Class-11th- Test
PHOTOSYNTHESIS IN HIGHER PLANTS

M.M-35 **TIME-1.5 HR**

SECTION A
Multiple Choice Questions **[1X 10=10]**

1. Which scientist showed that the green substances in plant (chlorophyll) is located in special bodies (chloroplast) within plant cells?

(A) Julius von Sachs (B) Cornelius van Niel (C) T.W. Engelmann
(D) Jan lngenhousz

2. The empirical equation representing the total process of photosynthesis for oxygen evolving organisms was given by

(A) $6CO_2 + 12H_2O \xrightarrow{Light} C_6H_{12}O_6 + 6HO_2 + 6O_2$
(B) $6CO_2 + 6H_2O \xrightarrow{Light} C_6H_{12}O_6 + 6O_2$
(C) $CO_2 + H_2O \xrightarrow{Light} [CH_2O] + O_2$
(D) $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$

3. Bacterial photosynthesis differs from that of higher plants in

(A) Not liberating Oxygen (B) Non-requirement of light
(C) Non-fixation of energy (D) Requirement of host organism

4. Assertion: Accessory pigments enable a wider range of wavelength of incoming light to be utilised for photosynthesis.
Reason: Accessory pigments also protect chlorophyll *a* from photo-oxidation.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true, but reason is not the correct explanation of the assertion.
(C) If assertion is true, but reason is false.
(D) If both assertion and reason are false.

5. Assertion: Stroma lamellae have both PS I and PS II but the membrane of grana lack PS II as well as NADP reductase.
Reason: Cyclic photophosphorylation can also occur when only light of wavelength below 680 nm is available for excitation of chlorophyll molecule.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true, but reason is not the correct explanation of the assertion.
(C) If assertion is true, but reason is false.
(D) If both assertion and reason are false.

6. In C_3 plants, first stable product of photosynthesis during dark reaction is
(A) PGA (B) PGAL (C) RuBP (D) Oxalo-acetic acid

7. For synthesis of a molecule of glucose, the requirement of ATP and NADPH is respectively
(A) 15 and 10 (B) 12 and 18 (C) 12 and 6 (D) 18 and 12

8. Pigment system I performs independently
(A) Non-cyclic photophosphorylation
(B) Cyclic photophosphorylation
(C) Oxidative phosphorylation
(D) Photolysis

9. Which is not an accessory pigment?
(A) Carotene (B) Xanthophyll (C) Chlorophyll a
(D) Chlorophyll b

10. A possible location of the cyclic photophosphorylation is

(A) Grana (B) Stroma (C) Stroma lamellae
(D) Thylakoid

SECTION – B **[2X3= 6]**

11. Who worked on finding the reactions of C3 cycle & what he used for studying it ?

12. Compare Cyclic & Non-Cyclic Phosphorylation.

13.Write short note on Kranz Anatomy.

SECTION-C **[3X 3= 9]**

14. Who gave the 1st action spectrum ? Explain his experiment & also mention his observations.

15. Draw Calvin cycle in detail . Also write the balance sheet of energy expenditure to form 1 molecule of glucose.

16. What was the contribution of Cornelius van Neil to the understanding of photosynthesis. Explain.

SECTION-D **[5X1= 5]**

17. Highlight the differences bw C3 & C4 plants.

CASE STUDY **[1X5= 5]**

18. Photosynthesis is under the influence of several factors, both internal (plant) and external. The plant factors include the number, size, age and orientation of leaves, mesophyll cells and chloroplasts, internal CO2 concentration and the amount of chlorophyll.

When several factors affect any biochemical process, Blackman's (1905) Law of Limiting Factors comes into effect.

Light quality, light intensity and the duration of exposure to light these light factors affects photosynthesis.
Carbon dioxide is the major limiting factor for photosynthesis. The concentration of CO2 is very low in the atmosphere (between 0.03 and 0.04 per cent). Increase in concentration upto 0.05 per cent can cause an increase in CO2 fixation rates; beyond this the levels can become damaging over longer periods.

1.) As per low of limiting factors, If a chemical process is affected by more than one factor, then its rate will be determined by the factor which is _____.

a) Nearest to its minimal value

b) Nearest to its maximal value

c) Nearest to its optimal value

d) None of the above

2) In photosynthesis, increase in incident light beyond optimum level causes the _____

a) Breakdown of chlorophyll and increase in photosynthesis.

b) Activation of chlorophyll andincrease in photosynthesis.

c) Breakdown of chlorophyll and decrease in photosynthesis.

d) Breakdown of chlorophyll and decrease in photooxidation.

3.) What concentration of CO2 is present in our atmosphere or surrounding?

4.) Give the Blackman's (1905) Law of Limiting Factors.

5.) How C3 and C4 plants respond to CO2 concentration?