# TERM 3 HOLIDAY ASSIGNMENT 2026
## FORM THREE
## BIOLOGY PAPER 1

| Section | Question Numbers | Maximum Score | Candidate's Score |
|---|---|---|---|
| Paper 1 | 1 – 25 | 50 Marks* | |
| TOTAL | | 50 Marks* | |

**1.** Give the structure of the cell that performs each of the following functions:

**a)** Synthesis of ribosomes. **(1 mark)**

_____

**b)** Regulates exchange of substances in and out of the nucleus. **(1 mark)**

_____

**c)** Breaks down large molecules and destroys worn-out organelles. **(1 mark)**

_____

**2.** Give the meaning of the following terms as used in ecology:

**i)** Synecology. **(1 mark)**

_____

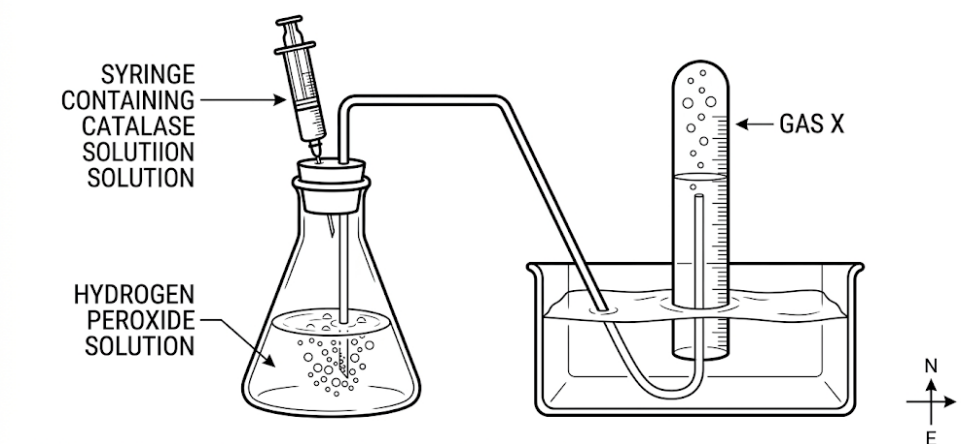
**ii)** Carrying capacity. **(1 mark)**

_____

**iii)** Population. **(1 mark)**

_____

**3.** The apparatus below was set up by students to investigate a reaction involving hydrogen peroxide and catalase. Study it and answer the questions.




**a)** Name gas X. **(1 mark)**

_____

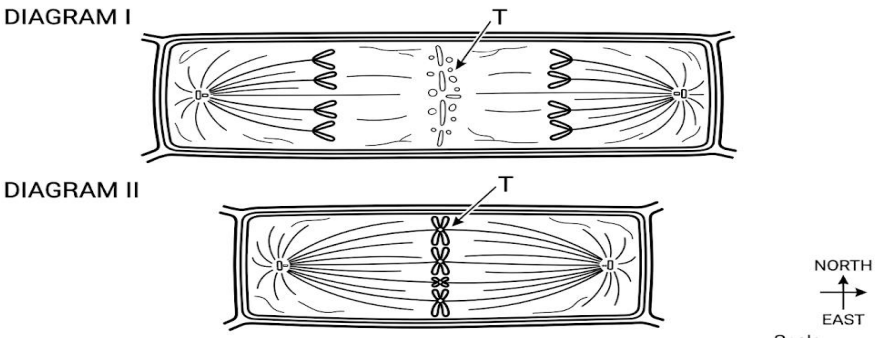
**b)** Write a word equation for the reaction which produces the gas. **(1 mark)**

