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3 (Sem-6/CBCS) BOT HC 1

2023

BOTANY

(Honours Core)

Paper : BOT-HC-6016

(Plant Metabolism)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions : $1 \times 7 = 7$

(a) How many ATPs are consumed for synthesis of one hexose sugar in C₃ cycle ?

(b) Name the cellular organelle where ATP synthetase works.

(c) MAP kinase are _____ proteins.
(Fill in the blank)

(d) Write two roles of uncouplers.

Contd.

- (e) Metallic part of an enzyme is called _____.
(Fill in the blank)
- (f) Name *one* enzyme responsible for transamination reaction.
- (g) What is the cellular location of glycolysis ?

2. Answer the following questions in brief :
2×4=8

- (a) Discuss briefly about Bayer's conformational model on ATP synthesis.
- (b) Distinguish between co-enzyme and co-factors.
- (c) Discuss briefly about the process of transamination.
- (d) What are the classes of enzymes according to the recent classification of IUB ?

3. Write brief answer on *any three* of the following :
5×3=15

- (a) Elucidate the role of temperature and $\text{CO}_2 : \text{O}_2$ ratio during photosynthetic CO_2 fixation.

(b) Describe the systematic infection of root by *Rhizobium* bacteria during biological nitrogen fixation.

(c) Illustrate the mechanisms of enzyme inhibition with proper examples.

(d) Elucidate the process of formation of pyruvic acid during glycolysis.

(e) Write shortly about antenna molecules and reaction centres involved in photosynthetic light reactions.

4. Answer **any three** from the following :

10×3=30

(a) Elucidate with proper representation of reactions involved in the process of conversion of nitrate to ammonia. Write briefly about GS/GOGAT system.

7+3=10

(b) Elucidate the role of calcium calmodulin cascade in signal transduction mechanism. What do you understand by receptor ligand interaction?

7+3=10

- (c) Describe the process of gluconeogenesis and its role in mobilisation of lipids during seed germination. What is α -oxidation? $7+3=10$
- (d) Elucidate with proper diagram the biosynthesis of ATP and $NADPH_2$ involving PS-I and PS-II. What is the role of metalloproteins in photolysis of water? $7+3=10$
- (e) With proper representation of chemical reactions describe the TCA cycle. Discuss the energy balance of the process. $7+3=10$
- (f) Give a detailed account on synthesis and degradation of starch in plant body. $5+5=10$