P530/2

BIOLOGY

(Theory)

Paper 2

July- August 2023

2½ Hours

UGANDA MUSLIMS TEACHERS' ASSOCIATION

UMTA JOINT MOCK EXAMINATIONS -2023

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 with well labelled diagrams where necessary.

Candidates are also advised to write on the front page of the answer sheets used, their full name, index number and indicate the questions attempted in their orders in a table as shown below,

| **Question** | | | | | **TOTAL (%)** |
|---|---|---|---|---|---|
| Marks | | | | | |

## SECTION A (40 MARKS)

**Question 1 is compulsory.**

**1.** The figure 1 below shows the rate of glucose reabsorption and excretion from mammalian kidney in relation to the glucose concentrations in the plasma. Consideredin this experiment also is the Renal plasma Ratio index of glucose, as the ratio of concentration of glucose in renal fluid to the concentration of the same glucose in blood plasma. Study figure 1 carefully and use it to answer questions that will follow.

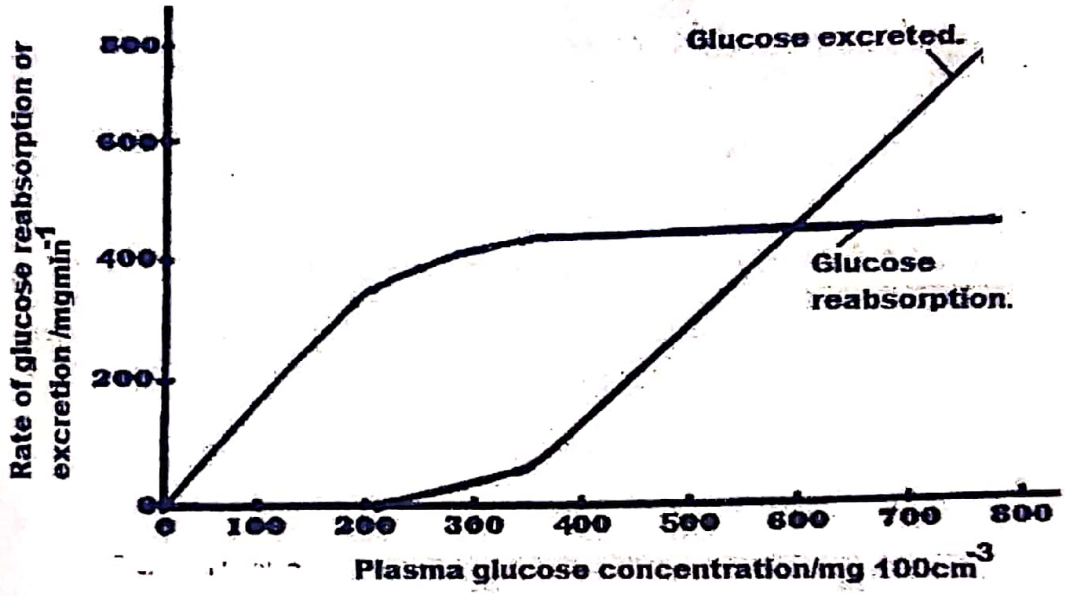


**Fig.1**

(a) Compare the rate of glucose reabsorbed and excreted by the mammalian kidney in relation to glucose in plasma. (09 marks)

(b) Explain the effect of plasma glucose concentration on rate of Glucose,

(i) Reabsorption (09 marks)

(ii) Excretion. (10 marks)

(c) What will be the value of the Renal plasma Ratio of glucose in the Kidney relativeto index equal to **1.0**, beyond plasma glucose concentration 0f 400mg $100cm^{-1}$. Explain your answer. (03 marks)

(d) Suggest with reasons, the effect of intravenous injection of sufficient hormone insulin, on the rate of glucose excretion. (06 marks)

(e) Outline complications a person is likely to suffer from, resulting from excess glucose levels in blood.
(03 marks)

## SECTION B (60 MARKS)

*Answer any three questions from this section.*

2. (a) Describe the significance of membranes of red blood cells being impermeable to out flux of positive ions in transport of respiratory gases. (10 marks)

(b) Discuss consequences of a blood group A person donating blood to a patient belonging to blood group **O**. (10 marks)

3. (a) Distinguish between Nitrification and nitrogen fixation. (06 marks)

(b) Explain how each one of the following conditions arise and what are theirecological significance in an ecosystem,

(i) Resource partitioning (07 marks)

(ii) Net primary productivity. (07 marks)

4. (a) Describe the roles particular proteins play in the process of DNA replication. (08 marks)

(b) Account for how changes in **pH** from the norm, will lower enzyme activity. (12 marks)

5. (a) Compare the process of inhibition and that of transmission of nerve impulses across a chemical synapse. (09 marks)

(b) Explain how resting potential is achieved and maintained immediately after passage of an impulse in an axon. (11 marks)

6. (a) How does polyploidy arise in a population and leads to evolution. (11 marks)

(b) Explain how industrial melanism account for evolution by natural selection. (09 marks)

**END.**