_____

**c)** Where in the human body does this type of reaction occur? **(1 mark)**

_____

**4.** Study the cell-division diagrams below and answer the questions that follow.




**i)** Identify the phase of cell division represented by Diagram II. **(1 mark)**

_____

**ii)** Name the structure labelled T. **(1 mark)**

_____

**iii)** Identify, with a reason, why the cell shown is not an animal cell. **(2 marks)**

_____

_____

**5.** Explain the significance of each of the following:

**i)** Cardiac muscle is myogenic. **(1 mark)**

_____

**ii)** The left ventricle of a mammalian heart is more muscular than the right ventricle. **(1 mark)**

_____

**iii)** Most carbon(IV) oxide is not transported simply dissolved in blood plasma. **(1 mark)**

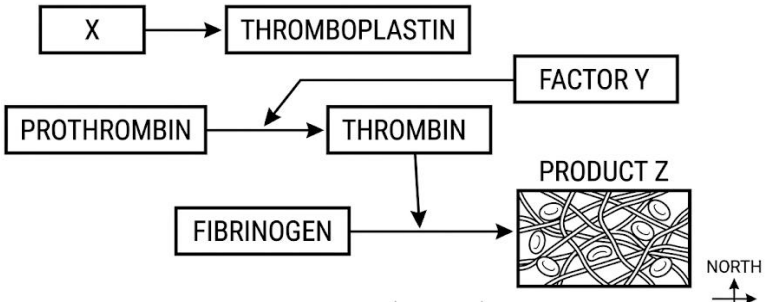
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**6.** Give ONE function of centrioles. **(1 mark)**

**b)** Name a kingdom in which all members lack centrioles in their cells. **(1 mark)**

_____

**7.** Study the flow chart below which represents a physiological process in mammals and answer the questions.




**i)** Name the blood component represented by X. **(1 mark)**

_____

**ii)** What is the significance of the product represented by Z? **(2 marks)**

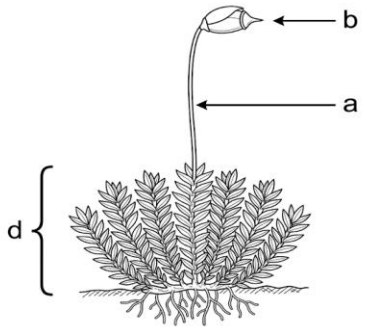
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_____

**iii)** Under what condition is thrombokinase released by platelets? **(1 mark)**

_____

**8.** The figure below represents a plant. Study it and answer the questions.




**a)** State the division to which the plant belongs. **(1 mark)**

_____

**b)** Label the parts marked a and b. **(2 marks)**

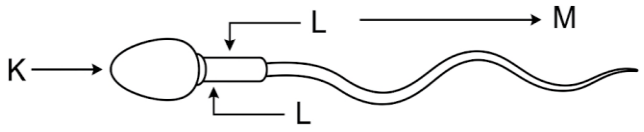
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_____

**c)** State the role of part d in the life cycle of the organism. **(1 mark)**

_____

**9.** The diagram below represents a specialized cell found in the human body. Study it and answer the questions.




**a)** Identify the cell. **(1 mark)**

_____

**b)** Name the parts labelled K and L. **(2 marks)**

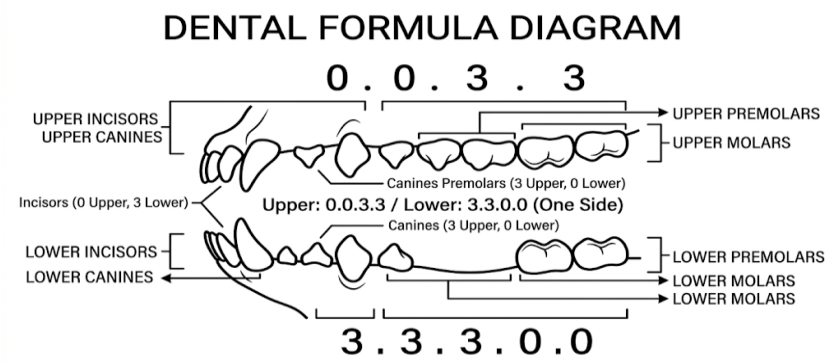
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**c)** What is the function of part M? **(1 mark)**

