



# BIOLOGY

## BOOKS - BAL BHARTI

### PHOTOSYNTHESIS

#### Can You Recall

1. Why energy is essential in different life processes?



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2. How do we get energy?



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## Can You Tell

1. Tomatoes, carrots and chillies are red in colour due to the presence of pigments. Name the pigment.



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2. What made Hill to perform his experiment?



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3. Distinguish between

action spectrum and absorption spectrum.



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4. Draw well labelled diagram of chloroplast.



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5. How chlorophyll-a is excited? Show it with diagram.



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6. Describe Calvin cycle.



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7. Draw a flow chart of non-cyclic photophosphorylation.



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8. Xerophytic plants survive in high temperature.



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9. Summarise photosynthetic reaction.



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10. Compare  $C_4$  and CAM plants.



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Use Your Brain Power

1. All life on earth is bottled solar energy.

Justify.



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2. The photosynthetic lamellae taken out from a chloroplast and suspended in a nutrient medium in the presence of  $CO_2$  and light. Will they synthesize sugar or not?



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## Think About It

1. Large number of gas bubbles are evolved during day time in a pond of water.



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2. Does moonlight support photosynthesis?



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**Exercise Choose Correct Option**

1. A cell that lacks chloroplast does not

A. evolve carbon dioxide



B. liberate oxygen

C. require water

D. utilize carbohydrates.

**Answer:**



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2. Energy is transferred from the light reaction step to the dark reaction step by.

A. chlorophyll

B. ADP

C. ATP

D. RuBP

**Answer:**



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**3. Which one is wrong in photorespiration.**

A. It occurs in chloroplasts

B. It occurs in day time only

C. It is characteristic of  $C_4$  -plants

D. It is characteristic of  $C_3$  -plants

**Answer:**



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4. Non-cyclic photophosphorylation differs from cyclic photophosphorylation in that the form

A. involves only PS I

B. Include evolution of  $O_2$

C. involves formation of assimilatory power

D. both 'b' and 'c'

**Answer:**



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5. For fixation of 6 molecules of  $CO_2$  and formation of one molecule of glucose in Calvin cycle, requires.

A. 3 ATP and 2  $NADPH_2$

B. 18 ATP and 12  $NADPH_2$

C. 30 ATP and 18  $NADPH_2$

D. 6 ATP and 6  $NADPH_2$

**Answer:**



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**6.** In maize and wheat the first stable products formed in mesophyll and in bundle sheath cells respectively are.

A. OAA and PEPA

B. OAA and OAA

C. OAA and 3PGA

D. 3PGA and OAA

**Answer:**



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7.  $C_4$  pathway is also called as dicarboxylation pathway because.

A. RuBP +  $CO_2$  in bundle sheath cells

B. PEPA +  $CO_2$  in mesophyll cells

C. both 'a' and 'b'

D. It occurs in presence of intensive light

**Answer:**



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**8.** The head and tail of chlorophyll are made up of.

- A. porphyrin and phytin respectively
- B. pyrrole and tetrapyrrole respectively
- C. prophyrin and phyrol respictively
- D. tetrapyrole and pyrrole respectively

**Answer:**



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**9.** The net results of photo-oxidation of water is release of.



A. electron and proton

B. proton and oxygen

C. proton, electron and oxygen

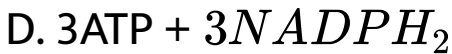
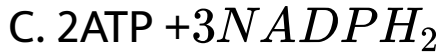
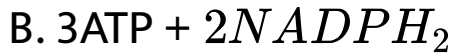
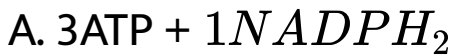
D. electron and oxygen

**Answer:**



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**10.** For fixing one molecule of  $CO_2$  in Calvin cycle, are required.



**Answer:**



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**11.** In presence of high concentration of oxygen, RuBP carboxylase converts RuBP to.

A. Malic acid and PEP

B. PGA and PEP

C. PGA and malic acid

D. PGA and phosphoglycolate

**Answer:**



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**12.** The sequential order in electron transport from PS-II and PS-I of photosynthesis is.

A. FeS, PQ, PC and Cytochrome

B. FeS, PQ, Cytochrome and PC

C. PQ, Cytochrome, PC and FeS

D. PC, Cytochrome, FeS, PQ

**Answer:**



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**Exercise Answer The Following Questions**

1. Describe the light dependent steps of photosynthesis. How are they linked to the dark reaction?



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2. What are the steps that are common to  $C_3$  and  $C_4$  photosynthesis?



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3. Are the enzymes that catalyse the dark reactions of carbon fixation located inside the thylakoids or outside the thylakoids?



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4. Calvin cycle consists of three phases, what are they? Explain the significance of each of them.



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5. Why are the plants that consume more than the usual 18 ATP to produce 1 molecule of glucose favoured in tropical regions?



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6. What is the advantage of having more than one pigment molecule in a photocentre?



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7. Explain why chlorophyll appears green in reflected light and red in transmitted light. Explain the significance of these phenomena in terms of photosynthesis.



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8. Why is photosynthesis considered to be the most important process in the biosphere?



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9. Why is photolysis of water accompanied with non-cyclic photphosphorylation?



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10. In  $C_4$  plants, why is  $C_3$  pathway operated to bundle sheath cells only?



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**11.** What would have happened if  $C_4$  plants did not have Kranz anatomy?



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**12.** Why does RuBisCo carry out preferential carboxylation than oxygenation in plants.



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**13.** What would happen if plants did not have accessory pigments?



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**14.** How can you identify whether the plant is  $C_3$  or  $C_4$ ? Explain/Justify.



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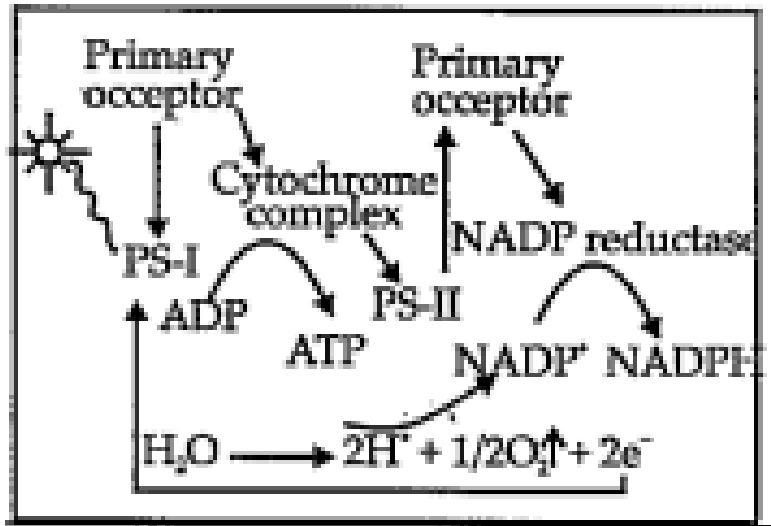
**15.** In  $C_4$  plants, bundle sheath cells carrying out Calvin's cycle are very few in number. Then also  $C_4$  plants are highly productive. Explain.



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**16.** Is there something wrong in following schematic presentation? If yes, correct it so

that photosynthesis will be operated.



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