

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. \_\_\_\_\_  $6\text{CO}_2 + \xrightarrow[\text{Chlorophylls}]{\text{Sunlight}}$  \_\_\_\_\_  $\text{C}_6\text{H}_{12}\text{O}_6 + \text{_____} + 6\text{H}_2\text{O}$ .
5. In 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 O<sub>2</sub> 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 & \_\_\_\_\_ NADPH<sub>2</sub> molecules are used through C<sub>3</sub> cycle.
20. In C<sub>3</sub> Plants CO<sub>2</sub> is fixed in the presence of enzyme \_\_\_\_\_.
21. Kranz anatomy is found in \_\_\_\_\_ plants.
22. In C<sub>4</sub> plants the CO<sub>2</sub> fixed from the atmosphere in the presence of enzyme \_\_\_\_\_.
23. In Sugarcane the 1st product of photosynthesis is \_\_\_\_\_.
24. In sugar cane for the production of molecule of Glucose \_\_\_\_\_ ATP & \_\_\_\_\_ NADPH<sub>2</sub> are required.
25. Agranal chloroplast is found in \_\_\_\_\_.
26. In C<sub>4</sub> plants C<sub>3</sub> cycle occur in \_\_\_\_\_ cell
27. In CAM plants stomata shows \_\_\_\_\_ movement.
28. In CAM plants CO<sub>2</sub> fixation occur during \_\_\_\_\_.
29. In CAM plants Acidification occur during \_\_\_\_\_ in which malic acid is stored in \_\_\_\_\_ of Mesophytes cell.
30. C<sub>4</sub> 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 C<sub>3</sub> 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 NADPH<sub>2</sub> 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 C<sub>4</sub> 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 (Q<sub>10</sub>) 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 C<sub>4</sub> plants?
- (5)When does photorespiration?
- (6)Why is Calvin cycle called C<sub>3</sub> cycle?
- (7) Describe photosynthetic pigments?
- (8)Explain photosystem?

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

- (1)Describe Q-cycle?
- (2) Distinction between C<sub>3</sub> and C<sub>4</sub> 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 takes place?
- b. Who discovered citric acid cycle?
- c. Which enzyme is responsible for conversion of sucrose into glucose and fructose?
- d. What is net ATP production in glycolysis?
- e. What is 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  $\text{NADH}_2$  yield----ATP

**l. Oxidation of FADH<sub>2</sub> yield----ATP**

**m. Pentose phosphate pathway was discovered by ----**

**2.Answaer in two or three sentences**

**[1.5 mark each]**

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

**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 Glyceral 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 Dscuss various steps of Krebs cycle.Also give the estimates of water,CO<sub>2</sub> and formation of ATP.
- 5 Define respiration.Explain the complete process of respiration in plant.
- 6 Where does glycolysis occure in a cell.Explain its different steps?

## Unit-4

### (1) Fill in the blanks with one words(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 notes on structural lipids?
- (ii)what are saturated fatty acids?
- (iii) What are significance of alpha oxidation?
- (iv) In what ways 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 element 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) Lacthaemoglobin**

**(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?**

-----0-----