_____

**10.** The diagram below represents the dental formula of an organism. Study it and answer the questions.




**i)** Calculate the total number of teeth in the jaw of the animal. **(1 mark)**

_____

**ii)** With a reason, identify the type of dentition represented. **(2 marks)**

_____

_____

**11.** a) Name the organism that:

**i)** Causes malaria. **(1 mark)**

_____

**ii)** Transmits malaria. **(1 mark)**

_____

**b)** State two control measures for malaria. **(2 marks)**

_____

_____

**12.** The table below shows three enzymes A, B and C and their respective optimum pH.

| Enzyme | Optimum pH |
|---|---|
| A | 6.8 |
| B | 2.0 |
| C | 8.0 |

**a) i)** Name the most likely region of the alimentary canal of a mammal where enzyme B would be found. **(1 mark)**

_____

**ii)** Give a reason for your answer. **(2 marks)**

_____

_____

**13.** a)

**i)** Name the respiratory surface in insects. **(1 mark)**

_____

**ii)** Name any one feature that adapts the structure named in (i) to its function. **(1 mark)**

_____

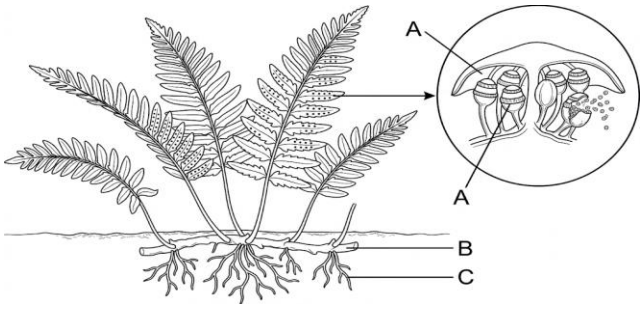
**iii)** Why does the blood of insects lack haemoglobin? **(1 mark)**

_____

**b)** Why do fish have gills that are highly vascularized? **(1 mark)**

_____

**14.** The diagram below represents a fern. Study it and answer the questions.




**a)** Name parts labelled A, B and C. **(3 marks)**

_____

_____

_____

**b)** To which division does the plant belong? **(1 mark)**

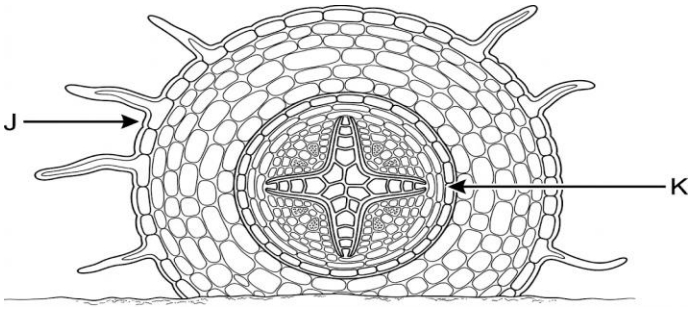
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**15.** State two ways in which Schistosoma species are adapted to a parasitic mode of life. **(2 marks)**

_____

_____

**16.** The diagram below represents a transverse section of a plant organ. Study it and answer the questions.




**a)** From which plant organ was the section obtained? **(1 mark)**

_____

**b)** Give two reasons for your answer. **(2 marks)**

_____

_____

**17.** To estimate the population size of mosquitoes in a village, researchers caught 500 mosquitoes, marked and released them. After 24 hours, 250 mosquitoes were caught, of which 50 had the mark.

