Give Short Answers of the Following Questions

1. Differentiate between action spectrum and absorption spectrum.

Ans. Action Spectrum and Absorption Spectrum:

Action Spectrum	Absorption Spectrum
• Action Spectrum: Shows the effectiveness of different wavelengths in driving photosynthesis. • Action spectrum is determined by measuring oxygen production or CO_2 uptake.	• Absorption Spectrum : Show the wavelengths of light absorbed by pigments. • Absorption is measured using a spectrophotometer.

2. How is photosynthesis a redox reaction?

Ans. Photosynthesis as Redox Reaction:

- Photosynthesis is a redox (reduction-oxidation) reaction.
- Water is oxidized to release oxygen (loss of electrons).
- Carbon dioxide is reduced to form glucose (gain of electron).
- Electrons are transferred from water to CO_2 via electron carriers.
- This electron flow forms the basis of the redox nature of photosynthesis.

3. Which molecule contributes oxygen in glucose? Water or carbon dioxide!

Ans.CO_2 contributes Oxygen in Glucose:

- The oxygen in glucose ($C_6H_{12}O_6$) comes from carbon dioxide (CO_2).
- During the Calvin cycle, CO_2 is fixed and incorporated into sugar.
- Water contributes the oxygen that is released as O_2 gas.
- So, CO_2 is the carbon and oxygen source for glucose molecule.

4. State the role of CO_2 in photosynthesis.

Ans. Role of CO_2 in photosynthesis:

- CO_2 is the raw material used in Calvin cycle of photosynthesis.
- It is fixed by the enzyme Rub is CO to produce glucose.
- Each CO_2 molecule contributes one carbon atom to sugar.
- Without CO_2, no carbohydrate formation can occur.
- It is the carbon source for building plant biomass.

5. Define electron transport chain.

Ans. Electron transport chain:

- The ETC is a series of protein complexes located in membrane.
- Electrons pass through these complexes and release energy.
- This energy is used to pump protons and create a proton gradient.
- In Chloroplasts, it leads to ATP and NADPH formation.
- In mitochondria, it results in ATP production via oxidative phosphorylation.

6. What do you mean by glycolysis?

Ans. Glycolysis:

- Glycolysis is the first step of cellular respiration, occurring in the cytoplasm.
- It breaks down one glucose molecule into two pyruvic acid molecule.
- Net gain of 2 ATP and 2NADH molecules occurs.
- It does not require oxygen.
- It prepares glucose for further breakdown in mitochondria.

7. What is the main structural difference between chlirophyII-a and chlorophyII-b?

Ans. ChlorophyII'a' and ChlorophyII 'b':

ChlorophyII'a'	ChlorophyII 'b'
• ChlorophyII a has methyl group (-CH_3) • Molecular formulae is $C_{55}H_{72}O_5N_4Mg$ • It is blue-green (BG) in colour. • It takes part directly in the light-dependent reaction which converts solar energy to chemical energy. • It is found in all photosynthesis organisms except photosynthesis bacteria. • Chlorophyll a itself exists in several forms differing slightly in their red absorbing peake.g.670, 680,690,700nm.	• ChlorophyII b has carbonyl group (-CHO). • Molecular formula is $C_{55}H_{70}O_6N_4Mg$ • It is yellow-green in colours(YG) • ChlrophyII b is found along with chlorophyII a in all green plant and green algae. • It does not directly involve in photosynthesis.

8. How can a cell synthesis ATP through substrate-level phosphorylation?

Ans. Synthesis ATP through substrate-level phosphorylation:

- ATP is formed by the direct transfer of a phosphate group to ADP from a phosphorylated substrate.

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- This occurs during glycolysis and the kreb's cycle.
- It does not require oxygen or electron transport chain.
- It is different from oxidative phosphorylation, which involves membrane.
- Example: Conversion of phosphoenolpyruvate or pyruvate by pyruvate kinase.

9. Can pyruvic acid enter Krebs cycle as such? If not, what changes are made to it before Krebs cycle?

Ans. Entrance of pyruvic acids in to Krebs cycle:

- No, pyruvic acid cannot directly enter in the Krebs cycle.
- It must be converted into acetyl-CoA by oxidative decarboxylation.
- The enzyme involved is the pyruvate dehydrogenase complex.
- Acetyl-CoA then enters the Krebs cycle.

10. Differentiate between C-3 and C-4 pohotosynthesis.

Ans. C_3 Plants and C_4 Plants:

C_3 Plants	C_4 Plants
• First stable product is a 3-carbon compound (3-PGA). • Occurs in mesophyll cells. • Less efficient in hot, dry conditions.	• First product is a 4-carbon compound (oxaloacetate). • CO_2 fixation occurs in mesophyII, Calvin cycle in bundles sheath cells. • More efficient in high light and temperature.