



BIOLOGY

BOOKS - PEARSON IIT JEE

FOUNDATION

LIFE PROCESSES IN PLANTS

Quick Recap

1. Plants are autotrophic. Can you think of some plants that are partially heterotrophic?



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2. Based on the balanced chemical equation for photosynthesis and the complex biochemical reactions involved in the process, answer the following questions.

(a) How many atoms of carbon are fixed per one molecule of glucose formed?

(b) How many Calvin cycles are involved for the formation of one molecule of glucose?

(c) What is the total number of NADP and ATP required for the entire process?

(d) How can six molecules of water give six oxygen molecules at the end?



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3. Assertion:- Biosynthetic phase of photosynthesis is also termed as dark reaction.

Reason :- Biosynthetic phase is not directly dependent on light but it is supported by products of light reactions.



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4. The phenomenon of guttation indicates that root pressure causes passive mode of absorption and transport. Justify.



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5. How is the phenomenon of bleeding different from that of guttation?



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6. What is wilting ?



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7. How is the rate of transpiration affected by intensity of light and temperature?



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8. Give the reasons for the following statements :

Cuticle reduces the rate of transpiration.



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Test Your Concepts Fill In The Blanks

1. The activities that are essential for living organisms are called _____.



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2. In _____ organisms, the life processes take place within one cell.



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3. The sum total of the process by which an animal or a plant takes in and utilizes food substances is known as _____ .



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4. The organisms that can produce their own food are known as _____ .



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5. The organisms that produce their food by using energy from chemical reaction and not by using sunlight are known as _____ .



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6. The phase of respiration that takes place in cytoplasm of the cell is called _____ .



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7. The respiration that takes place in the presence of oxygen is known as _____.



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8. The organisms that depend on anaerobic respiration for the energy are called _____ or _____ organisms.



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9. Mangrove trees have the adapted root called _____ for the purpose of breathing.



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10. In older portion of roots and woody stems, the exchange of gases takes place through small openings called _____.



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Test Your Concepts Select The Correct Alternatives

1. Which of the following element is not found in a molecule of chlorophyll?

A. Magnesium

B. Zinc

C. Carbon

D. Oxygen

Answer: C





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2. Unicellular organism like Amoeba is an example of _____ .

A. Chemoautotroph

B. Photoautotroph

C. Heterotroph

D. Both (a) and (b)

Answer: C



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3. Which among the following is not a pigment present in thylakoids?

A. Carotene

B. Chlorophyll-a

C. Chlorophyll-b

D. NADP

Answer: D



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4. What is the function of stomata?

A. Trapping solar energy.

B. Exchange of gases like carbon dioxide and oxygen.

C. Preparation of food.

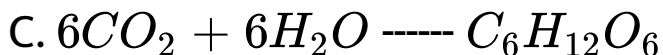
D. Both (b) and (c)

Answer: B



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5. Identify the correct equation which represents photosynthesis.



Answer: A



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6. Identify the reaction that does not occur during the light phase.

A. Absorption of light by chlorophyll

B. Photolysis of water

C. Reduction of NADP

D. Formation of sugar

Answer: D



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7. Identify the ions responsible for the absorption of light by chlorophyll.

A. Magnesium

B. Calcium

C. Chloride

D. Hydroxide

Answer: A



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8. Which of the following steps involves reduction taking place in the absence of light?

A. Formation of NADPH₂

B. Addition of carbon to RUBP

C. Formation of glucose from PGA

D. Regeneration of RUBP

Answer: C



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9. How many Calvin cycles are involved in the synthesis of one glucose molecule by photosynthesis?

A. 3

B. 1

C. 4

D. 6

Answer: D



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10. Release of oxygen during photosynthesis takes place in which of the following steps?

A. Photophosphorylation

B. Reduction of NADP

C. Carbon fixation

D. Photolysis of water

Answer: D



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11. Under which of the following conditions, the absorption of water mainly takes place by active transport?

(i) Low humidity

(ii) Low temperature

(iii) High temperature

(iv) High humidity

A. (i), (ii)

B. (ii), (iv)

C. (i), (iii)

D. Only (iii)

Answer: C



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12. Match the entries of Column 1 with those of Column 2.

Column 1	Column 2
A. Chloroplasts	(i) Light reactions
B. Photophosphorylation	(ii) Transportation of water
C. Calvin reactions	(iii) Stroma
D. Xylem	(iv) Formation of sugar

A.

$$A \rightarrow (iii), B \rightarrow (i), C \rightarrow (iv), D \rightarrow (ii)$$

B.

$$A \rightarrow (ii), B \rightarrow (i), C \rightarrow (iv), D \rightarrow (iii)$$

C.

$$A \rightarrow (iv), B \rightarrow (i), C \rightarrow (iii), D \rightarrow (ii)$$

D.

$$A \rightarrow (i), B \rightarrow (ii), C \rightarrow (iii), D \rightarrow (iv)$$

Answer: A



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13. The site for both aerobic and anaerobic respiration is _____ .

