

[This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2349

IC

Unique Paper Code : 42164401

Name of the Paper : Plant Physiology and Metabolism

Name of the Course : B.Sc. (Programme)

Semester : IV

Duration : 3 Hours

Maximum Marks : 75

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempts Five questions in all.
3. Question No. 1 is compulsory.
4. All questions carry equal marks.

1. (a) Attempt (Any Five)

(5×1=5)

(i) A hormone that was named after a fungus.

(ii) An example each of asymbiotic and symbiotic N<sub>2</sub> fixing bacteria.

P.T.O.

(iii) Name any two mineral ions that are required for photolysis of water.

(iv) Name the most abundant enzyme protein found in green tissues.

(v) Name the end product of glycolysis.

(vi) Name the pigment that exhibits photoreversibility.

(b) Define the following (Any Five) (5×1=5)

(i) Chelating agent

(ii) Plasmolysis

(iii) Coenzyme

(iv) Apical dominance

(v) Vernalization

(vi) Anaerobic respiration

(c) Give one important contribution of the following (Any Five) (5×1=5)

(i) Ernst Münch

(ii) F.F. Blackman

(iii) Robert Hill

(iv) T. Engelmann

(v) J.V. Sachs

(vi) W.W. Garner and H. A. Allard

2. Differentiate between the following (Any Five) :  
(5×3=15)

(a) Transpiration and Guttation

(b) Nitrate reductase (NR) and nitrite reductase (NiR)

(c) Macronutrient and Micronutrient

(d) Reversible and irreversible enzyme inhibitors

(e) SDP and LDP

(f) Cyclic and Non-cyclic photophosphorylation

(g) Active and passive absorption

3. Answer (Any Three) : (3×5=15)

(a) What are the criteria for determining the essentiality of mineral elements in plants?

(b) Explain lock and key model of enzyme action with suitable diagram. Discuss any two factors affecting enzyme activity.

(c) Describe nodulation process in leguminous plants with suitable diagrams.

(d) Give brief account on oxidative pentose phosphate pathway.

4. Brief account on the following (Any Five): (5×3=15)

(a) Crown gall

(b) Florigen concept

(c) Hatch & Slack cycle

(d) Ethylene as a hormone

(e) Respiratory quotient (RQ)

(f) Red drop effect

(g) Abscissic acid

5. Attempt the following (Any Three): (3×5=15)

(i) Explain  $GA_3$  induced  $\alpha$ -amylase synthesis in aleurone layer of cereals giving suitable diagrams.

- (ii) Describe the widely accepted "Cohesion and tension" theory of ascent of sap in higher plants. What are the limitations of this theory?
- (iii) Justify that water potential is an indicator of plant health. Explain its various components and their significance.
- (iv) Describe the activity of RUBISCO under high  $O_2$  concentration (Photorespiratory Glycolate pathway).
6. Attempt the following : (3×5=15)
- (a) Who proposed the Pressure Flow Model for translocation of photoassimilates via phloem? Explain this model with the help of flow diagram.
- (b) Give an account of physiological roles of Auxins or Cytokinins.
- (c) How are lipids converted into sugars during germination of seeds via Glyoxylate pathway?
7. (a) Explain oxidation of pyruvate in mitochondria? Work out how many ATP molecules are produced after oxidation of one molecule of pyruvate.

(8)

P.T.O.

(b) Discuss Calvin cycle in detail mentioning enzymes involved in each step ? (7)

(8)

(2000)