UG 6th Semester

CC- XIII (Plant Metabolism)

Unit- I

Long Question

1. Describe the biochemical reactions involved in the synthesis of of starch and sucrose. Are these two processes competing to each other? Explain.

2. discuss the role of regulatory enzymes in regulation of metabolism.

3. discuss the synthesis of sucrose and starch.

4. Explain Catabolism and anabolism with examples.

Short Notes

1. Allosteric enzymes

2. Isozymes

3. Regulation of metabolism

4. Covalent modification of enzymes

5. Differences Between Catabolism and Anabolism

6. catabolic and anabolic processes

7. Catabolism of sucrose and starch

Unit- II

Long Question

1.What part do chlorophyll ,carbon dioxide and light play in synthesis of simple carbohydrates in green plants?

2. What are radioactive isotopes? How far the use of tracer C12 has been successful in tracing out various intermediate products of the dark phase of the photosynthesis ?

3. Write note on structure of Chloroplast and Quantasomes.

4. Write note on Blackman's principle of limiting factors.

5. How would you prove experimentally the following:

(a) Oxygen is evolved in photosynthesis.

(b) Carbohydrate synthesis can not take place in the absence of chlorophyll.

6. Give an account of the process of photosynthesis.

7. How do plant utilise carbondioxide

8. Describe the mechanism by which plants convert CO_2 to carbohydrates .

9. Describe the mechanism of conversion of solar energy into chemical energy in plants.

10. Explain recent views of the mechanism of photosynthesis in green plants. Discuss at least three evidences to support the view that photosynthesis takes place in two steps.

11. Describe the mechanisms of photophosphorylation in higher plants.

12. What are the raw materials of photosynthesis? How are they absorbed and utilised?

Explain the information obtained with the use of C^{14} and O^{18}.

13. Give an account of the modern views on the mechanism of photosynthesis.

14. Describe cyclic and non cyclic electron transport and photophosphorylation.

15. Give an account of recent work on the mechanism of photosynthesis.

16. Write short note on chemosynthesis.

17. Write short note on photosynthetic phosphorylation.

18. Discuss briefly the mechanism of photosynthesis in green plants in the light of modern researches.

19. What do you understand by cyclic photophosphorylation.

20. What are limiting factors ? Describe in detail their significance in relation to photosynthesis.

21. Give a comparative account of photosynthetic pigments of higher plants.

22. Explain Q cycle in photosynthesis.

23. Give an account of various factors affecting photosynthesis.

24. Describe the role of photosynthetic pigments in the light reaction of photosynthesis.

25. Explain the carbon reduction through C4 pathway. What are the specific adaptations found in C4 plants to make the process efficient?

26. Give an account of C3 cycle.

Short Notes

1. Accessory pigments and their role

2. Crassulacean Acid Metabolism

3. Q cycle

4. C4 pathway

5. Emerson's effect and path of carbon in photosynthesis.

6. Path of carbon in C3 and C4plants.
7. C4 plants.

8. Carbondioxide fixation in dark.

9. Thylakoid.

10. Law of limiting factors.

11. Importance of photosynthesis.

12. Photophosphorylation.
13. Role of water in photosynthesis

14. Krantz anatomy

15. Hill reaction

16. Emerson effect

17. Far red drop of photosynthesis

18. Site of photosynthesis

19. Photosynthetic pigments

20. Role of chlorophylls in photosynthesis

21.Carotenoids

22. Photosystems

23.Photochemical reaction centre

24. Antenna molecules

25. Light harvesting complexes
26. Cooperativity between PSI and PSII

27. Distinction between PSI and PSII

28. Cyclic photophosphorylation
29. Non-cyclic photophosphorylation

30. ATP synthesis in photosynthesis

31. Distinction between cyclic and non-cyclic

32. Carboxylative phase of calvin cycle

33. Reductive phase of calvin cycle

34. Regenerative phase of C3 cycle

35. C4plants

36. CAM plants

37. Photorespiration

38. Kranz anatomy

39. Distinction between C3and C4pathway

40. Comparison between photorespiration and dark respiration.

Unit- III

Long Question

1. Explain the steps of glycolysis.

2. Give a detailed account of electron transfer through the multienzyme complexes of the mitochondrial respiratory chain.