A. Cytoplasm

B. Xylem

C. Phloem

D. Chloroplast

Answer: A



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14. In which process pyruvic acid undergoes complete oxidation and produces carbon dioxide and water?

- A. Excretion
- B. Anaerobic respiration
- C. Aerobic respiration
- D. Transportation

Answer: C



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15. In which part of the cell, does Kreb's cycle take place?

- A. Cytoplasm
- B. Mitochondria
- C. Chloroplast
- D. Both (a) and (b)

Answer: B



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16. Identify the organism in which pyruvic acid gets converted to lactic acid in the absence of oxygen.

A. Amoeba

B. Paramecium

C. Fungus

D. Vertebrate animals

Answer: D



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17. The conversion of pyruvic acid into lactic acid or ethanol in anaerobic respiration takes place in which organelle?

A. Mitochondria

B. Cytoplasm

C. Chlorophyll

D. Thylakoids

Answer: B



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18. The water droplets formed on the leaf margins in the early mornings under high humid conditions is considered as which phenomenon?

A. Condensation

B. Transpiration

C. Guttation

D. Bleeding

Answer: C



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19. Latex in rubber plants oozes out from the stems due to which phenomenon?

- A. Bleeding
- B. Guttation
- C. Transpiration
- D. Condensation

Answer: A



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20. Which of the following steps in cellular respiration is associated with release of maximum number of ATP molecules?

A. Glycolysis

B. Krebs's cycle

C. Oxidative phosphorylation

D. Reduction of NADP

Answer: C



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21. Match the entries of Column 1 with those of Column 2.

Column 1	Column 2
A. Stomata	(i) Anaerobic respiration
B. Mangrove trees	(ii) Intake of CO ₂
C. Woody stem	(iii) Pneumatophores
D. Yeast	(iv) Lenticels

A.

$A \rightarrow (ii), B \rightarrow (iii), C \rightarrow (iv), D \rightarrow (i)$

B.

$A \rightarrow (ii), B \rightarrow (i), C \rightarrow (iv), D \rightarrow (iii)$

C.

$$A \rightarrow (iv), B \rightarrow (i), C \rightarrow (iii), D \rightarrow (ii)$$

D.

$$A \rightarrow (i), B \rightarrow (ii), C \rightarrow (iii), D \rightarrow (iv)$$

Answer: A



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Mastering The Concepts Knowledge And Understanding

1. Differentiate between autotrophs and heterotrophs.



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2. How are autotrophs classified?



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3. Define photosynthesis.



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4. Name the different parts of chloroplasts.



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5. Draw the structure of chloroplast.



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6. Explain the main role of stomata in flower.



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7. What are the different phases of photosynthesis?



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8. Mention the different steps of reactions that take place during the light phase of photosynthesis.



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9. Write a short note on photophosphorylation.



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10. What are the factors that affect the rate of photosynthesis ?



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11. Explain about the nutrition in a unicellular animal which throws the undigested food by the rupture of cell membrane.



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12. Where do Hill's reactions take place in the chloroplasts?



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13. Write a short note on the function of the site that is used for photosynthesis.



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14. Identify the reaction that takes place in stroma and mention the major steps that are involved in it.



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15. Draw the anatomy of the different pathways by which water and minerals get transported in the root. Also label it.



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16. Identify the cell that helps in the transportation of food in the plants and explain the process in brief.



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17. Explain the mode of transportation of water from xylem to phloem.



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18. Differentiate:

(a) Respiration and transpiration.

(b) Aerobic and anaerobic respiration



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19. Define excretion.



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20. Write a short note on anaerobic respiration.



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21. Explain in brief about the source of energy that is formed during respiration.



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22. Mention the factors that affect transpiration.



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23. Name the stage which is common for both the types of respirations.



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24. How is transpiration minimized in crassulaceae plant?



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25. Name the process by which certain micro organisms like yeast fulfil their energy requirement.



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26. Explain the reason why some trees in the coastal swamps have their roots emerged outward.



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Mastering The Concepts Application And Analysis

1. What are the respective roles of chlorophyll-a and chlorophyll-b in the process of photosynthesis?



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2. Explain the mechanism of absorption of light by chlorophyll.



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3. Chlorophyll also contains accessory pigment called carotenoids in addition to the primary pigment chlorophyll. How does it help the plant?



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4. Clear division of labor is seen within a chloroplast. Give reason.



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5. What is the role of magnesium in the metabolism of plant?



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6. Generally, the lower leaves of the tree turn yellow while the leaves in the upper branches remain green. Give reason.



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7. Glucose is the main product of photosynthesis. With reference to this statement, answer the following questions.

(a) Leaves are found to possess very less or no glucose in them when they are tested. Justify this contradiction.

(b) In which form is carbohydrate translocated through phloem tissue in the plant? Why?



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8. The water and minerals are usually transported in the roots by apoplast pathway up to endodermis, but later transported by symplast pathway. Give reason.



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9. Can plants survive in salt water? Give reason in support of your answer.



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10. The energy released in anaerobic respiration is much less than aerobic respiration. Give reason.



