



Karanjia Auto College, Karanjia, Mayurbhanj

CC-XIII: Plant metabolism

Unit-1

(1) Fill in the blanks with one words (1×8)

- (i) Chemical compounds involved in the process of metabolism is known as _____.
- (ii) _____ Cycle has a spiral metabolic pathways.
- (iii) The pathway involved in the synthesis of compounds _____.
- (iv) _____ cycle shows amphibolic pathway.
- (V) The inhibition where end products of biosynthesis pathway inhibit the activity of the first enzyme _____.
- (Vi) Different enzymes that catalyze the same reaction _____.
- (Vii) Cell signalling is _____.
- (Viii) G protein- coupled receptors (GPCRs) is a _____ receptor.

(2) Short answer type: Answer the questions in 2-3 sentences (1.5×8)

- (i) What is your concept on metabolism and its functions?
- (ii) What is amphibolic pathway and give an example ?
- (iii) Write a brief note on allosteric enzymes and its properties?
- (iv) What is proteolysis?
- (V) Write a short note on isozymes?
- (Vi) What is Signal transduction?

(Vii) Name the two secondary messengers?

(Viii) Give a brief note on intracellular receptor.

(3) Short answer type: Answer the questions within 75 words (2×8) (i)

In what ways receptor-ligand interacted with each other?

(ii) What are important features of metabolism?

(iii) Distinguish between catabolic and anabolic pathways?

(iv) What is feedback inhibition and give an example?

(V) What is primary and secondary metabolites?

(Vi) Name the covalently modulated enzymes?

(Vii) Describe different types of receptor in relation to signal transduction?

(Viii) write notes on G protein - coupled receptors?

(4) Long answer type: answer the questions within 500 words (6×4)

(i) Give an account of regulation of metabolism?

(ii) What are metabolic pathways? Describe various anabolic pathways?

(iii) Briefly describe role of regulatory enzymes?

(iv) Enumerate briefly mechanism of nitric oxide signalling in plants?

(V) Describe different types of receptors in relation to signal transduction?

(vi) Describe Calcium signalling and calmodulin pathway?

Unit-2

1. Answer the following questions:(1×8)

1. _____ is the photosynthetic unit.

2. _____ is the photosynthetic apparatus.

3. _____ is the universal photosynthetic Pigment.

4. _____ 6CO_2 + _____ ^{Sunlight} _____ $\text{C}_6\text{H}_{12}\text{O}_6$ + _____ + $6\text{H}_2\text{O}$. Chlorophylls

5. Is photosynthesis _____ is Oxidised into _____ and _____ is reduced into _____
6. Oxygenated carotenoids are called _____.
7. _____ is present at the centre of the chlorophyll molecule.
8. Phycobillins are _____ soluble Pigments.
9. _____ is the reaction centre in PS-I and _____ PS-II.
10. Photolysis of water takes place in the presence of _____ & _____ ion.
11. Photolysis of water takes place near _____
12. All other Pigments except Chlorophyll-a are called _____.
13. The amount of light absorbed when plotted as a function of wavelength is called _____.
14. The amount of photon required to yield one molecule of oxygen is called _____.
15. When one molecule of photon is given then the number of O₂ produced is called _____.
16. The immediate acceptor of electron from PS-II is _____.
17. _____ & _____ are called Assimilatory Power.
18. The 1st Product of photosynthesis is _____.
19. For the production of one molecule of Glucose _____ ATP & _____ NADPH₂ molecules are wed through C₃ cycle.
20. In C₃ Plants CO₂ is fixed in the presence of enzyme _____.
21. Kranz anatomy is found in _____ plants.
22. In C₄ plants the CO₂ fixed from the atmosphere in the presence of enzyme _____.
23. In Sugarcane the 1st product of photosynthesis is _____.
24. In sugar came for the production of molecule of Glucose _____ A TP & _____ NADPH₂ are required.
25. Agranal chloroplast is found in _____.

26. In C₄ plants C₃ cycle occur in _____ cell
27. In CAM plants stomata shows _____ movement.
28. In CAM plants CO₂ fixation occur during _____.
29. In CAM plants Acidification occur during _____ in which malic acid is stored n _____ of Mesophytes cell.
30. C₄ cycle is also called as _____ path way.
31. Calvin Cycle is also called as _____ cycle.
32. _____ is also called as Primary photo chemical reaction.
- 33.. In photosynthesis Light reaction occur in _____ and Dark reaction occur in _____.