**a)** Estimate the population size of the mosquitoes in the village. Show your working. **(3 marks)**

_____

_____

_____

_____

**b)** State three assumptions made by the researchers when using this method. **(3 marks)**

_____

_____

_____

**18.** a) Name the bacterium found in the root nodules of leguminous plants. **(1 mark)**

**b)** What relationship is shown by the bacterium and the leguminous plant? **(1 mark)**

_____

**19.** Explain how each of the following mechanisms hinders self-pollination:

**a)** Protandry. **(1 mark)**

_____

**b)** Heterostyly. **(1 mark)**

_____

**20.** State three roles of osmosis in plant nutrition. **(3 marks)**

_____

_____

_____

**21.** Name the carbohydrate that is:

**a)** Found in abundance in mammalian blood. **(1 mark)**

_____

**b)** Stored in a mammalian liver. **(1 mark)**

_____

**22.** Liver damage can lead to impaired digestion of fats. Explain. **(2 marks)**

_____

_____

**23.** An individual belongs to blood group B+.

**a)** Name the antigens present in the individual's blood group. **(2 marks)**

_____

_____

**b)** Give the reason why this individual cannot receive blood from a blood group A donor. **(2 marks)**

_____

_____

**24.** a) Define the term eutrophication. **(1 mark)**

**b)** List two effects of eutrophication in an aquatic ecosystem. **(2 marks)**

_____

_____

**25.** What is the significance of each of the following in gaseous exchange in mammals?

**a)** Cartilage in the trachea. **(1 mark)**

_____

**b)** Moisture on the surface of alveoli. **(1 mark)**

_____

**c)** Mucus on the inner surface of the trachea. **(1 mark)**

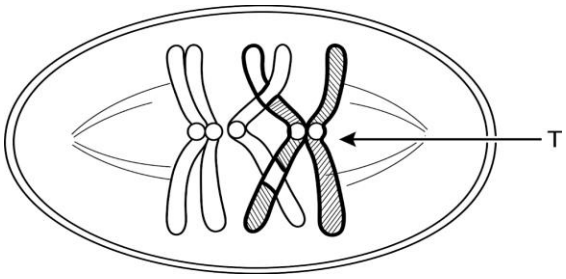
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# TERM 3 HOLIDAY ASSIGNMENT 2026
## FORM THREE
## BIOLOGY PAPER 2

| Section | Question Numbers | Maximum Score | Candidate's Score |
|---|---|---|---|
| Section A | 1 – 5 | 20 Marks | |
| Section B | 1–8 (as instructed) | 60 Marks | |
| TOTAL | Answered questions | 80 Marks* | |

## SECTION A (40 MARKS)

**1.** The diagram below shows a phenomenon that occurs during cell division.




**a)** Identify the phenomenon exhibited in the diagram. **(1 mark)**

_____

**b)** Identify the type of cell division in which this phenomenon occurs. **(1 mark)**

_____

**c)** Name the part labelled T and state its biological importance. **(2 marks)**

_____

_____

**d)** Name two organs in a human being where this type of cell division occurs. **(2 marks)**

_____

_____

**e)** On the table below, state one significant event that occurs during each stage listed. **(2 marks)**

_____

_____

| Stage in cell division | Meiosis I | Mitosis |
|---|---|---|
| Metaphase | | |
| Anaphase | | |

**2.** A biological washing powder contains enzymes. The enzymes remove stains such as blood from clothes when the clothes are soaked in water with the powder.

**a)** What is an enzyme? **(1 mark)**

_____

**b)** Identify two possible enzymes that may be found in the washing powder. **(2 marks)**

_____

_____

**c)** Would the stains be removed faster with the powder in water at 35 °C or 15 °C? **(1 mark)**

_____

**d)** Explain your answer in (c). **(2 marks)**

_____

_____

**e)** Why does boiling clothes soaked with the washing powder not necessarily remove the stains? **(2 marks)**

_____

_____

**3.** The amount of blood flowing through selected parts of the mammalian body at different activity levels was measured as shown below.

| Part of body | At rest ($cm^3$/min) | Light exercise ($cm^3$/min) | Strenuous exercise ($cm^3$/min) |
|---|---|---|---|
| Alimentary canal | 1200 | 800 | 400 |
| Cardiac muscle | 100 | 250 | 1400 |
| Skeletal muscle | 900 | 5000 | 16000 |

**a) i)** Account for the high blood flow through cardiac and skeletal muscle during strenuous exercise. **(4 marks)**

_____
_____
_____
_____

**ii)** Account for the blood flow through the alimentary canal at rest. **(2 marks)**

_____
_____

**b)** Name two waste materials excreted by both the skin and the kidney. **(2 marks)**

_____
_____

**4.** a) Nitrogen in the atmosphere cannot be directly utilized by plants. State two ways by which this nitrogen is made available for plant use. **(2 marks)**

