

P530/2

**Biology**

**(Theory)**

Paper 2

**July/Aug. 2022**

2½ 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 six questions.*

*Answer question one in section A plus three others from 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. In an investigation, a diabetic and normal individual were given a similar amount of glucose solution at 7:00 a.m. Figure 1 shows the blood glucose levels of a normal and a diabetic individual.

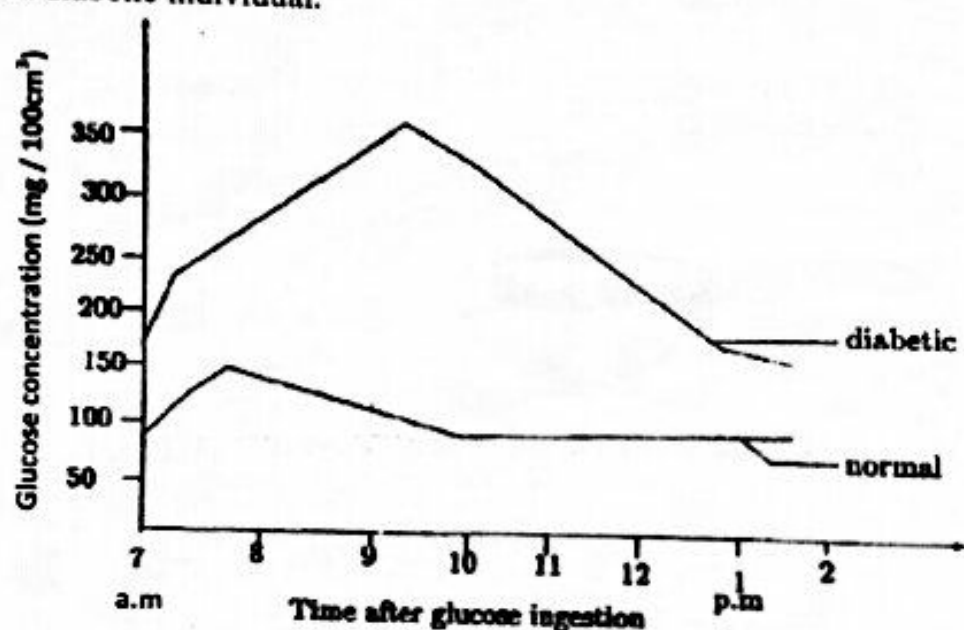


Fig.1

In another experiment, an individual was made to fast overnight and then ingested 75g of glucose. At an interval of 30 minutes the concentration of glucose and insulin in blood were determined. Table 1 shows the results obtained.

Table1

Time/minutes	Mean concentrations	
	Glucose/mmoldm <sup>-3</sup>	Insulin/ $\mu$ moldm <sup>-3</sup>
0	50	2.0
30	55	2.0
60	60	4.0
90	80	6.0
120	60	8.0
150	50	6.5
180	50	2.0

Use the information provided to answer questions that follow.

- (a) Describe the effect of glucose ingestion on glucose levels in the following individuals.
- (i) Diabetic. (04marks)
  - (ii) Normal. (04marks)
- (b) (i) Describe the differences in the glucose levels of diabetic and normal individuals. (04marks)
- (ii) Explain the observed differences in the levels of glucose of the two Individuals. (06marks)
- (c) Suggest and explain how the results of the experiment in figure 1 would be affected if the:
- (i) Normal individual had ingested a starch solution instead of glucose solution. (05marks)
  - (ii) Diabetic individual was injected with insulin hormone before ingestion of the glucose solution. (03marks)
- (d) (i) Describe the relationship between the concentration of glucose and insulin in table 1. (03marks)
- (ii) Explain the relationship described in (d) (i) above. (04marks)
- (e) From the results in table I above, explain the likely healthy condition of the individual. (04marks)

### SECTION B (60MARKS)

*Attempt any THREE questions.*

2. (a) Explain how the following tissues are adapted for their function.
- (i) Xylem vessels. (08marks)
  - (ii) Compact bone. (06marks)
- (b) How is support achieved in herbaceous plants? (06marks)
3. (a) Describe the structure and formation of nucleic acids. (10marks)
- (b) How is DNA involved in the synthesis of proteins in cells? (06marks)
- (c) Explain the effect of temperature on the denaturation of enzymes. (04 marks)

4. (a) Differentiate between the circulatory system of fish and mammals. (05marks)
- (b) Outline the events that lead to ventricular systole in mammals. (06marks)
- (c) Explain each of the following observations:
- (i) Endothermy requires a double circulatory system. (04marks)
- (ii) Single circulation is not suitable for fresh water fish. (05marks)
5. (a) Explain the ecological impact of each of the following human activities.
- (i) Use of pesticides. (07marks)
- (ii) Drainage of nitrate into water bodies. (06marks)
- (b) How can endangered species be conserved? (07marks)
6. (a) How is the loss of uterine lining prevented after conception in humans? (04marks)
- (b) Explain the role of the placenta as a barrier and link between the foetus and the mother. (08marks)
- (c) Describe the significance of developmental changes undergone by the mammalian foetus during pregnancy. (08marks)

**END**