ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Advanced Level

CROP SCIENCE

PAPER 2

6049/2

NOVEMBER 2022 SESSION

2 hours 30 minutes

Additional materials:
Answer paper
Scientific calculator

TIME 2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces provided at the top of this page and on all separate answer paper used.

Section A

Answer **all** questions.

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

Section B

Answer any **two** questions.

Write your answers on the separate answer paper provided.

At the end of the examination, fasten the separate answer paper securely to the question paper.

INFORMATION FOR CANDIDATES

Marks are given in brackets [ ] at the end of each question or part question.

You are advised to spend no longer than **80 minutes** on Section A.

FOR EXAMINER'S USE
Section A
1
2
3
4
5
6
Section B
TOTAL

This question paper consists of 10 printed pages and 2 blank pages.

Section A (60 marks)

Answer all questions.

(a) **Fig. 1(a)** outlines the initial stages of respiration.

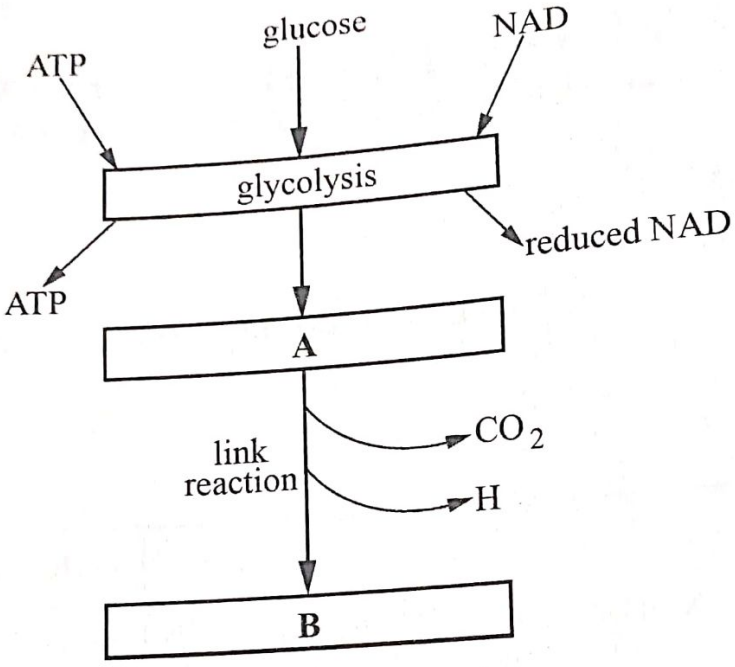

Fig. 1(a)

(i) Identify substance **A** and **B**.

A _____ [1]

B _____ [1]

(ii) State the importance of **NAD** in glycolysis.

_____

_____ [1]

(iii) Give a reason why ATP is needed at the start of glycolysis.

_____

_____ [1]

(iv) How many molecules of ATP are yielded from one molecule of glucose during the process of glycolysis?

_____ [1]

(b) **Fig. 1(b)** shows how temperature affects the rate of photosynthesis.

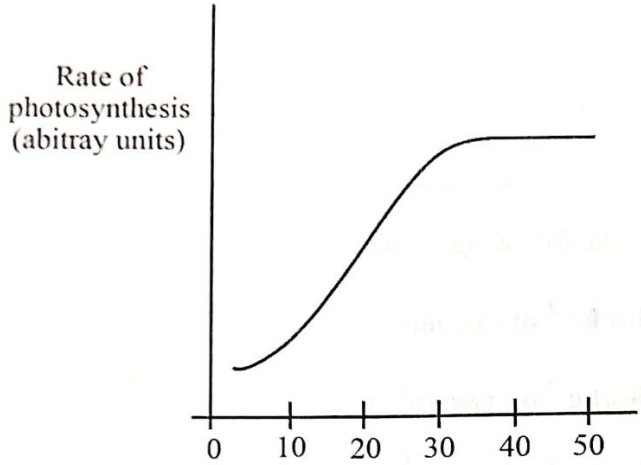

Fig. 1(b)

(i) Explain why the rate of photosynthesis remain constant from 30°C.

_____

_____

_____ [3]

(ii) Explain the effects of temperatures beyond optimum on the reaction rate.

_____

_____

_____

_____ [2]

2 (a) Explain the significance of Cation Exchange Capacity **(CEC)** to a farmer.

[3]

(b) Soil **X** has the following properties.

60 m moles$_c$kg^{-1} of calcium

50 m moles$_c$kg^{-1} of magnesium

30 m moles$_c$kg^{-1} of sodium

10 m moles$_c$kg^{-1} of potassium

5 m moles$_c$kg^{-1} of hydrogen

3 m moles$_c$kg^{-1} of aluminium

Calculate:

(i) Total Exchangeable Anions **(TEA)**,

[1]

(ii) Total Exchangeable Bases **(TEB)**,

[1]

(c)

3 (a

For Examiner's Use

(iii) CEC,

_____

_____

_____ [1]

(iv) Percentage base saturation.

_____

_____

_____ [1]

(c) Outline any **three** characteristics of a soil colloid.

_____

_____

_____ [3]

3 (a) Describe the structure of the golgi body.

_____

_____

_____

_____

_____ [3]

(b) Give any **four** functions of the golgi body.

[4]

(c) Outline **three** roles of the cell surface membranes.

[3]

4 (a) State any **three** farming activities in natural region I.

[3]

(b) Suggest any **four** challenges of dryland farming in natural region four of Zimbabwe.

_____

_____

_____

_____

_____

_____ [4]

(c) Identify any **three** soil moisture conservation strategies that a farmer can adopt in arable lands.

_____

_____

_____

_____

_____

_____ [3]

[Turn over

5 (a) Explain how the following cultural practices protect crops from pests:

(i) Destruction of crop residues,

[2]

(ii) Growing catch crops.

[2]

(b) Discuss any **six** advantages of cultural methods of pest control.

[6]

For Examiner's Use

6 (a) Explain Mendel's second law of inheritance.

[2]

(b) Distinguish between mitosis and meiosis in plants.

[4]

(c) Discuss how meiosis leads to genetic variation in crops.

[4]

Section B (40 marks)

Answer any **two** questions.

7 (a) Discuss the significance of soil structure in crop production. [8]

(b) Identify problems associated with a poor soil structure in crop production. [6]

(c) Suggest ways of maintaining a good soil structure. [6]

8 (a) Discuss the importance of soil temperature in crop production. [9]

(b) Describe the water planting method. [5]

(c) Suggest reasons why farmers adopt the water planting method in crop production. [10]

9 (a) Explain the importance of conservation farming in Zimbabwe. [10]

(b) Discuss any **five** conservation farming methods that farmers can adopt in arable lands. [10]

10 (a) Identify crop traits that may be genetically engineered for a farmer located in the marginal areas of Zimbabwe. [6]

(b) Describe the role of ribosomes in protein synthesis. [6]

(c) Explain how DNA replication results in the passing on of genetic material from cell to cell. [8]