**b)** State the importance of saprophytic bacteria in the environment. **(1 mark)**

_____

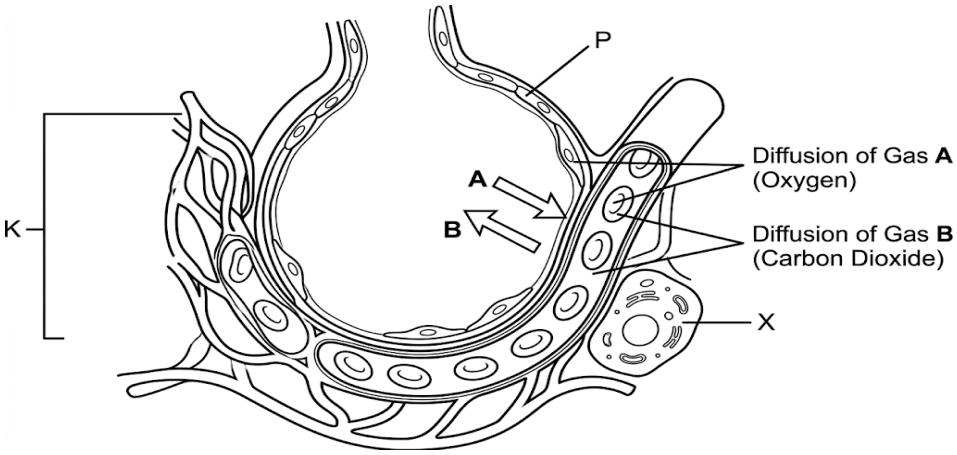
**c)** Briefly explain how excessive use of fertilizers affects large water bodies. **(3 marks)**

