P530/2

BIOLOGY
(Theory)
Paper 2
Jul./Aug. 2023
2 ½ Hours

UGANDA TEACHERS' EDUCATION CONSULT (UTEC)

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** and **three** other questions in section **B**.*

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

SECTION A: (40 MARKS)

1. A special calorimeter was developed into which a naked volunteer human being was placed. After 28 minutes of being inside the calorimeter, the human was made to ingest iced water and then the changes in the temperature of the hypothalamus and the skin were recorded. **Figure 1** shows the results obtained during the investigation. Points labelled **(a)**, **(b)** and **(c)** on the figure, indicate the number of times the human ingested iced water.

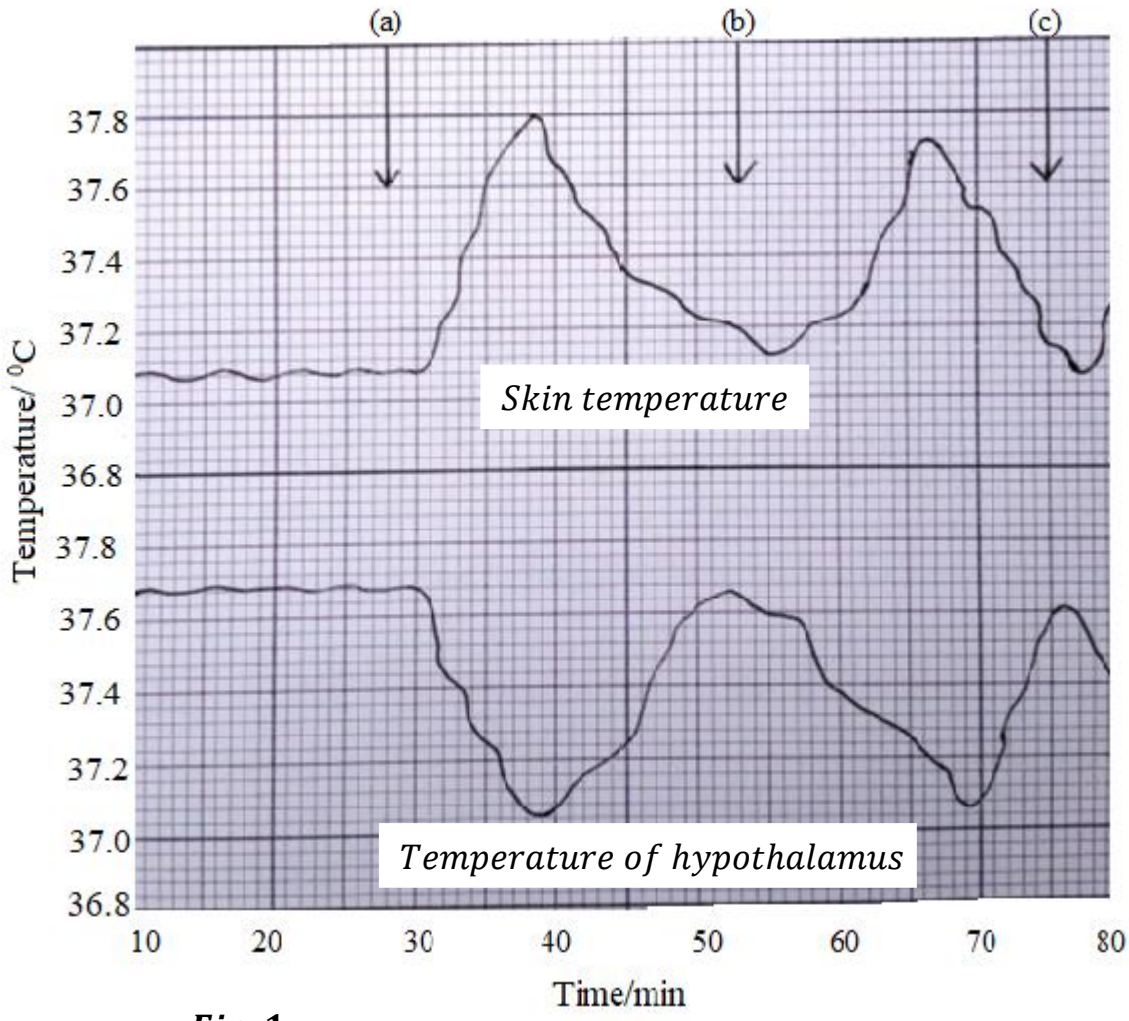

***Fig.* 1**

(a) Describe the effect of ingestion of iced water on the temperature of the hypothalamus and the skin. *(06 marks)*

(b) Explain the relationship between the temperature of the hypothalamus and that of the skin. *(10 marks)*

(c) Explain why the skin temperature rises immediately following ingestion of iced water. *(06 marks)*

(d) Suggest how ingestion of iced water would have affected the energy loss by evaporation from the skin. *(07 marks)*

(e) Explain why the human was made to ingest iced water;

(i) 28 minutes later. *(03 marks)*

(ii) three times. *(01 mark)*

(f) Explain what would happen if a lizard was used instead of a human being. *(05 marks)*

(g) What ecological advantage does a human have over a lizard? *(02 marks)*

SECTION B: (60 MARKS)

2. (a) Describe the different mechanisms which may limit variation in higher plants. *(08 marks)*

(b) Explain the reproductive adaptations in flowering plants that have contributed to their evolutionary success. *(12 marks)*

3. (a) How does light contribute to the synthesis of lipids in plants? *(12 marks)*

(b) Explain why lipids are suitable storage food materials for a camel than carbohydrates. *(08 marks)*

4. (a) Describe how lactic acid is produced from a glucose molecule in a muscle cell. *(10 marks)*

(b) Why is little ATP produced during the process described in (a)? *(05 marks)*

(c) Explain why athletic training may reduce on the effects of lactic acid in muscle cells. *(05 marks)*

5. (a) Explain how plants that live in salt marshes are able to survive plasmolysis. *(10 marks)*

(b) Explain the effect of water logging on each of the following.

(i) Water uptake by plant roots. *(06 marks)*

(ii) Nitrogen content of the soil. *(04 marks)*

6. (a) How does each of the following influence plant distribution?

(i) Acidic rain. *(08 marks)*

(ii) Temperature. *(06 marks)*

(b) Explain why apical dominance is more common in plants that grow under forest canopies than those in open habitats. *(06 marks)*

END