BUTIRU CHRISTIAN COMPREHENSIVE SECONDARY SCHOOL

BIOLOGY DEPARTMENT

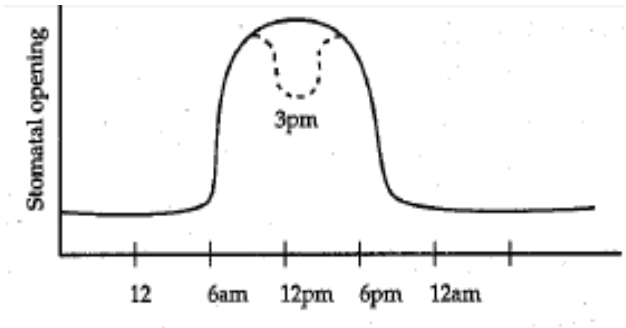
S.6 GROUP OPEN BOOK TEST, Term 1 2024.

Time allocation: 2 days, **Submission Date**: 5/03/2024 at 7:00 am

Instruction: In a group of two members each, attempt all questions.

1. Compare and contrast the mechanisms of photosynthesis and cellular respiration. How has the chemiosmosis model helped unify current ideas on the mechanisms of these two processes (20 marks)

2. The graph below tracks a bean plant's stomata over 24 hours. The dashed line indicates partial closing of stomata on a hot and dry afternoon. (20marks)



   i. How would this affect CO_2 and O_2 concentrations within the leaf of C_3 plants?
   ii. What would be the impact on photosynthesis and photorespiration?
   iii. How would these effects be different if the above plants were C_4 plants?
   iv. Explain how the behavior of a CAM plant stomata would differ from the above-observed trend in bean plants.

3. The photosynthetic rate of aquatic plants in a test tube can be determined by collecting and measuring the amount of oxygen gases bubbling out of the water. If bicarbonate, the source of carbon dioxide for aquatic plants, is added to the water, the rate of oxygen evolution increases. If CO_2 is fixed by the Calvin cycle but oxygen is evolved by the light reactions, how can an increase in CO_2 supply increase the rate of Oxygen evolution? (20 marks)

4. Trace a bacon, lettuce, and tomato sandwich through the human alimentary canal, explaining what happens to the meal at each stage. (20 marks)

5. Some essential mineral nutrients such as selenium and others are required in the human diet in a minuscule amount to thousand of a milligram. What kinds of experiments and observations would help demonstrate that a mineral is required by humans? (20marks)

THE END