

2020

BIOCHEMISTRY — HONOURS

Paper : DSE-B-2

(Plant Biochemistry)

Full Marks : 50

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

1. Answer **any five** questions : 2×5
- (a) What is the difference between C3 and C4 plants?
 - (b) Why secondary metabolites are produced in plants?
 - (c) Name one plant hormone and write its function.
 - (d) What are the names of the enzymes involved in GOGAT pathway?
 - (e) Which hormones are used for callus induction?
 - (f) Write two benefits of tissue culture.
 - (g) Give two examples of terpenoids.
 - (h) How are plant hormones passed to the specific site of activity?
2. Answer **any two** questions :
- (a) What is photorespiration? Schematically represent it. Write two factors that affect photorespiration. 3+2
 - (b) (i) Describe three distinct roles of plant vacuoles.
(ii) What is tonoplast and where it is found? 3+2
 - (c) What is cyanide resistant respiration? Write the physiological significance of it. 2+3
 - (d) What is a plant alkaloid? Give two examples. What are the functions of alkaloids in plants? 1+2+2
 - (e) (i) What is the primary sites of auxin biosynthesis? Name one inhibitor of auxin transport.
(ii) How glutamate synthetase activity is regulated by adenylation? (2+1)+2
3. Answer **any three** questions :
- (a) (i) What is light reaction?
(ii) What are the differences between PS I and PS II complexes?
(iii) What is photophosphorylation?
(iv) Compare and contrast cyclic photophosphorylation and non-cyclic photophosphorylation. 2+3+2+3

Please Turn Over

- (b) (i) Write down the glyoxalate cycle indicating all steps, name of enzymes and cofactors (if any).
What is its importance?
- (ii) Mention the steps of TCA cycle where CO₂ is generated. Where are the enzymes of TCA cycle located? (5+2)+(2+1)
- (c) (i) What is Calvin cycle? Where does it occur?
- (ii) What are the three stages of Calvin cycle? Describe briefly all the steps of this cycle.
- (iii) How this cycle is regulated? (1+1)+(1½+4)+2½
- (d) (i) What are protoplast?
- (ii) What are peroxisomes? Write its functions.
- (iii) What are the antenna pigment molecules? Mention its role.
- (iv) Write three major functions of plasma membrane. 1+3+3+3
- (e) (i) In TCA cycle, show the steps in detail where NADH and FADH₂ are produced.
- (ii) Describe the components that make up a plant cell wall and describe their roles.
- (iii) What is 'enhancement effect' in relation with photosynthetic rate? 4+3+3
- (f) (i) Define biological nitrogen fixation.
- (ii) Why do plants need fixation of atmospheric nitrogen?
- (iii) What is leghaemoglobin?
- (iv) Choose the correct one :
Important enzymes involved in nitrogen fixation are–
- (1) Nitrogenase and hydrogenase
- (2) Nitrogenase and hexokinase
- (3) Nitrogenase and peptidase
- (4) Nitrogenase and hydrolase.
- (v) How many molecules of ATP are required to fix one molecule of nitrogen? 2+2+2+2+2
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