

END OF TERM ONE EXAMINATIONS - 2025

SENIOR FIVE

BIOLOGY

2 HOURS

INSTRUCTION:

- Attempt all items.

ITEMS

Item one

A group of researchers is studying two types of bacteria living in drastically different environments: Bacteria group A lives in the hot, dry deserts of Northern Africa while bacteria group B lives in the icy, cold tundras of Northern Europe. Despite the extreme temperatures, both bacterial groups survive and maintain stable internal conditions from their respective environments. However, researchers observe a curious difference: when bacterial cells from both groups were placed in a water medium under the same laboratory conditions, the membranes of group B cells remained more fluid and increased in size, while group A cells stiffened and didn't show any significant change in size. After 2 days, group B cells were noticed to be living while group A cells died. The scientists analyzed the two cells, and identified key differences in terms of cell membrane components.

Task:

- a) Identify the conditions that were used in the laboratory.
- b) Describe features about their cell membranes that allowed both groups to thrive successfully in their home environments.
- c) Explain the observed changes in the two groups of bacteria when the cells were under the under mentioned laboratory conditions.

Item two

Eucalyptus trees are a very fascinating species of plants reaching impressive heights of over 30 metres. Even with such unusual heights, eucalyptus tree stems show great mechanical strength particularly in windy areas, flexibly swinging along with the wind. O'level Biology students usually wonder how materials can move up and down the plant over such distances against gravity. As an A'level Biology student, you're required to sensitize these young Biologists.

Task: Using a transversely cut young mango tree and a microscope, write a comprehensive sensitization report to the students over these observations.



Item three

A group of S.2W students have been keenly observing something unusual about their lunch and supper routines. They regularly buy two types of soda; Soda A and Soda B from the school canteen to accompany their meals.

Over time, they noticed the following:

- When they drink Soda A or B along with posho (a maize derived food), they experience bloating, larger stool volumes, and sometimes body weakness later in the day.
- However, those who take Soda B after eating a large amount of posho (two full plates) report that the problem is less severe or disappears.
- With Soda A, the negative effects remain the same no matter how much posho is eaten.

They suspect the sodas might be interfering with the digestion of food, especially the starch in posho. They share their observations with the Biology teacher, who encourages them to research on the biological cause behind these effects.

On your way to class, these students approach you, and ask you to draw logical conclusions from these observations.

Task:

- a) Identify the biological phenomenon that might be taking place in the students' bodies due to consumption of Soda A and Soda B.
- b) Elaborately discuss the possible causes of the observed effects.
- c) Explain how this kind of observation can be relevant in medicine, especially in the design or use of certain drugs.