

16/8/22

**M.Sc. (BIOTECHNOLOGY)
SEMESTER II EXAMINATION
AUGUST 2022
PAPER CODE - MBT-CC202
PAPER TITLE: MOLECULAR PLANT
PHYSIOLOGY**

Time: Three Hours

Maximum Marks: 75

Attempt all questions. Question no 1 is compulsory. All parts of a question must be attempted in continuation. Start answer of a fresh question on a new page. Cite examples and draw labelled diagrams wherever necessary.

Question No. 1:

A) Choose the correct answer: [1 x 5 = 5]

- 1) In C3 and C4 plants respectively, primary carboxylation takes place with the help of
 - (a) PEP carboxylase and pyruvate carboxylase
 - (b) RuBP carboxylase and PEP carboxylase
 - (c) PEP carboxylase and RuBP carboxylase
 - (d) RuBP carboxylase and pyruvate carboxylase
- 2) Avena test is for which hormone
 - (a) Cytokinin
 - (b) Brassinosteroid
 - (c) Auxin
 - (d) ABA
- 3) Ephemerals plants survive the environmental stress by the
 - (a) Stress resistance
 - (b) Stress susceptibility
 - (c) Stress avoidance
 - (d) None of these

4) Blossom-end rot in tomato is due to deficiency of

- (a) Ca
- (b) Fe
- (c) Nitrogen
- (d) Phosphorous

5) Which element is the major component of Nitrate Reductase System?

- a) Mo
- b) N
- c) H
- d) None of the Above

B) Write True (T) or False (F) for the following statements: [1 x 5 = 5]

- a) Addition of a lot of succinates does not reverse the inhibition of succinic dehydrogenase by malonate.
- b) The FeMo protein component of nitrogenase consists of two different polypeptides which are associated as a mix of $\alpha 1-\beta 3$ tetramer.
- c) Salt, cold and drought stress induces phospholipids biosignalling.
- d) Photosynthesis is an amphibolic process.
- e) The fundamental feature of Kranz Anatomy of C₄ plants is presence of agranal chloroplasts in bundle sheath cells and granal chloroplasts in mesophyll cells

C) Fill in the Blanks of following sentences: [1 x 5 = 5]

- a) _____ and _____ minerals are required for chlorophyll synthesis.
- b) Non -cyclic electron transport and O₂ evolution are inhibited by _____ and _____.
- c) Reclamation disease of cereals and leguminous plants is caused by deficiency of mineral.
- d) Immediate precursor of ethylene biosynthesis in plants is _____.
- e) In drought acclimation, tolerance of a plant against a particular stress is _____.

Question No. 2:

A) Differentiate between the following

[7.5 x 2 = 15]

- 1. Cyclic and non-cyclic photophosphorylation
- 2. C₃ and C₄ plants

OR

B) Answer briefly any TWO of the following questions:

[7.5 x 2 = 15]

- i. Give an account of photosynthetic carbon reduction cycle (PCR).
- ii. What is Cyanide resistant respiration? Discuss its significance.
- iii. Write a short note on synthesis, transport and storage of starch.

Question No. 3:

[7.5 x 2 = 15]

A) Briefly discuss any TWO of the following:

- i. Nitrogen assimilation in plants.
- ii. Role of nif and nodulin gene in biological nitrogen fixation
- iii. What do you mean by macro and micro-nutrients? Describe the role of nitrogen, potassium and iron in plant nutrition.

OR

B) Answer briefly any TWO of the following questions:

[7.5 x 2 = 15]

- i. Active transport and electrogenic pumps for nutrient uptake.
- ii. Describe the mechanism of nitrogen fixation in nodules of leguminous plants.
- iii. How will you differentiate Nitrification and Denitrification?

Question No. 4:

[7.5 x 2 = 15]

A) Describe in brief the following:

- i. What is the significance of seed dormancy? Describe in detail the methods to overcome seed dormancy.
- ii. What are Auxins? Discuss their physiological role in plants.

OR

B) Attempt any TWO of the following:

[7.5 x 2 = 15]

- i. Write a note on structure, biosynthesis and molecular mechanism of action of Absciscic acid.
- ii. Describe the structure and functions of phytochromes and cryptochromes. Describe their roles in signal transduction.
- iii. Briefly discuss the structure and functions of brassinosteroids and polyamines.

Question No. 5:

[7.5 x 2 = 15]

A) Describe in brief the following:

- i. What is the significance of SOS pathway and molecular chaperones in stress physiology?
- ii. Describe the molecular pathways of fruit ripening. How these pathways can be modified to control the post-harvest deterioration of fruits?

OR

B) Attempt any TWO of the following:

[7.5 x 2 = 15]

- i. Write a note on role of LEA proteins in stress tolerance.
- ii. Molecular basis of senescence, ageing and programmed cell deaths in plants.
- iii. Differentiate between abiotic stresses from biotic stresses.