P530/2
BIOLOGY
(Theory)
Paper 2
AUGUST, 2024
2½ hours

JINJA JOINT EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

MOCK EXAMINATIONS – AUGUST, 2024

BIOLOGY

(THEORY)

Paper 2

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Answer question ONE in section A plus three others from section B.

Candidates are advised to read questions carefully, organize their answers and present them precisely and logically.

Illustrate, whenever necessary, with well labelled diagrams.

SECTION A (40MARKS)

1. A study was carried out on a typical C4 plant kept in conditions of constant light intensity and temperature while water supply was varied. Changes in the water potential, concentration of abscissic acid and stomatal resistance were recorded over time. Study the figure 1 below and answer the questions that follow.

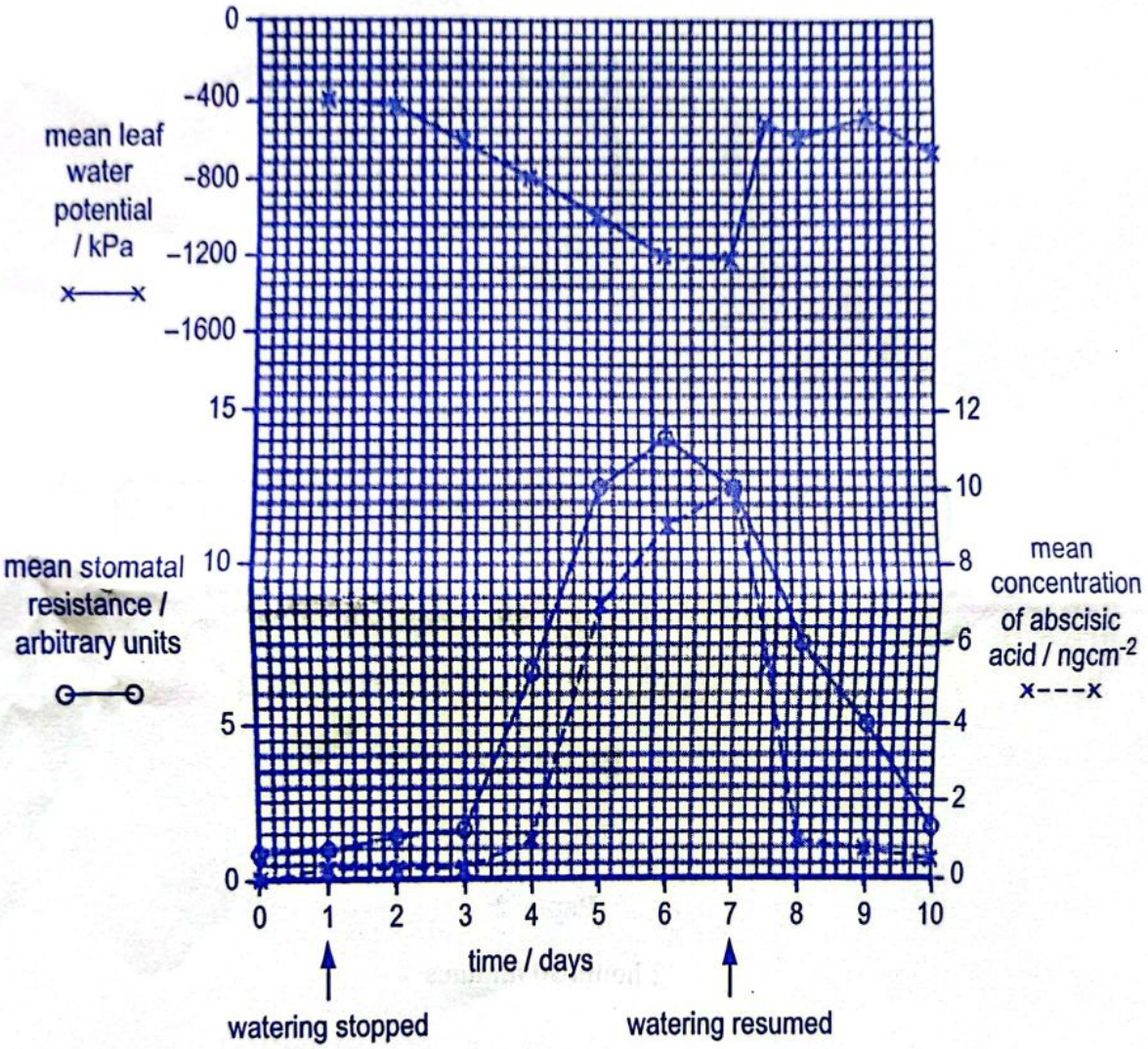

Figure 1

(a) Describe the variation in the;

(i) Mean leaf water potential (04 marks)

(ii) Mean concentration of abscissic acid. (04 marks)

(iii) Mean stomatal resistance. (04 marks)

(b) Explain the relationship between water potential, abscissic acid and stomatal resistance. (10 marks)

(c) Suggest what would be the effect of extreme light intensity and temperature on the experimental results from the beginning of the experiment. (06 marks)

(d) Explain;

(i) The ecological significance of the changes described in (c) above to a C4 plant growing in dry areas. (04 marks)

(ii) How increase in stomatal resistance can affect photosynthetic efficiency of the above plant. (03 marks)

(e) How is transpiration important in plants? (04 marks)

SECTION B: (60 MARKS)

2. (a) Describe the interactions of various species of organisms in an ecosystem. (08 marks)

(b) Explain the ecological significance of each of the following components of an ecosystem.

(i) Parasitism. (04 marks)

(ii) Competition. (04 marks)

(c) Explain how direct competition between different species of organisms is reduced. (04 marks)

3. (a) Explain how the human body responds to a change in the air temperature from $30^{o}c$ to $20^{o}c$. (06 marks)

(b) Describe the functioning of the counter current exchange mechanism in terrestrial mammals that permit water conservation. (08 marks)

(c) Compare hair pin counter current multiplier and counter current heat exchange system. (06 marks)

4. (a) Describe what happens to the end product of glycolysis during;

(i) Lactate fermentation. (04 marks)

(ii) Alcohol fermentation. (06 marks)

(b) Describe the significance of Kreb's cycle. (05 marks)

(c) How is oxidative phosphorylation different from photophosphorylation? (05 marks

5. (a) Explain how each of the following affect allele frequency of a population.

(i) Genetic load. (04 marks)

(ii) Natural selection. (04 marks)

(iii) Gene flow. (04 marks)

(b) In drosophila, the genes for wing length and eye colours are sex linked. Normal wings and red eyes are dominant to miniature wing and white eyes. In a cross between a miniature wing and red eyed male and a normal winged white eyed female. Explain the F1 and F2 generations assuming there was complete linkage. (08 marks)

6 (a) Compare nervous and endocrine system. (08 marks)

(b) Describe how the secretion of the following hormones is controlled.

(i) Thyroxine. (06 marks)

(ii) Aldosterone. (06 marks)

 End