P530/2
BIOLOGY
(Theory)
Paper 2
July/ Aug: 2023
2 ½ hours

MMM JOINT MOCK EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

BIOLOGY
(THEORY)

Paper 2

2 hours 30 minutes

INSTRCUCTIONS TO CANDIDATES:

This paper consists of section; **A** *and* **B**

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, illustration with well labeled diagrams where necessary.

Turn Over

SECTION A

Question **1** *is compulsory*

1. An individual with juvenile diabetes was injected with insulin or allowed to inhale insulin(a recent product administered using a nasal spray) figure 1.1 shows the concentration of insulin in the blood plasma in the 480 minutes after injection or inhaling insulin. In both cases insulin was of the same type obtained from a genetically engineered Escherichia coli.

Figure 1.2 show the concentration of glucose in the blood plasma in the 480 minutes after injecting or inhaling insulin.

Study both graphs and use them to answer the questions that follow.

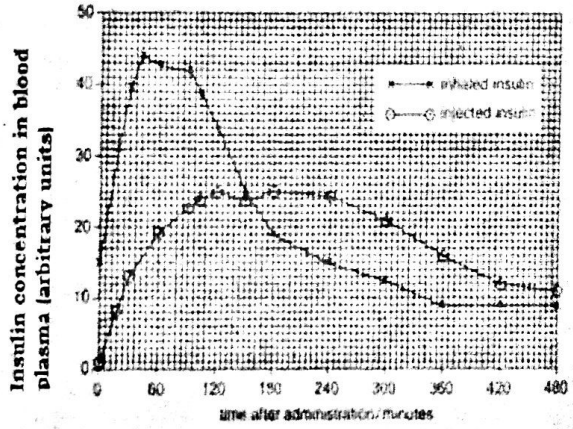

Fig 1.1

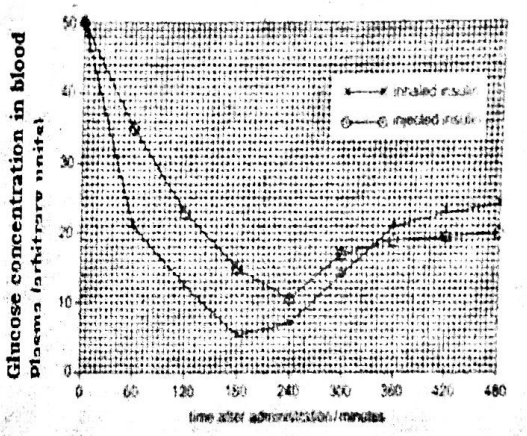

Fig 1.2

(a) What are causes and symptoms of juvenile diabetes? *(08 marks)*

(b) Compare the levels of injected insulin and inhaled insulin in the blood plasma *(09 marks)*

(c) Explain the effect of injected insulin on the blood glucose concentration. *(10 marks)*

(d) Suggest the advantages and disadvantages of inhaling insulin rather than injecting insulin. *(06 marks)*

(e) Explain the need for regulation of blood glucose concentration *(07 marks)*

SECTION B

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

2. (a) State the basic characteristics of a circulatory system . *(04 marks)*

(b) Distinguish between open and closed circulatory systems. *(09 marks)*

(c) Describe the pattern of blood flow in the single circulation of a fish. *(07 marks)*

3. (a) Describe the structure of ATP and explain its role as an energy source within the cell *(08 marks)*

(b) How is a copy of DNA converted into a complementary messenger RNA strand? *(07 marks)*

(c) Comment on the significance of proteins in biological systems. *(05 marks)*

4. (a) What is **a species**? *(03 marks)*

(b) Describe how new species may arise *(13 marks)*

(c) Explain why closely- related species may be unable to interbreed successfully *(04 marks)*

5. (a) Describe how the population of *Biden Pillosa* in a grassland may be estimated. *(08 marks)*

(b) How is the size of the population of the species in (a) above regulated. *(08 marks)*

(c) Why are human populations not regulated by negative feedback mechanisms. *(04 marks)*

6. (a) Describe how each of the following tissues are related to their functions
(i) Parenchyma *(03 marks)*

(ii) Collenchyma *(03 marks)*

(iii) Sclerechyma *(06 marks)*

(b) Explain the distribution pattern of mechanical tissue in a stem and root of a dicotyledonous plant *(08 marks)*

END