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Sardar Patel University

M. Sc. Botany (III Semester) Examination

Saturday, 1st December 2012

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

Paper PS03C BOT02: Plant Physiology and 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.

QI. Select the appropriate answer for the following multiple choice questions: **(8 X 1 = 8)**

1. The membrane which allows passage of solvent as well as some selective solutes and prevents others is called

(a) Permeable membrane (b) Semipermeable membrane

(c) Selectively permeable membrane (d) Imperimeable membrane

2. Passive, directional movement of molecules is part of the process called _____.

(a) Free energy (b) Brownian movement

(c) Diffusion (d) Lysis

3. Conversion of starch to sugar is essential for

(a) Stomatal opening (b) Stomatal closing

(c) Stoma formation (d) Stomatal growth

4. Which is produced during water stress that brings stomatal closure?

(a) Ethylene (b) Abscisic acid

(c) Ferulic acid (d) Coumarin

5. Apical dominance is due to

(a) Abcisic acid (b) Gibberelic acid

(c) Auxin (d) Cytokinin

6. Catabolism of which biomolecule/s produces Acetyl-coA that leads to TCA cycle

(a) Carbohydrate (b) Fat

(c) Amino acids (d) All of the above

7. Reduction of nitrite to ammonia requires

(a) uptake of 5 electrons (b) uptake of 6 electrons

(c) uptake of 8 electrons (d) None of the above

8. In leucoplasts the reducing equivalents for nitrite reduction is derived from

(a) NADPH (b) NAD

(c) FADH (d) None of the above

(Contd.....2)

QII. Answer <u>any SEVEN</u> of the following questions briefly: **(7 X 2 = 14)**

1. Cite evidences to prove that in photosynthesis light and dark reactions occur.
2. Photosynthetic CO_2 fixation and photorespiratory oxygenation are competing reactions. Discuss in brief.
3. Acclimation is different from adaptation. Explain.
4. Comment upon 'Phytochromes A and B have contrasting effects'.
5. Plant hormones rarely, if ever, function alone. Explain.
6. What is the function of nitrate reductase kinase in nitrate assimilation?
7. The nitrite assimilation in leaves needs to be slowed down or completely switched off in dark. Give reasons.
8. Why TCA cycle is considered to be central pathway?
9. What is the fate of Pyruvate in aerobic conditions and in anaerobic conditions?

QIII. Answer the following questions in detail: **(4 X 12 = 48)**

1. (a) Discuss the mechanism of entry of water into the xylem and of its ascent to the top of tall trees. **(6)**

   (b) Giving a brief account of factors influencing the rate of diffusion, briefly discuss the significance of diffusion in plants. **(6)**

   <u>OR</u>

   (b) (i) "Plant Physiology is a basic discipline which ultimately interfaces with several other subjects of plant sciences". Explain. **(3)**

   (ii) Describe the part played by water in physiology of plants. **(3)**

2. (a) What is photosystem? Which pigment acts as a reaction centre? Describe the interactions of photosystem I & II. **(6)**

   (b) Write an explanatory note on dark fixation of CO_2 in CAM plants and the significance of CAM. **(6)**

   <u>OR</u>

   (b) Write briefly on the mechanism of opening and closing of stomata, especially with reference to the involvement of ion transport. **(6)**

3. (a) Briefly discuss the biochemistry of fruit ripening and its control. **(6)**

   (b) (i) Explain the role of light in the regulation of plant development and briefly discuss the function of phytochrome? **(4)**

   (ii) What do you understand by vernalization? Give some practical uses of this phenomenon. **(2)**

   <u>OR</u>

   (b) (i) Give an overview of plant responses to stress with an emphasis on temperature / water stress **(4)**

   (ii) What are the tropic and nastic movements? In what respect do they differ from each other? **(2)**

4. (a) Briefly discuss the senescence and abscission processes and their significance in plants **(6)**

   (b) Compare the physiological roles of gibberellins, and cytokinins, and present a brief account of the application of growth regulators in horticulture and agriculture **(6)**

   <u>OR</u>

   (b) Briefly explain the following:

   (i) Nitrate assimilation in roots **(4)**

   (ii) Chemiosmotic hypothesis **(2)**

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