Centre Number	Candidate Number	Candidate Name

NAMIBIA SENIOR SECONDARY CERTIFICATE

BIOLOGY ORDINARY LEVEL

6116/2

PAPER 2

1 hour 30 minutes

Marks 80

2023

Additional Material: Non - programmable calculator

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Candidates answer on the Question Paper in the spaces provided.
- Write your Centre Number, Candidate Number and Name in the spaces at the top of this page.
- Write in dark blue or black pen.
- You may use a soft pencil for any diagrams, graphs or rough working.
- Do not use correction fluid.
- You may use a non-programmable calculator.
- Do not write in the margin *For Examiner's Use*.
- Answer **all** questions.
- The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
8	
Total	

Marker	
Checker	

This document consists of **13** printed pages and **3** blank pages.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

For Examiner's Use

1 Fig.1.1 shows a cross-section of a dicotyledonous leaf.

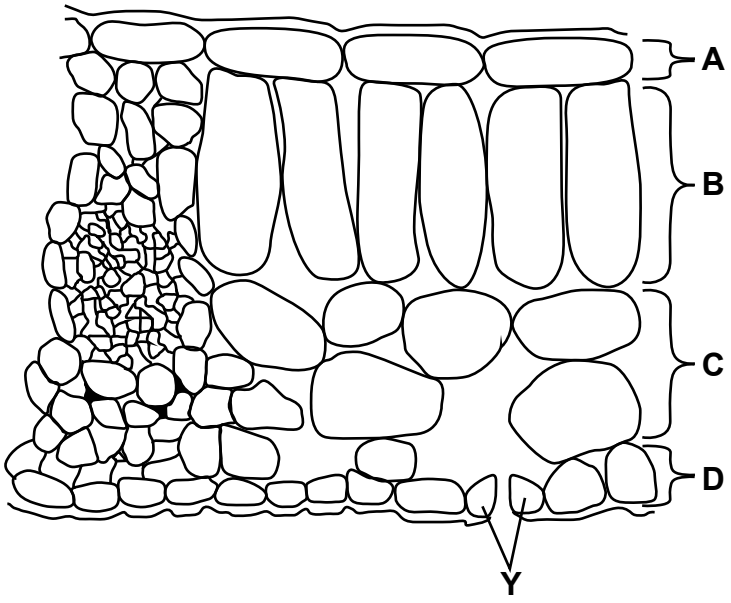

Fig.1.1

(a) (i) Identify the tissues labelled **A**, **B**, **C**, and **D**.

A .....

B .....

C .....

D ..... [4]

(ii) State the function of the cells labelled **Y**.

.....

..... [1]

(iii) On Fig. 1.1 draw a line
to the xylem and label it with an **X**,
to the phloem and label it with a **P**. [2]

(b) Explain **three** ways in which the structure of a leaf is adapted for photosynthesis.

.....

.....

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..... [3]

[10]