2. Answer in 1 to 2 sentence (1.5 marks)

1. What is Quantasome?
2. What is Absorption spectrum?
3. What is Action Spectrum?
4. What is Quantum yield?
5. What is Quantum requirement?
6. Write the equation of photosynthesis?

3. Answer in 75 words (2 marks)

1. Write a note on Photosynthetic Pigment.
2. Write a note on chlorophyll.
3. Write a note on Photolysis of water.
4. Briefly describe CAM pathway.
5. Write a note on PS-I & PS-II.
- 6.. What are antenna molecules?

4. Answer in 500 words (6 marks)

1. Describe the Z-scheme of photosynthesis
2. Describe C₃ cycle of photosynthesis

3. Describe Hatch & Slack pathway & photosynthesis.

4. Describe the Process of Light reaction

5. Describe Glycolysis & it's Significance

Unit-2

1. Answer the following questions:(1×8)

(1)___ number of ATP and NADPH₂ molecules required to fix 1 Carbon dioxide molecule during Calvin cycle?

(2)___ number of cycles required to produce one molecule of glucose.

(3) The first stable product of photosynthesis in C₄ plants is_____.

(4)The reaction centre of light energy in photosystem I is ___.

(5)A molecule of sedoheptulose has carbon atoms numbering_____.

(6)Photorespiration is inhibited by_____.

(7) Temperature coefficient (Q₁₀) for photosynthesis under normal conditions is___.

(8)Photolysis of water concerned with ___ photosystem.

(9)In experiments on photosynthesis the isotope used by Calvin was_____.

(10)_____ Photosynthetic bacteria have both PSI and PSII.

2. Answer the following questions:(1.5×8)

(1)Explain photolysis of water?

(2)Explain Emerson effect?

(3)What do you understand by Kranz type of anatomy?

(4)Which compound is the carbon dioxide acceptor in C₄ plants?

(5)When does photorespiration?

(6)Why is Calvin cycle called C₃ cycle?

(7) Describe photosynthetic pigments?

(8) Explain photosystem?

3. Answer the following questions:(2×8)

(1) Describe Q-cycle?

(2) Distinction between C3 and C4 pathway?

(3) Explain reductive phase of Calvin cycle?

(4) Non-cyclic photophosphorylation?

(5) CAM plants?

(6) Describe factors affecting carbon dioxide reduction?

(7) Short notes on Photochemical reaction centre?

(8) Distinction between PSI and PSII?

4. Answer the following questions:(6×4)

(1) Give a comparative account of CAM and C4 plants?

(2) Illustrate the 'Z scheme' of photosynthesis?

(3) Give an account of carbon dioxide fixation in C3 plants?

(4) Give an account of Photorespiration in plants?

(5) Describe HSK pathway? How is it different from C3 pathway?

(6) What is photophosphorylation? Explain the process of cyclic and non cyclic photophosphorylation?

Unit-3

1. Answer the question in one word

[1 mark each]

- a. Where does glycolysis take place?
- b. Who discovered the citric acid cycle?
- c. Which enzyme is responsible for the conversion of sucrose into glucose and fructose?
- d. What is the net ATP production in glycolysis?
- e. What is the net gain of ATP during aerobic respiration of one molecule of glucose?

- f. Who discovered glycolysis?
- g. Which metabolic pathway is common to both fermentation and cellular respiration?
- h. What is the end product of glycolysis?
- i. How many molecules of ATP are gained during anaerobic respiration of one molecule of glucose?
- j. RQ of sprouting potato tubers will be-----
- k. Oxidation of NADH_2 yield----ATP
- l. Oxidation of FADH_2 yield----ATP
- m. Pentose phosphate pathway was discovered by ----

2. Answer in two or three sentences [1.5 mark each]

- a. Give equation of cellular respiration.
- b. What are respiratory substrates?
- c. What is respiratory quotient?
- d. Give an equation of fermentation.
- e. What is glycolysis?
- f. Compensation point
- g. Why respiration is called cellular respiration?
- h. Respiratory quotient
- i. Anaerobic respiration
- j. Fermentation aerobic respiration

3. Answer in 75 words

[2 marks each]

