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S. No. of Question Paper : 1686

Unique Paper Code : 216601 C

Name of the Paper : Plant Metabolism and Biochemistry (BTHT-610)

Name of the Course : B.Sc. (Hons.) Botany

Semester : VI

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *Five* questions in all including

Question No. 1 which is compulsory.

1. (a) Answer briefly the following (any *five*) : 5×2=10
- (i) Define nitrification and denitrification.
 - (ii) Define and graphically represent Michaelis-Menten constant.
 - (iii) Differentiate between Triglyceride and Phospholipid.
 - (iv) What are coupled reactions ? Give *one* example.
 - (v) How was it shown that maximum photosynthetic activity occurs in blue and red lights ?
 - (vi) Define active and allosteric sites.
 - (vii) What is anaerobic respiration ?

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- (b) Fill in the blanks : 5×1=5
- (i) If RQ is 1, respiratory substrate is
 - (ii) The biochemist who proposed lock and key hypothesis was
 - (iii) The number of NADPH used for the fixation of one molecule of CO₂ is
 - (iv) Protein component of an enzyme is
 - (v) The synthesis of carbohydrates through the reversal of glycolysis is

2. Explain the following (any *five*) : 5×3=15

- (i) In some plants, respiration continues even in the presence of cyanide.
- (ii) A solution of chlorophyll appears red in reflected light.
- (iii) O₂ is not used during Krebs cycle but still the cycle does not operate in the absence of oxygen.
- (iv) All enzyme catalyzed reactions show a pH optimum.
- (v) Malonic acid inhibits the activity of the enzyme succinic dehydrogenase, but the inhibition gets reduced on addition of succinic acid.
- (vi) Synthesis of fatty acid is not a reversal of fatty acid breakdown.

3. Write short notes on the following (any *five*) : 5×3=15

- (a) Isoenzymes
- (b) Dinitrogenase

- (c) Substrate level phosphorylation
- (d) Significance of pentose phosphate pathway
- (e) Breakdown of starch by amylases and phosphorylases
- (f) Emerson enhancement effect and its significance
- (g) Transamination.
4. Write explanatory notes on the following (any *three*) : 3×5=15
- (a) Secondary metabolites
- (b) Non-cyclic photophosphorylation
- (c) CO₂ fixation in CAM and C₄ plants
- (d) Sucrose synthesis in plants
- (e) Glycolysis.
5. (a) Give a concise account of classification of enzyme. Give *one* example of each class. 6
- (b) What are catabolic and anabolic processes ? Discuss the role of Acetyl CoA in cellular metabolism. 6
- (c) Give the experimental evidence which revealed that PGA is the first product of CO₂ assimilation in C₃ plants. 3
6. (a) Explain the mechanism of photorespiration in detail. Highlight its significance. 8
- (b) Explain the process of rhizobial infection and root nodulation in legumes. 7

7. (a) Give an account of electron transport chain in mitochondria and its role in ATP synthesis. 6
- (b) Explain β -oxidation pathway of breakdown of fatty acid. 6
- (c) Name the enzymes catalyzing the following reactions : 3
- (i) Conversion of sucrose to fructose and glucose
- (ii) Conversion of acetaldehyde to ethanol
- (iii) Conversion of pyruvate to acetyl CoA.