For Examiner's Use

2 Fig. 2.1 shows the application of systemic pesticides to a plant.

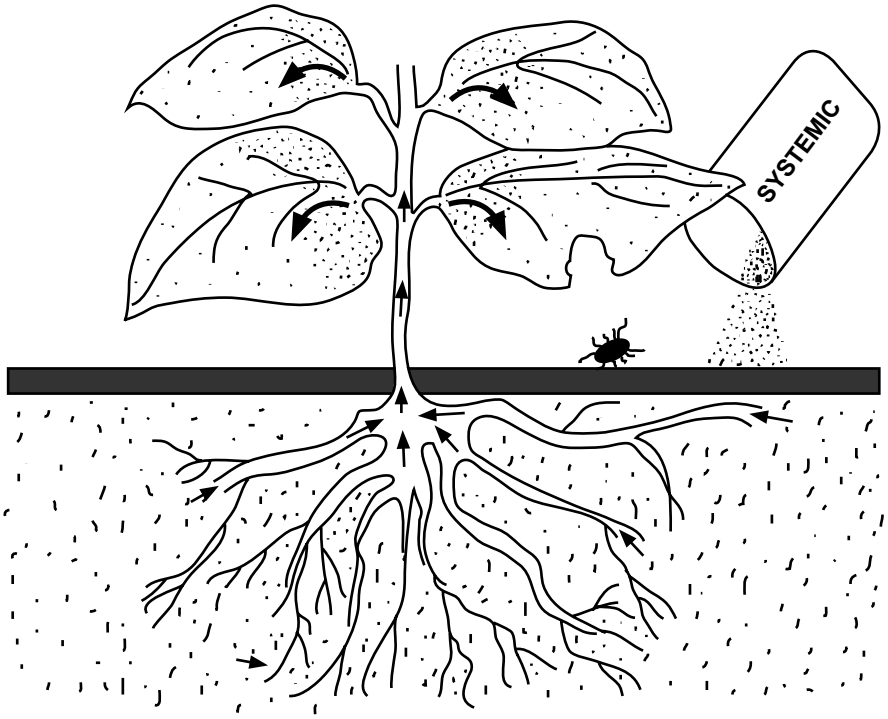

Fig. 2.1

(a) Describe how the pesticide reaches the leaves to kill the insects.

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..... [3]

(b) Fig. 2.2 shows a cross section through the stem of the plant in Fig. 2.1

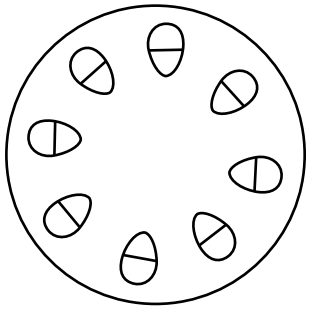

Fig. 2.2

(i) On Fig. 2.2 shade the tissue that will contain a higher concentration of the pesticide. [1]

(ii) Name the tissue shaded in **(i)**.

..... [1]

(c) Suggest the process leading to the uptake of the pesticide into the roots of the plant.

.....

.....

.....

..... [2]

(d) Systemic pesticide may be applied to the leaves. Describe the process occurring that causes the pesticide to move through the plant and kill insects.

.....

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.....

..... [3]

[10]

For Examiner's Use

3 The gas exchange system in humans is adapted to allow air to pass in and out of the body, and for efficient gaseous exchange to take place.

(a) List **three** features of the gaseous exchange surfaces in humans.

.....

.....

.....

.....

..... [3]

(b) In an experiment, the number of breaths per minute and the volume of air taken in per breath by a young man, were measured, at rest and after exercise.

Table 3.1 shows the results.

Table 3.1

	volume of air per breath / dm^3	**number of breaths per minute**
at rest	0.5	12
after exercise	3	30

(i) Calculate the total volume of air breathed in by the young man per minute at rest.

[1]

(ii) Explain why the number of breaths per minute increases after exercise.

.....

.....

.....

..... [2]

For Examiner's Use

(c) Describe the effects of tobacco smoke on the gaseous exchange system with reference to carbon monoxide and tar.

carbon monoxide .....

.....

.....

.....

tar.....

.....

.....

..... [4]

[10]

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4 Fig. 4.1 shows the removal of lactic acid during the period called recovery.

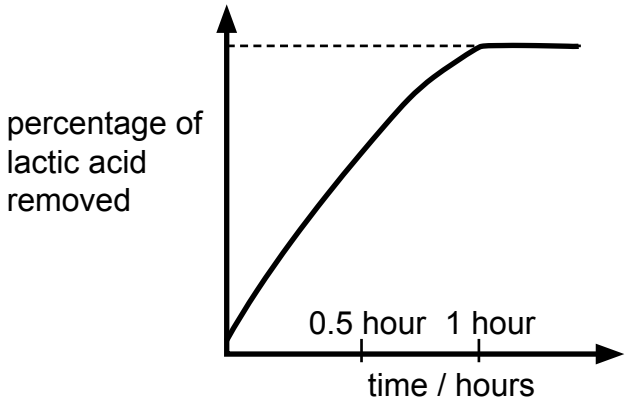

Fig. 4.1

(a) (i) With reference to the graph, how long did it take to reach full recovery?

..... [1]

(ii) Describe what happens to the lactic acid that has been produced in the muscles once anaerobic respiration stops.

.....

.....

.....

.....

.....

