

THE OPEN UNIVERSITY OF SRI LANKA
B.Sc./B.Ed. DEGREE PROGRAMME
BOTANY – LEVEL 04
FINAL EXAMINATION – 2008/2009
BTU 2201/BTE 4201 – PLANT PHYSIOLOGY (PAPER I)
DURATION : TWO AND A HALF (2 ½) HOURS

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DATE : 11.07.2009

TIME: 10.00 a.m. – 12.30 p.m.

ANSWER ANY FOUR(04) OF THE FOLLOWING QUESTIONS.

01. a) "Most of the unique properties of water are due to the existence of hydrogen bonds between water molecules"
Discuss this statement.
b) Briefly describe the importance of these properties to plant life.
02. Write briefly on the following.
a) Metal toxicity in plants.
b) Mycorrhizae and mineral nutrition.
03. a) Describe the common features of cell membranes
b) List the major functions of membranes.
c) Explain why
i. the cell membrane is more like a fluid.
ii. the cell membrane is structurally and functionally asymmetric.
04. a) What are the major sources of mineral nutrients for plants?
b) Briefly describe the methods of analyzing the mineral content of a plant.
c) What is an essential element? Differentiate between macronutrients and micronutrients.
Explain how the chelating agents help in the acquisition of ions by plants.
d) What is meant by "critical concentration of an element"? what is the importance of knowing the critical concentration for different crop plants?
05. Write an essay on "Growing plants in a soil-less medium"
06. Write short notes on the following.
a) cation exchange capacity of a soil.
b) Components of cell water potential and their relationship.
c) Transpiration and its role in plants.

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DATE : 11.07.2009

TIME: 1.30 p.m. – 4.00 p.m.

ANSWER ANY FOUR(04) OF THE FOLLOWING QUESTIONS.

01.
 - a) Describe the nature of enzymes.
 - b) Briefly explain how enzymes lower the activation energy of a reaction.
 - c) Differentiate between “induced-fit hypothesis” and “lock and key hypothesis”.
 - d) Discuss the significance of compartmentalization of enzymes in the cell.

02.
 - a) What is the significance of photosynthesis in nature?
 - b) Describe the role of “photosystems” in the light reactions of photosynthesis.
 - c) Outline the events that take place in the calvin cycle.
 - d) Indicate how “dark reactions” are dependent on “light reactions”.

03. Describe how hormones influence each of the following.
 - i. Stomatal closure under drought conditions.
 - ii. Response of plant organs to gravity.
 - iii. Organogenesis in micro-propagation.

04. Write short notes on the following.
 - i. Photorespiration.
 - ii. Pollution and stress in plants.



05. a) What are plant hormones?
- b) Explain the following statements.
- i. Auxin inhibits the growth of lateral buds but not that of the terminal bud that produces it.
 - ii. GA is used to increase the yield of barley malt.
 - iii. Low O₂ concentration and low temperatures delay ripening of fruits during storage.
 - iv. Release from apical dominance can be achieved through the application of cytokinins to the apical bud.
06. a) How does low temperature influence flowering behaviour?
- b) State whether a short day plant with a critical night length of 10 hours would flower under the following conditions. Give reasons in each case.
- i. 15 hours of day light followed by 9 hours of darkness.
 - ii. 12 hours of day light followed by 12 hours of darkness.
 - iii. 13 hours of day light followed by 11 hours of darkness with a flash of far-red light at hour 18.
 - iv. 12 hours of day light followed by 12 hours of darkness, with a flash of red light at hour 18 followed by a flash of far-red light.
 - v. 10 hours of day light followed by 14 hours of darkness with a flash of red light at hour 17.

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