

Name:.....Sign.....



FOUNTAIN OF HOPE HIGH SCHOOL

Uganda Advanced Certificate of Education

End of term 1 examination 2025

S 5 Biology

Theory

Time: 2 Hours

Instructions

- ✓ *Attempt all questions in this paper.*
- ✓ *Illustrations where necessary shall be awarded*
- ✓ *Present your work neatly and logically.*

ITEM 1

Regina studies pharmacy at Makerere University. She is researching about a pesticide to combat the army worms that have attacked their village, and destroyed many food crops by eating their leaves and stems in Bukeeka district. She has so far formulated two drug samples M and K. in her laboratory tests, she noted that drug sample M freely passes through the membranes of the cell and blocks movement of vesicles within the cell of army worms. Drug sample M targets the respiratory pathway and inhibits one of the enzymes that catalyze respiration in the cytoplasm, but must be some molecules to enter the cell.

Task

- (a) Explain why the molecules of the two drug samples move across the cell membrane in different way.
- (b) Explain how drug samples M and K will be able to control the pest as expected by the researcher.
- (c) With a reason, advise Regina which of the two drugs is most suitable for controlling the pest.

ITEM 2

In one of the study tour trips to a swamp, Irene noted that the lung fish contained a lot of unsaturated fatty acids in their cell membranes and also had a lot of adipose tissues in their bodies especially during the dry seasons when some pools could dry and the fish gets buried in the mud for a longer time. He was also amazed by small insects walking in the different pools without sinking. The team also observed that activities of the animals in the swamp greatly decreased during the extreme cold conditions, yet surprisingly they became more active during day time as environmental temperatures increased.

Task

- (a) Explain the significance of the lung fish having much
 - (i) Unsaturated fatty acids in their cell membrane.
 - (ii) Having much adipose tissues during the conditions described in the scenario.
- (b) Explain the fact that Irene observed some insects walking on water without sinking and mention the importance of these properties of water to organisms.
- (c) Explain the effect of environmental temperatures on the activities of the animals in the swamp.

ITEM 3

A science exhibition is to be held in a university near your school next week. Prepared materials of prokaryotic and eukaryotic cells are to be observed by

everyone using microscopes. Some of the invited guests do not have sufficient knowledge about these cells and will need guidance for them to be able to identify and distinguish between these two types of cells. You have been chosen as one of the students to guide these guests as they observe the cells. Make a write up that you will use on that day.

ITEM 4

In a hospital, scientists are developing a new water soluble drug to treat protein folding disorders. This disorder causes certain proteins in the cell to misfold, making them non-functional. The drug must dissolve in the blood stream and reach the affected cells. Once inside, it interacts with cell's watery environment to help proteins fold correctly. Meanwhile, Researchers studying plant biology notice a similar process in trees, where water moves from roots to leaves, carrying dissolved nutrients essential for protein formation.

Task

- (a) Identify the key properties of water investigated.
- (b) Explain why the drug is transported in the blood stream.
- (c) Explain how the interaction of drug and watery environment cause proper protein folding.
- (d) Describe the properties of water that allow transport of dissolved nutrients essential for protein formation from the roots to its leaves.
- (e) How can the understanding of protein misfolding help develop treatment of diseases caused by misfolded protein?
- (f) How could knowledge of water movement in plants be applied to improve agricultural production?

ITEM 5

Nabwire was advised to eat a lot of fruits and vegetables instead of eating too much fats and cholesterol in order to have good health. She refused to take up the advice and after a month of sedentary life style, she notices chest pain and shortness of breath after walking a short distance, gained a lot of weight and struggles with hypertension. During the routine checkup, his doctor informed her of the elevated cholesterol levels in blood.

Task

- (a) Identify the health condition Nabwire is suffering from.
- (b) How do the fats and cholesterol cause this condition?
- (c) Why was Nabwire advised to eat a lot of fruits and vegetables instead of fats and cholesterol?

END