Ans:- Photosynthesis → 1. It is the most important physio-biochemical process on which entire life on this planet (earth) depends.

2. Only the green plants are capable to utilize radiant energy (light) ~~in producing~~ and can produce carbon containing compound (organic) from CO_2 & H_2O ~~by illuminated green cells~~.

3. Hence the formation of ~~food~~ organic compound (glucose) from CO_2 & H_2O by illuminated green cells is known as Photosynthesis.

4. Here Oxygen is the by-product which comes from H_2O and not from CO_2.

5. The over all reaction of Photosynthesis is as follows

$$6CO_2 + 6H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light}} C_6H_{12}O_6 + 6O_2.$$

6. It is an oxidation - reduction process in which water is oxidised and CO_2 is reduced to Carbohydrate.

7. There are several evidences which show that there are two ~~distinct~~ different but interrelated phases ~~in~~ as

(i) Light Reaction
(ii) Dark Reaction.

(i) Light Reaction ; 1. It is known as Hill Reaction also as discovered by Hill (1937).

2. It takes place in granna of chloroplast.

3. Here the radiant energy (light) is absorbed by two pigment systems and $NADP.H_2$, ATP and Oxygen are produced.

4. Pigment System I ⇒ Consists of a group of pigment molecule which absorbs light above 680 mμ.

5. Pigment System II ⇒ It absorbs light below the wavelength of 680 mμ

6. Both of the systems are excited by photon to release electron

7. These electrons are accepted by electron acceptor and release electron. ~~This process is completed~~

Light Reaction takes places

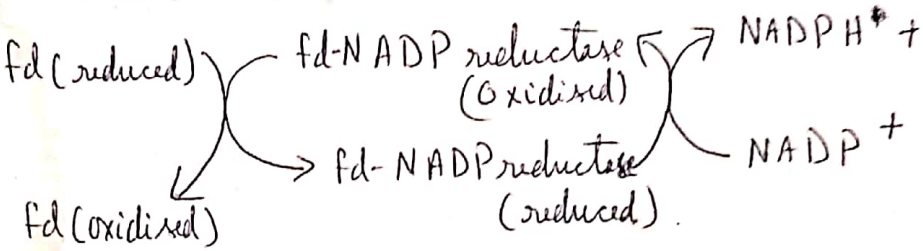
8. There are following aspects of Light Reaction.

(A) Photolysis of Water / Production of O_2 :-

$$2H_2O + 2A \text{ (Hydrogen Acceptor)} \xrightarrow[\text{Chloroplast}]{\text{Light}} 2AH_2 + O_2 \uparrow$$

(B) Formation of Assimilatory Powers: - Due to light electrons are released which ~~are utilized~~ helps in reduction of NADP and esterification of orthophosphate to form A.T.P.

(C) Reduction of NADP :- It is reduced by reduced ferredoxin with help of ~~flavop~~ flavoprotein enzymes, termed as Ferredoxin NADP reductase



Due Hence P.S. I is left in an oxidised state after reduction of ferredoxin. To maintain the continuity electron is supplied from one to another and finally from Water. The flow of electron takes place as shown in graphic representation of Light Reaction.

(D) Formation of ATP → The energy released during the transport of electrons are utilized in the formation of A.T.P. from ADP & iP. This ATP formation takes place in presence of light hence called as Photophosphorelation. It may be of following 3 Types as shown in the Diagrams.

(i) Non-Cyclic → Here the electron does not return to its place from where it has been stracted. One molecule of ATP & 2NADPH2 are produced during this cycle.

(ii) Cyclic → Here the electron comes to its origin point. Here 2 molecules are produced.

(iii) Pseudo Cyclic: As shown in diagram.

