P530/2
BIOLOGY
(Theory)
Paper 2
Nov./Dec. 2023
2½ hours

UGANDA NATIONAL EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

BIOLOGY
(THEORY)

Paper 2

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of sections; **A** *and* **B**.

Answer question **one** *in section* **A** *plus* **three** *others from section* **B**.

Candidates are advised to read the questions carefully, organise their answers and present them precisely and logically, illustrating with well labelled diagrams where necessary.

Turn Over

SECTION A (40 MARKS)

Question **1** *is* **compulsory**.

1. Figure **1** shows the effect of temperature variation on the rate of photosynthesis and respiration in leaves of the same plant. The plant was given adequate amounts of light with other factors kept constant.

Figure **2** shows the effect of temperature variation on the amount of carbon dioxide absorbed by two plant species; **A** and **B**. Plants **A** and **B** each uses a different carbon dioxide fixation pathway.
Study the **two** figures and answer the questions that follow.

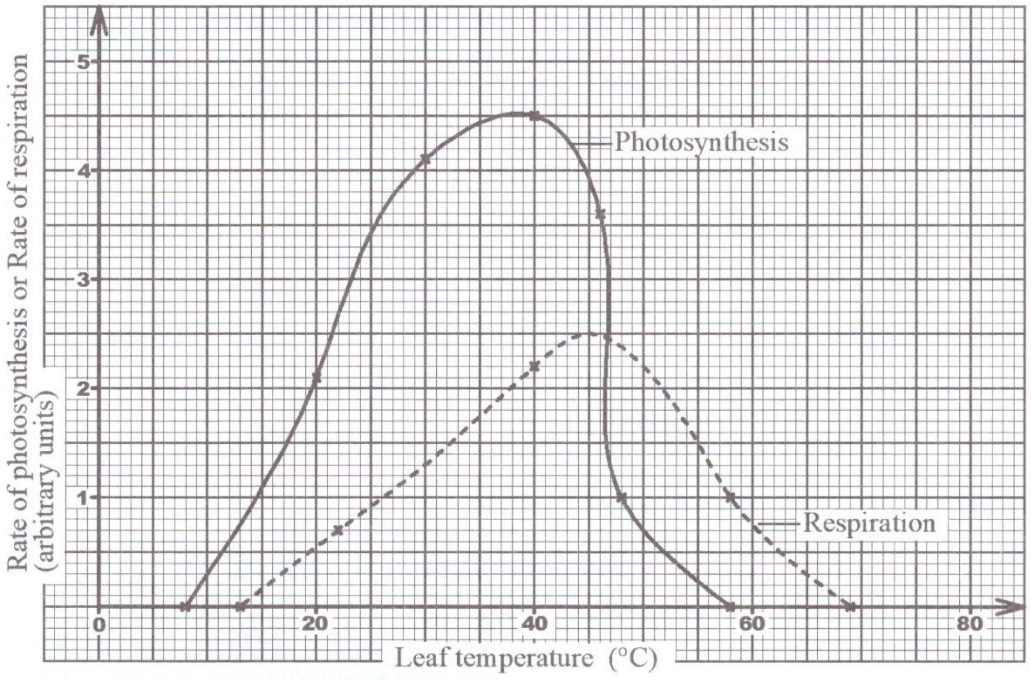

Fig. 1

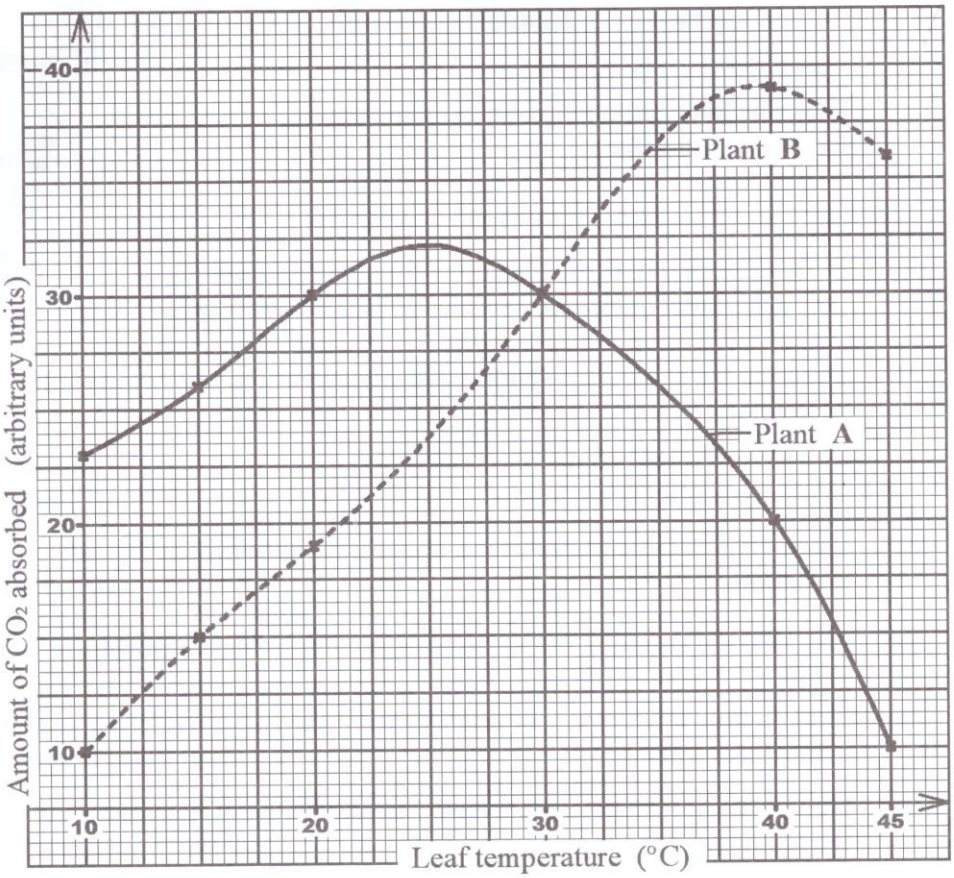

Fig. 2

(a) From figure **1**:

(i) Describe how the rate of photosynthesis varies with temperature of the leaf. (*04 marks*)

(ii) Explain how the rate of respiration varies with temperature of the leaf. (*05 marks*)

(iii) Explain the difference in the rates of photosynthesis and respiration between leaf temperatures of 40 °C and 70 °C. (*08 marks*)

(iv) Explain the relationship between respiration and photosynthesis. (*04 marks*)

(b) Compare the amounts of carbon dioxide absorbed by each of the two plant species **A** and **B** in figure **2**. (*07 marks*)

