynthesis.
  
  __________________________________________________________________________
  __________________________________________________________________________
f. Explain how the structure of the leaf supports its function in photosynthesis.
QUESTION FIVE: PLANT TRANSPORT

a. Define transpiration.

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b. Name the site where transpiration takes place in plant.

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(c) Draw a labelled diagram in the space below to show the transpiration stream through a plant.
d. Explain why the rate of transpiration in plants is **slower** on a cold and wet day.

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QUESTION SIX: PLANT REPRODUCTION AND GROWTH

Figure 6.1 below shows the structure of a flowering plant.

a. Describe how the features of the male part of the flower is adapted for pollination.

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b. List TWO (2) advantages of sexual reproduction in flowering plants.

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c. Draw a **labelled diagram** in the space below to show what happens when a pollen lands on the stigma.

![Diagram space]

d. Explain the difference between sexual and asexual reproduction as it occurs in flowering plants.

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Seed germination is an important process in the growth of plants.

e. Name the **plant hormone** that is responsible for breaking the dormancy in seed germination.

f. Describe **hypogeal** seed germination.
**QUESTION SEVEN:** CELLS AND GENETICS

**Figure 7.1** shows a human karyotype.

a. Define **karyotype**.

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____________________________________________________________________

b. Use the diagram shown above to explain the importance of obtaining a karyotype.

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Figure 7.2 shows the feature of a chromosome found inside the nucleus of a cell.

c. Describe the difference between DNA, gene and chromosome.

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**Figure 7.3** given below shows the events that occur in a meiotic cell division.

![Diagram of meiotic cell division](image)

**d.** Describe what happens during crossing over at Metaphase 1.

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**e.** Explain how crossing over causes genetic variation.

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f. Discuss the significance of cell division **mitosis** and **meiosis** in the continuity of life.

In your discussion
- **Define each cell division**
- **State their location and their purpose**
- **Identify their number of daughter cell and chromosome**
- **Comment on the relationship between each cell division**
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