

Candidate Name

Centre Number

Candidate Number



ZIMBABWE SCHOOL EXAMINATIONS COUNCIL
 General Certificate of Education Advanced Level

BIOLOGY

6030/2

PAPER 2 Theory Structured

NOVEMBER 2023 SESSION

1 hour 30 minutes

Additional materials:
Electronic calculator

TIME: 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

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

Answer **all** questions.

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

INFORMATION FOR CANDIDATES

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

FOR EXAMINER'S USE	
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10	
TOTAL	

This question paper consists of 11 printed pages and 1 blank page.

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[Turn over



04

Answer all questions

- 1 (a) (i) State the difference between fats and oils.

_____ [1]

- (ii) State **one** property of a phospholipid.

_____ [1]

- (b) Fig.1.1 shows a glycerol molecule and a fatty acid molecule.

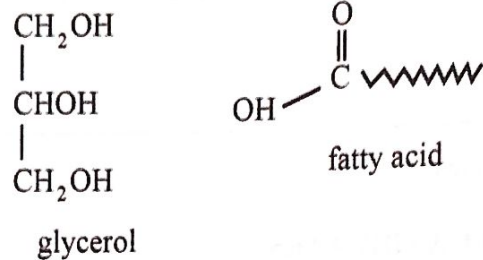


Fig.1.1

- (i) Name the bond formed when the glycerol and the fatty acid chemically bond together.

_____ [1]

- (ii) In the space below, show how a glycerol molecule combines with fatty acid molecules to form a triglyceride.

[3]

[Total:6]

- 2 (a) **Table.2.1** shows incomplete information on the stages in the preparation of temporary slides.

Complete **Table.2.1** by filling in the missing information.

Table. 2.1

procedure	reason
	Removal of water to prevent bacterial decay
Fixation	
	to make material transparent

[3]

- (b) Contrast between the light microscope and electron microscope.

[3]

- (c) Explain the importance of regulation of membrane fluidity.

[1]

[Total: 7]



3 (a) Fig. 3.1 shows part of a DNA molecule.

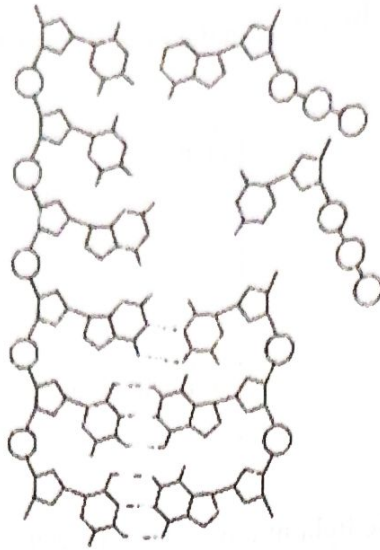


Fig.3.1

(i) Name the bond between two bases in the DNA molecule.

[1]

(ii) On Fig.3.1 indicate, with an X, a purine base. [1]

(iii) Explain the importance of having base pairs within the double helix.

[2]

(b) (i) Explain why DNA replication is described as semi-conservative.

[1]



- (ii) Explain the information which could be given during genetic counselling.

[2]
[Total: 7]

- 4 A student crossed a grey-bodied normal-wing fly with an ebony-bodied, curved wing fly. The offsprings were as follows:

Grey body and normal wings	33
Grey body and curled wings	23
Ebony body and curled wings	28
Ebony and normal wings	16

- (a) The expected ratio of offspring produced was **1:1:1:1**
Complete **Table.4.1** by calculating number expected (E) and the difference (O - E). [2]

Table.4.1

Phenotype	Number of observed (O)	Number of expected (E)	Difference (O - E)	Difference squared
Grey body, normal wings	33			64
Grey body, Curled wings	23			64
Ebony body, Curled wings	28			9
Ebony body, Normal wings	16			81

- (b) Calculate the chi-squared (X^2) value using the formula;

$$X^2 = \sum \frac{(O-E)^2}{E}$$

[2]



- (c) Justify whether the observed numbers of offspring are significantly different from those expected, given a critical value of 7.815 at 3 degrees of freedom.

[2]
[Total:6]

- 5 Fig.5.1 shows the effect of temperature and light intensity on the rate of photosynthesis.