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11. ATP-ADP cycle is the basis of metabolism.

Comment on this statement with respect to the metabolism in plants.



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12. Stomata are abundant on the under surface of the leaves. Give reason.



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1. Assertion (A): Chlorophyll is green in colour.

Reason (R): Chlorophyll absorbs green light from visible spectrum of light.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer: C



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2. Assertion (A): The rate of photosynthesis increases with increase in light intensity only up to a point.

Reason (R): Photosynthesis includes dark phase

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer: A



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3. Assertion (A): Leaves of different plants possess variable shades.

Reason (R): Chlorophyll contains complex

structure with magnesium as the central atom.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer: B



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4. Assertion (A): The cells in mesophyll are loosely packed with air spaces.

Reason (R): Photosynthesis takes place even when stomata are closed.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer: A



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5. Assertion (A): Water molecules move from xylem to phloem during transportation process.

Reason (R): The source of energy for this process comes from the respiration in the form of ATP.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer:



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6. Assertion (A): In *Cuscuta*, stomata remain open during night.

Reason (R): *Cuscuta* is a hydrophyte.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer: C



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7. Assertion (A): Physical exercise is usually followed by muscular pain.

Reason (R): Anaerobic respiration results in the production of less number of ATP molecules

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer: B



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8. Assertion (A): In prokaryotes, anaerobic respiration takes place

Reason (R): Prokaryotes possess indistinct nucleus.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer:



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9. Assertion (A): In woody plants, cuticular transpiration takes place.

Reason (R): In woody plants, epidermis is replaced by cork cambium

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer: D



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10. Assertion (A): Kreb's cycle takes place in the cristae of mitochondria

Reason (R): Cristae possess DNA and ribosomes.

- A. Both A and R are true and R is the correct explanation for A.
- B. Both A and R are true but R is not the correct explanation for A.
- C. A is true and R is false.
- D. A is false and R is true.

Answer: C



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Assessment Tests Fill In The Blanks

1. Nutrition is classified into _____ and _____ nutrition.



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2. The mode of nutrition in which an organism depends on other organism for their food is known as _____ .



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3. _____ are green-coloured plastids.



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4. _____ are the stacks of membrane bound flattened sac-like structures.



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5. _____ of the guard cell closes the stomatal aperture.



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6. During the process of glycolysis, glucose gets converted to a compound known as _____ .



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Assessment Tests Select The Correct Alternatives

1. Identify the site for the occurrence of dark reactions in chloroplast.

A. Carotene

B. Stroma

C. Thylakoids

D. Double membrane

Answer: B



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2. Identify the cells that help in the opening of stomatal pores for the entry of carbon dioxide during daytime.

A. Palisade cells

B. Guard cells

C. Mesophyll cells

D. Xylem

Answer: B



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3. Which is the primary site for the absorption of light

- A. Palisade cells
- B. Guard cells
- C. Mesophyll cells
- D. Xylem

Answer: A



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4. What is the purpose of large surface area of the leaf?

A. Helps in diffusion of carbon dioxide for the site of photosynthesis.

B. Facilitates the movement of the chloroplast.

C. Helps in the effective absorption of the sunlight.

D. Creates space for the efficient exchange of the gases.

Answer: C



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5. Identify the internal factor responsible for photosynthesis.

A. Light

B. Carbon dioxide

C. Chlorophyll content

D. Temperature

Answer: C



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6. Identify the plants that use the total body surface for respiration purpose.

A. Chlamydomonas

B. Spirogyra

C. Mangrove trees

D. Both (a) and (b)

Answer: D



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Assessment Tests True Or False

1. Transpiration is directly proportional to humidity.



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2. Transpiration through waxy coating over epidermal layers of leaves is known as lenticular transpiration.



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3. The decrease in concentration of potassium ions leads to increase in turgidity of the guard cells.



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4. Calvin reactions take place in grana of the chloroplast.



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5. During night, the plants release major proportion of carbon dioxide.



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1. Cyanobacteria: _____ : : Paramoecium :
Heterotrophs.



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2. Grana : _____ : : Stroma : Calvin reactions.



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3. Surface respiration: Chlamydomonas:
Mangrove trees: _____.



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4. Lenticels: lenticular respiration: : _____ :
Cuticular respiration.



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[Assessment Tests Answer The Following Questions](#)

1. Mention the disadvantages of transpiration in plants.



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2. What do you know about sunken stomata?



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3. Name the different types of transpiration.



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4. What is the effect of temperature on photosynthesis?



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5. How is the balance of carbon dioxide and oxygen maintained in the atmosphere?



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6. What are the different pathways by which water and minerals are transported from root to the xylem?



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7. What are the different mechanisms that are involved in ascent sap?



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8. Do the plants on the higher altitudes undergo less transpiration? Explain.



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9. Explain the different types of transpiration.



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10. Respiration is a slow process in plants.



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11. Glycolysis is common for both aerobic and anaerobic respiration.



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12. Define nutrition and mode of nutrition.



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13. Define cellular respiration.



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14. What is the chemical reaction that takes place in yeast? Mention the condition.



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