..... [4]

(b) State the number of ATP molecules released during aerobic and anaerobic respiration.

aerobic ..... ATP molecules

anaerobic ..... ATP molecules

[2]

(c) State **three** uses of energy in the human body.

.....

.....

.....

.....

..... [3]

[10]

For Examiner's Use

5 The list of some processes that occur in the carbon cycle is given below.

respiration photosynthesis combustion decomposition

(a) (i) Classify the processes into those that remove carbon from the atmosphere and those that return carbon to the atmosphere.

Write your answers in the table below.

remove carbon from atmosphere	returns carbon to the atmosphere

[4]

(ii) Name a process in the carbon cycle that neither removes nor returns carbon to the atmosphere.

..... [1]

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(b) Fig. 5.2 shows how carbon dioxide affects the rate of photosynthesis in a plant.

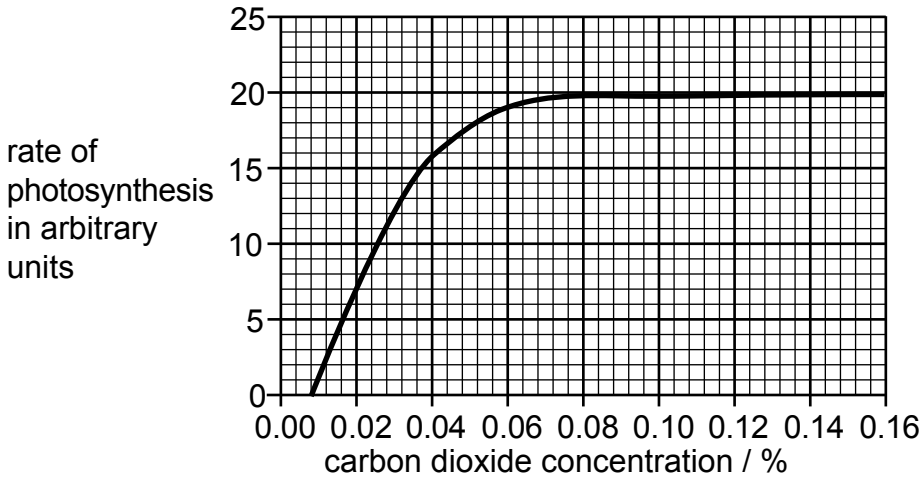

Fig. 5.2

(i) Describe the effect of changing the carbon dioxide concentration on the rate of photosynthesis. Use the information from Fig. 5.2 to illustrate your answer.

.....

.....

.....

.....

..... [3]

(ii) State the balanced chemical equation for photosynthesis.

.....

..... [2]

[10]

For Examiner's Use

6 Fig. 6.1 shows the four stages of an enzyme-controlled reaction.

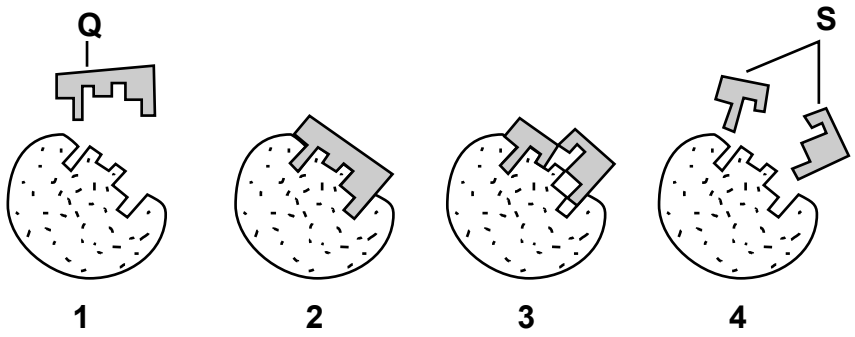

Fig. 6.1

(a) Identify **Q** and **S**.

Q .....

S ..... [2]

(b) **(i)** Explain how a rise in temperature may increase the rate of an enzyme-controlled reaction.

.....

.....

..... [2]

(ii) Suggest what happens to the active site when the enzyme is denatured by high temperature and state why the enzyme can no longer catalyse a reaction even after the temperature is lowered.

.....

.....

..... [2]

(iii) Name **one** other environmental factor that may cause the denaturation of an enzyme.