- | | |
|--|---------------------------------------|
| 1 Oxidative phosphorylation | 12 Chemiosmotic mechanism |
| 2 Reduced coenzyme | 13 ATP synthase |
| 3 Substrate level phosphorylation | 14 Role of uncouplers |
| 4 ETC/ETS | 15 Respiratory quotient |
| 5 Why does anaerobic respiration produce less energy than aerobic respiration? | 16 Anaerobic respiration |
| 6 Significance of citric acid cycle. | 17 Fermentation |
| 7 Malate aspartate shuttle | 18 Preparatory phase of glycolysis |
| 8 Glycerol phosphate shuttle | 19 Payoff of glycolysis |
| 9 Cyanide resistant respiration | 20 Oxidative phase of PPP |
| 10 Factors affecting respiration. | 21 Non oxidative phase of PPP |
| 11 Photophosphorylation | 22 Regulation and significance of PPP |

4. Answer the following in 500 words

[6 marks each]

- 1 Illustrate the mechanism of electron transport system.
- 2 Describe the pentose phosphate pathway.
- 3 Describe the process and role of citric acid cycle in living organism.
- 4 Discuss various steps of Krebs cycle. Also give the estimates of water, CO₂ and formation of ATP.
- 5 Define respiration. Explain the complete process of respiration in plant.
- 6 Where does glycolysis occur in a cell. Explain its different steps?

Unit-4

(1) Fill in the blanks with one word(s) (1×8)

- (i) The major lipids that make up the cell membrane are _____.
- (ii) Carotenoids are _____ lipids.
- (iii) _____ is the precursor for fatty acid synthesis?
- (iv) The conversion of acetyl CoA to Malonyl CoA is rate-limiting step in fatty acid synthesis. _____ enzyme catalyses the above mentioned reaction?
- (v) Beta-Oxidation enzymes are present in _____.
- (vi) The Glyoxylate cycle was described by _____.
- (vii) In plants and some microorganisms, conversion of fats to carbohydrates taking place through _____.
- (viii) Production of glycogen from glucose is named as _____.

(2) Short answer type: Answer the questions in 2-3 sentences (1.5×8) (i)

write a short note on structural lipids?

- (ii) what are saturated fatty acids?
- (iii) What is the significance of alpha oxidation?
- (iv) In what ways does the synthesis of glycerol take place in plants?
- (v) Define Gluconeogenesis?
- (vi) What is the end-product of beta oxidation reaction?

(Vii) What is biological importance of lipids?

(Viii) where did the enzymes for omega oxidation locate?

(3) Short answer type: Answer the questions within 75 words(2×8)

(i) Give an account of classification of lipids?

(ii) Illustrate the steps of synthesis of fatty acids?

(iii) Distinguish between glycolysis and Gluconeogenesis?

(iv) Give a comparative account of alpha and beta oxidation?

(V) Describe role of Gluconeogenesis in mobilization of lipids during seed germination?

(Vi) Give an account of peroxisomal beta oxidation?

(Vii) Name the site of Glyoxylate cycle in plants?

(4) Long answer type: answer the questions within 500 words(6×4)

(i) Give an account of Gluconeogenesis? Describe the role of Gluconeogenesis in mobilization of lipids during seed germination?

(ii) Illustrate the process of beta oxidation and its significance?

(iii) Describe the process of synthesis of triglycerides?

(iv) Enumerate Glyoxylate cycle and its significance? **Unit-4(b)**

1. Answer the following questions (1×8)

(1) ___ trace elements is associated with prosthetic group of nitrite reductase.

(2) Prosthetic groups of nitrite reductase are _____.

(3) Reddish pigment in functional root nodules of Leguminosae is _____.

(4) The enzyme nitrogenase is extremely sensitive to _____.

(5) Ammonia is oxidised into nitrite by _____ bacteria.

(6) Nitrogen is absorbed by the plants _____.

(7)_____molecules of ATP are required to fix one molecule of nitrogen.

(8) Conversion of ammonia to nitrite and then to nitrates is called_____.

(9)The reaction of glutamate and ammonium ion to yield glutamine is catalyzed by enzyme_____.

2. Answer the following questions:(2×8)

(1) Nitrogen cycle(2)Ammonification

(3)Bacteroids(4)Laghaemoglobin

(5)nif gene(6)Nitrite reductase

(7)Transamination(8) Rhizobium

(9) Denitrification

3. Answer the following questions:(6×4)

(1) Describe the various stages of nitrogen cycle?

(2)Give an account of biological nitrogen fixation?

(3)What is nitrogen assimilation? Describe nitrate and ammonia assimilation in plants?

(4)Describe the biochemistry of nitrogen fixation?

(5)Give a general catalytic mechanism of nitrogen fixation by nitrogenase enzyme complex?

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