_____
_____
_____

**d)** State two reasons why it has been difficult to eradicate malaria in the tropics. **(2 marks)**

_____
_____

**5.** The diagram below shows the exchange of gases in an alveolus. Study it and answer the questions that follow.




**a)** Name gases A and B. **(2 marks)**

_____
_____

**b)** State the importance of gas B in tissues. **(1 mark)**

_____

**c)** Name parts marked K and P. **(2 marks)**

_____
_____

**d)** State three adaptations of the alveolus to its function. **(3 marks)**

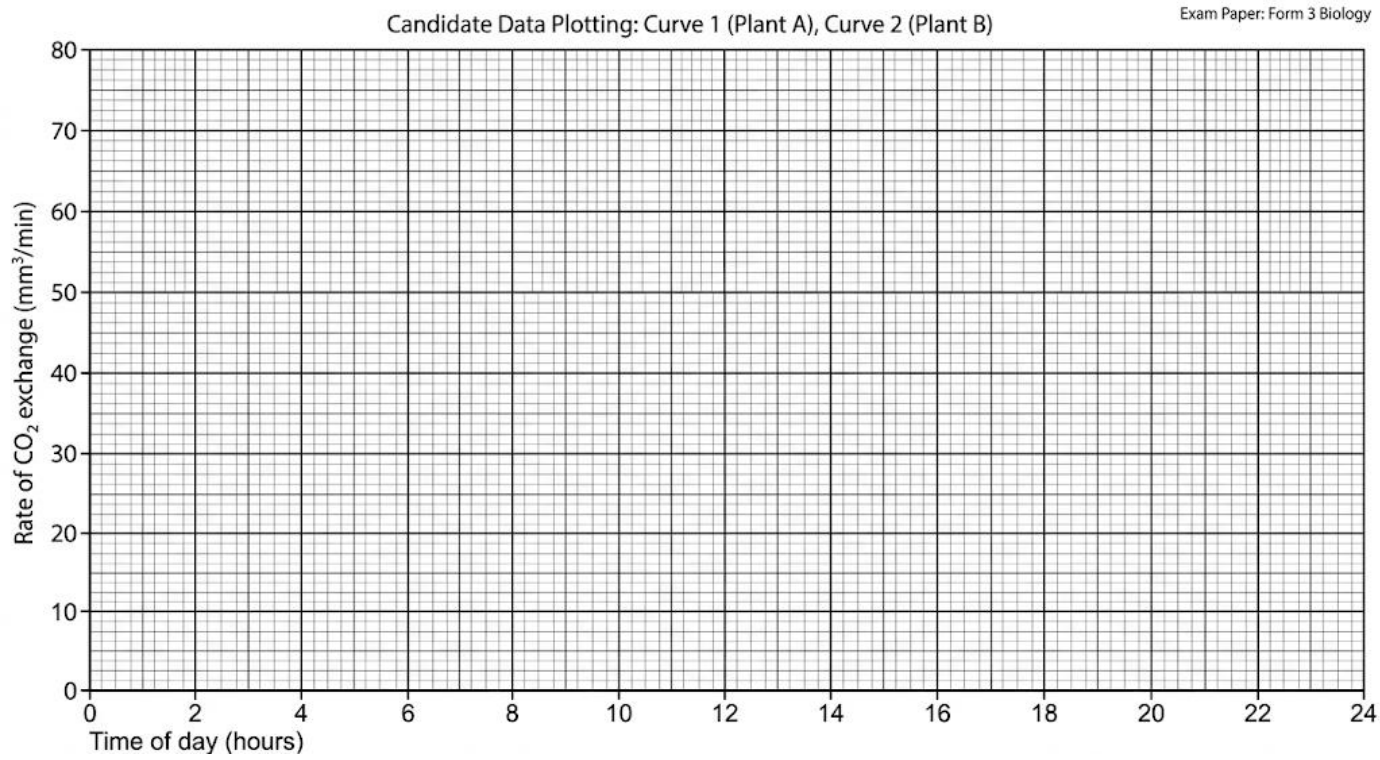
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## SECTION B (ANSWER QUESTION 6 AND ANY ONE OF QUESTIONS 7 AND 8)

**6.** In an experiment to investigate a process in a plant species, the rates of carbon(IV) oxide consumption and carbon(IV) oxide release were measured at different times of the day. The results are shown below.

| **Time of day (hours)** | **6** | **8** | **10** | **12** | **14** | **16** | **18** | **20** | **22** | **24** |
|---|---|---|---|---|---|---|---|---|---|---|
| $CO_2$ consumption ($mm^3$/min) | 0 | 50 | 72 | 96 | 96 | 55 | 20 | 0 | 0 | 0 |
| $CO_2$ release ($mm^3$/min) | 40 | 24 | 12 | 4 | 4 | 8 | 34 | 50 | 50 | 50 |

**On the same axes, plot graphs of $CO_2$ consumed and $CO_2$ released against time.**




[**a)** Name the biological process represented by the $CO_2$ consumption curve. **(2 marks)**

_____

_____

**b)** Account for the shape of the curve for $CO_2$ consumption. **(2 marks)**

_____

_____

**c)** Account for the shape of the curve for $CO_2$ release. **(2 marks)**

_____

_____

**d) i)** From the graph, state the time of the day when the plant attains the compensation point. **(1 mark)**

_____

**d) ii)** What is meant by compensation point? **(1 mark)**

_____

**e)** Explain how temperature affects the rate of $CO_2$ consumption in a plant. **(1 mark)**

_____

**f)** Under certain conditions, $CO_2$ concentration in the blood of a mammal rises above normal. State two physiological changes that occur in the body to lower the $CO_2$ level back to normal. **(2 marks)**

_____

_____

**g)** Most $CO_2$ is transported from tissues to the lungs within red blood cells and not simply in plasma. State one advantage of this mode of transport. **(1 mark)**

_____

**7.** Describe how water molecules are absorbed from the soil and move to the leaves in a tree. **(10 marks)**

_____

_____

_____

_____

_____

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_____

**8.** Explain any five adaptations of the ileum to the process of absorption. **(10 marks)**

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_____

**b)** Explain any five features or mechanisms that hinder self-pollination in plants. **(10 marks)**

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