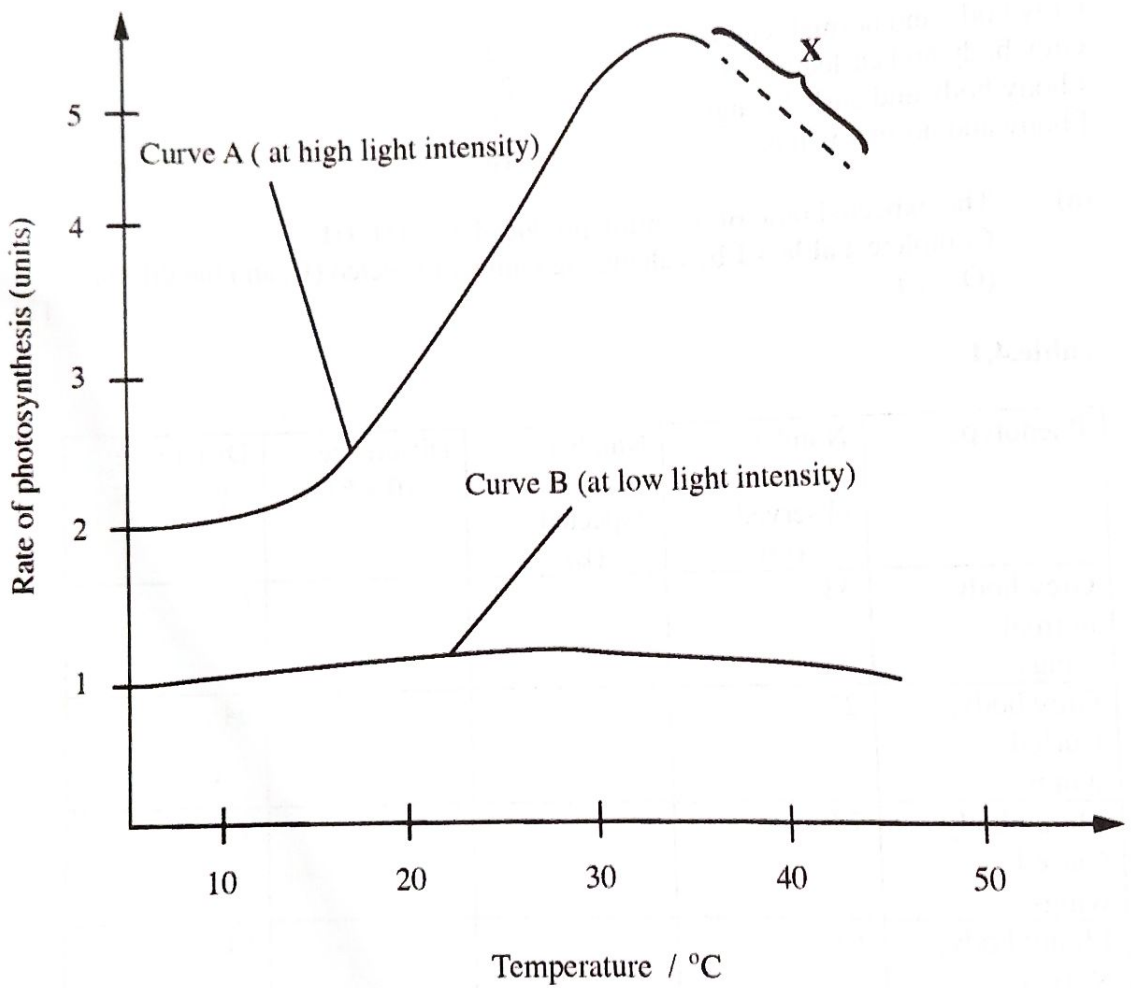


Fig. 5.1

- (a) State two other factors that affect the rate of photosynthesis.

[2]



(b) Deduce the limiting factors at 30°C for curve A and curve B.

curve A _____ [2]
curve B _____

(c) Explain the decline in the rate of photosynthesis at stage X.

