3 (Sem–6/CBCS) BOT HC 1

2024

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 : 1×7=7

   (a) Name the type of the metabolic pathway which is involved in the synthesis of compounds in plant bodies.

   (b) What is the first stable product in the C4 pathway ?

   (c) Which of the given lights are strongly absorbed by plants ?

      (i) Indigo and Yellow

(ii) Yellow and Violet

(iii) Blue and Red

(iv) Orange and Violet

(d) Name the enzyme which catalyses the conversion of N_2 into ammonia during the biological N_2 fixing process.

(e) Name one simple lipid.

(f) Which enzyme is required for the synthesis of ATP ?

(g) The end product of glycolysis under anaerobic conditions is _____.

(Fill in the blank)

2. Answer the following questions shortly : 2×4=8

(a) Write the roles of PS-II during photosynthesis.

(b) Write a note on ATP as high energy molecule.

(c) Define aerobic respiration.

(d) Distinguish between RuBP and RuBisCO.

3. Answer the following questions briefly : ***(any three)*** 5×3=15

(a) Explain Glycolysis. State its end products. In both aerobic and anaerobic respiration, determine the fate of these products.

(b) Discuss the key events and outcomes of the light reaction of photosynthesis.

(c) Discuss different types of nitrogen-fixing bacteria and their symbiotic relationships with plants.

(d) Explain the mechanisms of enzyme inhibition with suitable example.

(e) What is meant by the term 'signal transduction'? What are some of the steps by which signal transduction can occur ?

4. Answer the following questions as instructed : ***(any three)*** 10×3=30

(a) Explain how the irreversible reaction catalysed by the pyruvate dehydrogenase complex leads to the entry of acetyl-CoA into the TCA cycle. Why cannot acetyl-CoA be used as a substrate for gluconeogenesis ? 4+6=10

(b) What is a second messenger ? Why do you suppose it is called this ? Elucidate the role of calcium-binding proteins eliciting a response. 2+2+6=10

(c) Distinguish between aerobic respiration and anaerobic respiration. Explain the significance of oxygen in aerobic respiration in the context of ETS. 3+7=10

(d) Describe the β-oxidation pathway of fatty acid degradation. Draw the glyoxylate cycle. 6+4=10

(e) Why do you suppose RuBisCO performs more carboxylation in C4 plants than in other plants ? Explain the Hatch and Slack pathways with proper schematic sketch. 4+6=10

(f) What are mono, oligo and polysaccharides ? Describe their role"in plant metabolism. 3+7=10