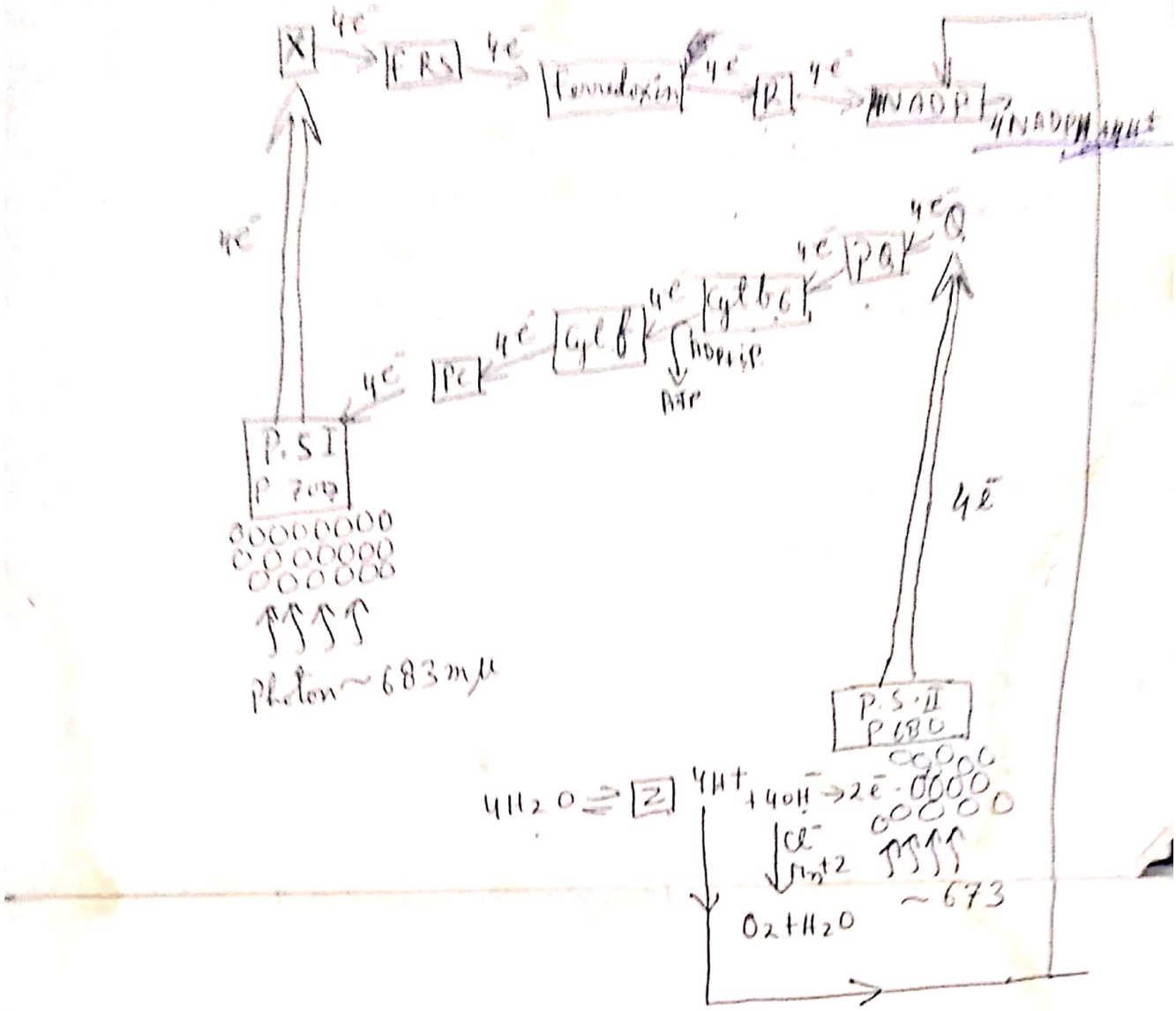


Diagram Showing Non-Cyclic Photophosphorylation

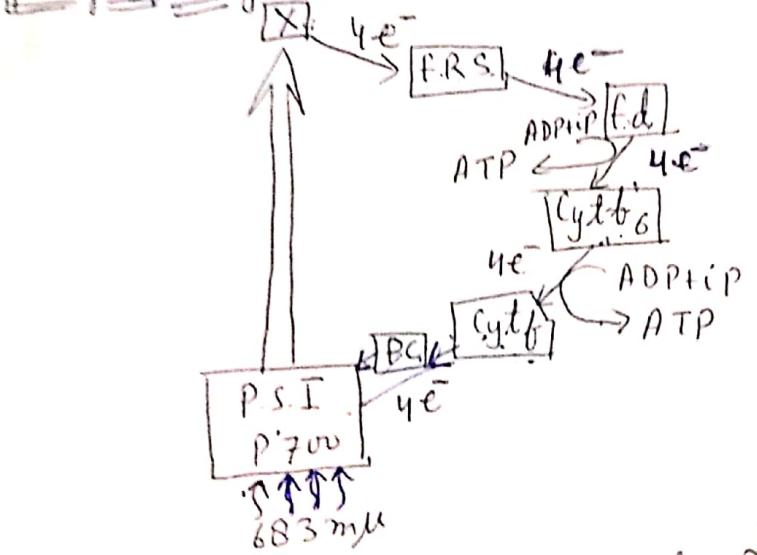


Diagram Showing Cyclic Photophosphorylation.

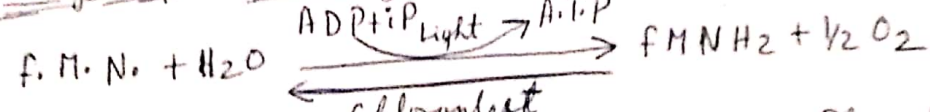


Diagram Showing ~~Non~~ Pseudo-Cyclic Phosphorylation

Significance :- 1. Oxygen produced during this ~~made~~ changed the environment of earth from ~~oxidising to reducing~~.
Reducing to Oxidising.

2. Now ~~almost~~ most of the life depends upon oxygen so ~~also~~ in absence of this one cannot think about life.

3. The $NADPH_2$ & ATP produced ~~during~~ here are utilized in reduction of CO_2 during Dark Reaction.