_____ [2]
[Total: 6]

6 Fig.6.1 shows oxygen dissociation curves for sickle cell trait haemoglobin and normal haemoglobin at sea level.

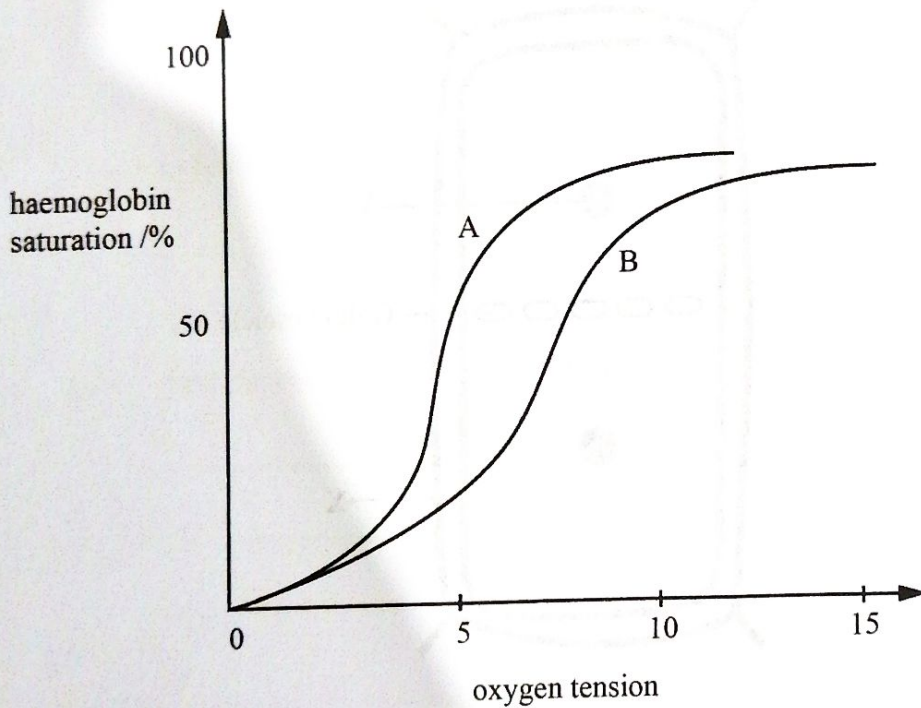


Fig. 6.1

(a) Indicate, with an X and Y on the vertical axis, the position of loading and unloading tension respectively. [2]



(b) Identify, with a reason, the curve for the sickle trait.

curve

reason

[2]

(c) Suggest the implications of taking a sickle cell trait individual to higher altitude.

[2]

[Total: 6]

7 Fig.7.1 shows one of the stages in plant cytokinesis.

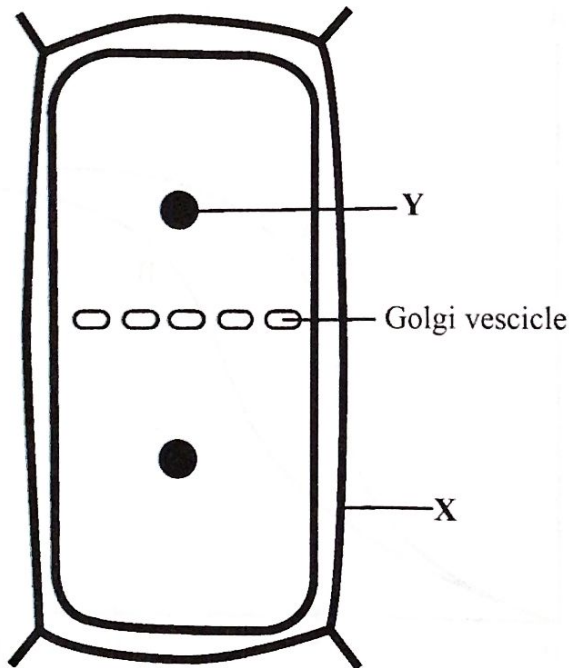


Fig.7.1

(a) (i) Name the part labelled:

X

Y

[2]

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(ii) Explain the role of Golgi vesicles in Fig.7.1

[2]

(b) Suggest why a cleavage furrow is **not** formed during cytokinesis in a plant cell.

[2]

[Total:6]

8 (a) Describe the role of hormone replacement therapy (HRT) during menopause.

[1]

(b) (i) State the cause of menopause in women.

[1]



(iii) Suggest any **three** advantages of menopause in females.

[3]

[Total:5]

9 Fig.9.1 shows alternation of generation in a plant.

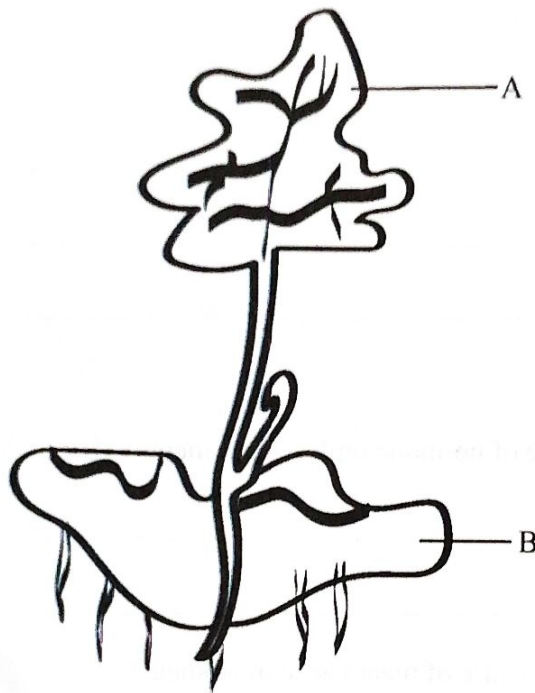


Fig.9.1

(a) (i) Identify the phylum to which the organism belongs

[1]

(ii) Name the part labelled

A. _____

B. _____

[2]



(iii) Suggest any **three** features that enable the organisms in this phylum to survive on land.

[3]
[Total:6]

10 (a) State any **two** ways in which Ebola is transmitted.

1. _____

2. _____

[2]

(b) Explain why the distribution of Ebola is highest in the Congo region.

[3]
[Total:5]