..... [1]

(c) Chemical digestion occurs in the stomach. Name an enzyme that act in the stomach and state its substrate and end products.

(i) enzyme, ...

(ii) substrate, ...

(iii) end products. ..... [3]

[10]

For Examiner's Use

7 Fig. 7.1 shows some stages in sexual reproduction in plants.

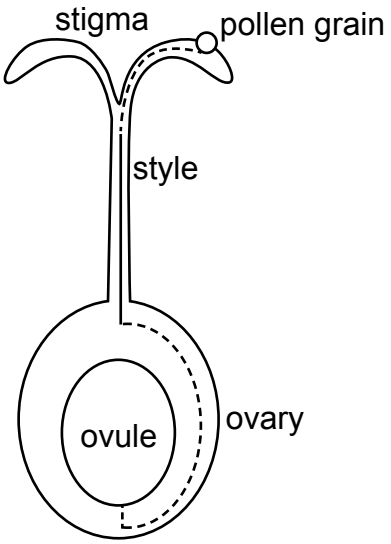

Fig. 7.1

(a) Describe the events that occur after germination of the pollen grain on the stigma leading to fertilisation.

.....

.....

.....

..... [3]

(b) Fig. 7.2 shows self-pollination.

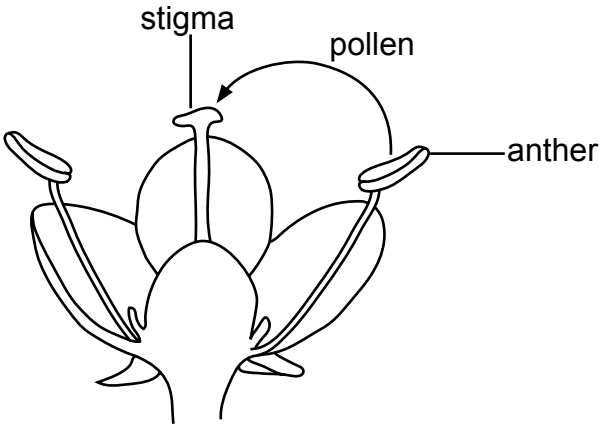

Fig. 7.2

(i) Define *self-pollination*.

.....

.....

..... [2]

For Examiner's Use

(ii) Suggest **two** advantages and **one** disadvantage of self-pollination.

advantage 1 .....

.....

advantage 2 .....

.....

disadvantage .....

.....

..... [3]

(iii) Name **two** agents of pollination

.....

..... [2]

[10]

For Examiner's Use

8 Fig 8.1 shows a eukaryotic cell.

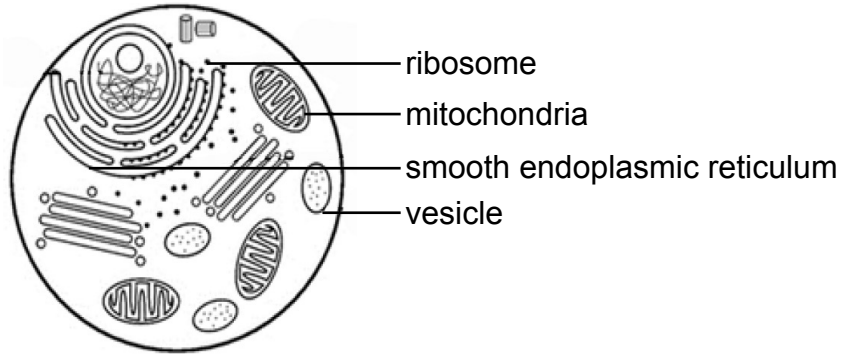

Fig. 8.1

(a) State the functions of the following structures.

ribosome .....

.....

mitochondria .....

.....

smooth endoplasmic reticulum .....

.....

vesicle .....

..... [4]

(b) Describe the structure of DNA.

.....

.....

..... [2]

(c) **(i)** Define *gene mutation*.

..... [1]

(ii) Sickle cell anaemia was the first genetic disease to be described in terms of a gene mutation.

Describe the symptoms of sickle cell anaemia.

.....

.....

.....

..... [3]

[10]

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