3. Describe the biochemical reactions involved in TCA cycle. Why TCA cycle is aerobic eventhough in none of its steps Oxygen is involved? Explain.

4. Narrate all the steps of pentose phosphate pathway. Mention the significance of such pathway.

5. Describe in detail the process of glycolysis. Add a note on the fate of pyruvate.

6. give an account of energy releasing process in glucose oxidation.

7. Explain Glycolysis. State where it occurs and its end products. In both aerobic and anaerobic respiration, determine the fate of these products.

8. Describe the process and role of citric acid cycle in living organisms

9. discuss various steps of Kreb's cycle. Also give the estimates of water, carbon dioxide and formation of ATP.

10. Discuss the basic mechanism by which ATP synthase generates ATP in the mitochondria

11. How does chemiosmosis leads to ATP synthesis in mitochondria? Explain.

Short Notes

1. Cyanide resistant respiration
2. Factors affecting respiration
3. Amphibolic role of TCA cycle
4. Regulation of glycolysis
5. role of uncouplers
6. Proton-motive Force
7. Alternate oxidase system
8. Regulation of TCA cycle
9. substrate level phosphorylation
10. significance of Oxygen in aerobic respiration in the context of ETS
11. comparison between fermentation and aerobic respiration
12. ETC
13. Respiratory substrates
14. racker's experiment
15. Boyer's conformational model
16. Jagendorf's experiment
17. ATP synthase
18. proton gradient
19. Regulation of PDH
20. NADH shuttle
21. Oxidative decarboxylation of pyruvate
22. Anaplerotic reactions in TCA cycle

Unit- IV

Long Question

1. Describe the reactions of glyoxylate cycle and mention its significance.

2. Give an account of biosynthesis of triglycerides.

3. explain the chain elongation reactions in fat synthesis

4. describe the beta- oxidation pathway of fatty acids.

5. What are lipids? Explain the distribution & degradation of lipid in plants

6. Draw beta-oxidation pathway. No description is required.

7. What are plant lipids? How are they biosynthesized? Discuss the mechanism of their biosynthesis

8. Describe degradation of fats. What is the fate of end product of their oxidation?

9. enumerate the steps leading to the synthesis of fatty acids

10. give an account of fat synthesis in plants

11. give an account of gluconeogenesis. Explain its role in mobilization of lipids during seed germination.

Short Notes

1. beta oxidation of fatty acids

2. Glyoxylate cycle

3. Difference between alpha and beta- oxidation of fats

4. Alpha- oxidation

5. role of gluconeogenesis in mobilization of lipids during seed germination

Unit- V

Long Question

1. What do mean by nitrogen fixation? Describe the physiology and biochemistry of biological nitrogen fixation.

2. Describe the mechanism of biological nitrogen fixation.

3. What is signal transduction? Describe its mechanism.

4. Discuss the process of biological nitrogen fixation in plants.

5. explain the key steps involved in signal transduction.

6. describe the mechanism of nitrogen fixation in leguminous plants.

7. Describe the biochemistry of biological nitrogen fixation.

8. Give an account of nitrogen metabolism in green plants

9. How do plants absorb nitrogen from the environment? Describe the process involved in the conversion of absorbed nitrogen into protoplasm

Short Notes

1. Ammonia assimilation & transamination

2. Nitrate assimilation

3. Leghaemoglobin

4. Ammonification and Nitrification

5. Reductive amination

6. cGMP

7. Second messenger

8. Importance of leguminous plants

9. Nitrogenase

10. difference between Nitrate assimilation & Nitrate reduction

11. difference between Reductive amination and tranamination

12. difference between Nitrification & denitrification