(c) From figures **1** and **2**, suggest the plant species whose rate of photosynthesis was studied in figure **1**. *Give reason(s) for your answer.* (*04 marks*)

(d) Explain any **two** other factors that can affect the rate of photosynthesis. (*04 marks*)

(e) Describe how carbon dioxide from the atmosphere is fixed in the bundle sheath cells. (*04 marks*)

SECTION B (60 MARKS)

Answer any **three** *questions from this section.*
Any additional question(s) answered will **not** *be marked.*

2. (a) Describe the ecological significance of each of the following forms of behaviour:

(i) Territorial behaviour. (*06 marks*)
(ii) Courtship behaviour. (*07 marks*)

(b) Giving an example in each case, suggest ways by which animals avoid predation. (*07 marks*)

3. (a) Describe the structure of the mature vascular tissues in flowering plants. (*10 marks*)

(b) Explain how the movement of water from the soil provides support in a herbaceous plant. (*10 marks*)

4. (a) How is the human placenta adapted for exchange of materials between the mother and the foetus? (*05 marks*)

(b) The mammalian embryo develops inside the mother's womb before being born. Explain the importance of this type of embryo development. (*06 marks*)

(c) Describe the different exchange mechanisms by which materials move between the foetus and the mother. (*09 marks*)

5. (a) Giving examples, describe the different functions performed by proteins in mammals. (*14 marks*)

(b) Explain the factors that can cause protein denaturation. (*06 marks*)

6. (a) State **three** major distinguishing features of gaseous exchange in fish and terrestrial insects. (*03 marks*)

(b) How is gaseous exchange in a bony fish different from that of a cartilaginous fish? (*04 marks*)

(c) How is ventilation in man controlled? (*13 marks*)

END