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Sardar Patel University
M. Sc. Biochemistry (III Semester) Examination

Tuesday, 4th December 2012

2. 30 p.m. to 5. 30 p.m.

Paper PS03E BIC01: Plant Biochemistry

Max. Marks: 70 (Seventy only)

- N.B.: (i) Answers of all the questions (including multiple choice questions) should be written in the provided answer book only.
(ii) Figures in the right indicate marks.

Q1. Select the appropriate answer for the following multiple choice questions: (08)

1. What is the term for a situation in which water osmoses out of a cell and into the surrounding environment?
(a) lysis (b) plasmolysis
(c) hemolysis (d) hydrostatic pressure increase
2. In seed germination, the first to occur is
(a) Diffusion (b) Exosmosis
(c) Endosmosis (d) Imbibition
3. The photoperiodic stimulus perceived by
(a) Leaves (b) Buds
(c) Meristem (d) Flowers
4. Which one of the following plant hormones is responsible for water balance of plant?
(a) Auxin (b) Abscisic acid
(c) Cytokinin (d) Ethylene
5. The phytoalexins are
(a) Isoflavonoids (b) Sesquiterpene
(c) Both a & b (d) None of the above
6. Which property is specifically attributed to gibberellins?
(a) Apical bud growth inhibition
(b) Root initiation in stem cuttings
(c) Elongation of genetically dwarf plants
(d) Act as selective weedicide
7. Seeds in which germination is stimulated by light are called
(a) Photoblastic seeds (b) Thermoblastic seed
(c) Positively photoblastic (d) Negatively photoblastic
8. Photoperiodism is associated with synthesis of
(a) Vernalin (b) Colchicine
(c) abscissin (d) Florigen

(Contd.....2)

QII. Answer any SEVEN of the following questions briefly:

(7 X 2 = 14)

- (1) Briefly explain the statement "many plant functions depend quite directly upon the properties of water and of substances dissolved in the water".
- (2) Differentiate between apoplast and symplast transport.
- (3) "The permeability of plasma membrane is affected by a number of external and internal factors". Justify.
- (4) Define "apical dominance"
- (5) ABA is also called stress hormone. Why?
- (6) What two key enzymes are rate-limiting for ethylene biosynthesis, and what reactions do they catalyze?
- (7) Differentiate between dormancy and quiescence
- (8) What is meant by systemic acquired resistance?
- (9) What is the function of nitrate reductase kinase in nitrate assimilation?

QIII. Answer the following questions in detail:

(4 X 12 = 48)

1. (a) (i) How is the phenomenon of diffusion involved in the water relations of plants? (3)
(ii) Explain, "Osmosis plays a very important role in some of the vital processes of the plant". (3)
- (b) Elucidate the current concept of the mechanism of the opening of stomata. Also briefly discuss whether transpiration serve any useful function in the plants? (6)

OR

- (b) With suitable illustration/s explain the cohesion theory of ascent of sap in plants. (6)
2. (a) (i) Give an account of mechanism of CO₂ fixation, explaining major steps and the end products in photosynthesis. (3)
(ii) What is photorespiration and how is it related to photosynthesis? (3)
- (b) Giving an overview of respiration in plants, briefly discuss the gluconeogenesis (6)

OR

- (b) (i) What do you understand by fermentation in plants? Distinguish between aerobic respiration and fermentation. (3)
- (ii) In what significant way does crassulacean acid metabolism (CAM) differ from C₄ metabolism? (3)

(Contd.....3)

3. (a) Define photomorphogenesis and explain the role of light in the regulation of plant development and briefly discuss the function of phytochrome. (6)
- (b) Explain the following in brief: (2 X 3 = 6)
- (i) Polar transport of auxins
 - (ii) Role of cytokinin in plant growth.

OR

- (b) (i) With suitable explanation justify. "Jasmonates are a growing class of signaling molecules and plant hormones". (3)
- (ii) What do you understand by vernalization? Give some practical uses of this phenomenon. (3)
4. (a) (i) Write a short account of the phenomenon of photoperiodism in plants (3)
- (ii) Briefly explain the nitrate assimilation in roots (3)
- (b) Briefly discuss the biochemistry of fruit ripening and its control. (6)

OR

- (b) (i) Describe the hormonal changes that take place during seed development and germination and offer a rationale for these changes. (3)
- (ii) Give a brief account of senescence process and its significance in plants (3)

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