



# BIOLOGY

## BOOKS - CENGAGE BIOLOGY

### NUTRITION IN PLANTS AND ANIMALS

#### Question

1. Name the organelle in which photosynthesis occurs. Name the pigment present in plants which can absorb solar energy.



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2. The first step of photosynthesis is

A. ionisation of water

B. attachment of  $CO_2$  to 5-carbon sugar.

C. excitation of electron of chlorophyll by a  
photon of light

D. formation of ATP

**Answer:**



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3. To synthesise one glucose molecule, the Calvin cycle uses \_\_\_\_ molecules of  $CO_2$  , \_\_\_\_ molecules of ATP, and \_\_\_\_ molecules of NADPH.



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4. Where do the light and dark reactions take place ?



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5. Why is the rate of photosynthesis more during a bright sunny day as compared to a cloudy day ?



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## Mandatory Exercise Exercise Set I

1. Define the Photosynthesis



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2. Define the Photophosphorylation



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3. Write the full form of NADP and ADP.



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4. Given below are certain biological statements which are incomplete and hence

incorrect. Re-write the correct form of the statements by inserting suitable word/words at the right place. Do not delete any word already given in the statement. Underline the inserted word/words.

(a) Destarching a plant means removing the starch from the plant.

(b) The splitting of water molecules into hydrogen ions and hydroxyl ions is termed photolysis.



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5. It is advisable not to sleep under a tree at night. Give reason.



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6. What is the specific function of light energy in the process of photosynthesis?



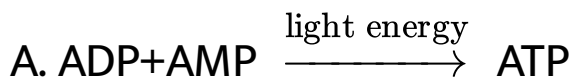
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7. Write the chemical equation of the photosynthetic process.



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8. Which one of the following concerns photophosphorylation?



**Answer: B**





9. Photosynthesis is maximum in

- A. green light
- B. blue followed by red light
- C. red followed by blue light
- D. blue light

**Answer: C**



10. \_\_\_\_\_ proposed the 'law' of limiting factors.



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11. Mention the internal factors affecting the rate of photosynthesis.



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**Mandatory Exercise Exercise Set II**

1. Arrange the following parts of the digestive system in the order in which food passes through on the way from the mouth to the anus.

- (a) pharynx ,(b) pyloric sphincter , (c )rectum ,  
(d) stomach , (e ) caecum , (f) small intestine ,  
(g) colon , (h) oesophagus

Mouth				
				Anus



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2. Which acid is secreted by the cells of the gastric glands in the stomach?

A. Hydrochloric acid

B. Sulphuric acid

C. Nitric acid

D. Hydroiodic acid

**Answer: A**



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**3. (a)** Colour the diagram of a villus in the small intestine using the colours suggested below:

(i) Outer layer of columnar epithelium - yellow

(ii) Artery - red

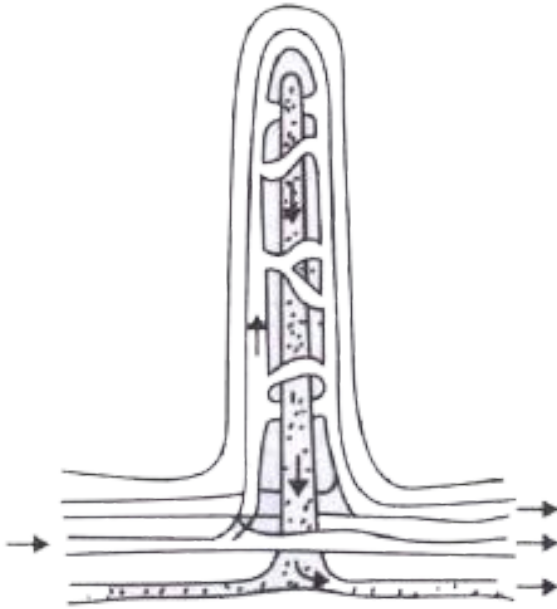
(iii) Vein - blue

(iv) Lymphatic vessel - green

(v) Capillaries - red turning to blue

(b) Also label the lacteal, lumen of the gut,

artery, vein, lymphatic vessel in the diagram.



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4. Define the ingestion



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5. Define the egestion



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6. Define the extracellular digestion



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7. Define the absorption



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## 8. Complete the digestion table

Organ	Secretion	Enzyme	Nutrient	Product after digestion
Stomach		Pepsin		Proteoses
	Pancreatic juice	Tearing	Protein	Peptides and amino acids

Organ	Secretion	Enzyme	Nutrient	Product after digestion
Ileum		Lipase		
Ileum		Sucrase		
Colon	None	None	None	



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## 9. State the function of incisor







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**10.** State the function of tongue



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**11.** State the function of pancreas



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**12.** State the function of HCl





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**13.** State the function of oesophagus



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**14.** Give the dental formula of man both for milk and permanent teeth.



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**15.** Differentiate between dentine and enamel



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**16.** Differentiate between mechanical and chemical digestion



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**17.** The following paragraph is related to assimilation of food by our body. Complete the

paragraph by selecting suitable words from those given in the box. You can use the term only once.

Hepatic portal, excess glucose, subcutaneous, amino acids, deamination, fatty acids, glycerol, glycogen, proteins, lymphatic, absorbed, carried, empties.

The foods digested and \_\_\_\_\_ by the gut are transported in two ways. Simple sugar, amino acids, vitamins and minerals, etc., are \_\_\_\_\_ to the liver by the \_\_\_\_\_ vein. The liver converts any \_\_\_\_\_ into insoluble which can be temporarily stored. The circulate in the body and they serve as building blocks of \_\_\_\_\_. The amino acids cannot be stored. Any excess amino

acids are broken down in the liver by a process called \_\_\_\_\_ in which the nitrogen-containing amino group is removed and converted into urea for excretion. \_\_\_\_\_ and \_\_\_\_\_ absorbed by the gut are transported mainly through the intestinal system. The thoracic duct of the lymphatic system \_\_ into large veins carrying blood to the heart. Some fats are used in the synthesis of certain compounds in the body cells. The excess quantity of fat gets deposited chiefly below the skin as \_\_\_\_\_ fat.



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**18.** Provide scientific terms for the following:

When all the teeth are dissimilar \_\_\_\_\_



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**19.** Provide scientific terms for the following:

The organ in which bile is produced \_\_\_\_\_



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**20.** Provide scientific terms for the following:

The component of food on which lipase acts

-----



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**21.** Provide scientific terms for the following:

The part of the gut in which water is absorbed

-----



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**22.** Provide scientific terms for the following:

The enzyme which converts trypsinogen into

trypsin \_\_\_\_



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**23.** One should not talk during swallowing.

Give reason.



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1. Complete the crossword puzzle using the clues given below:

Across

3. Scientific name for fat and oil. [5]

6. These are used for chewing food. [5]

7. Intestine that absorbs water into bloodstream. [5]

9. Nutrient group containing meat, eggs and beans. [7]

11. Type of acid that makes up proteins. [5]

12. Hole through which faeces pass out of the body. [4]

13. Storage organ for faeces. [6]

15. Fingerlike projections of small intestine. [5]

17. Scientific name for fibre. [9]

19. Hydrochloric\_\_ is made in the stomach. [4]

20. Nutrient group containing sugar, starch and cellulose. [12]

21. Fluid in mouth. [6]

Down

1. Green chemical that breaks fats into smaller globules. [4]

2. The duodenum is the \_ part of the small intestine. [5]

4. Organ at back of mouth where both food

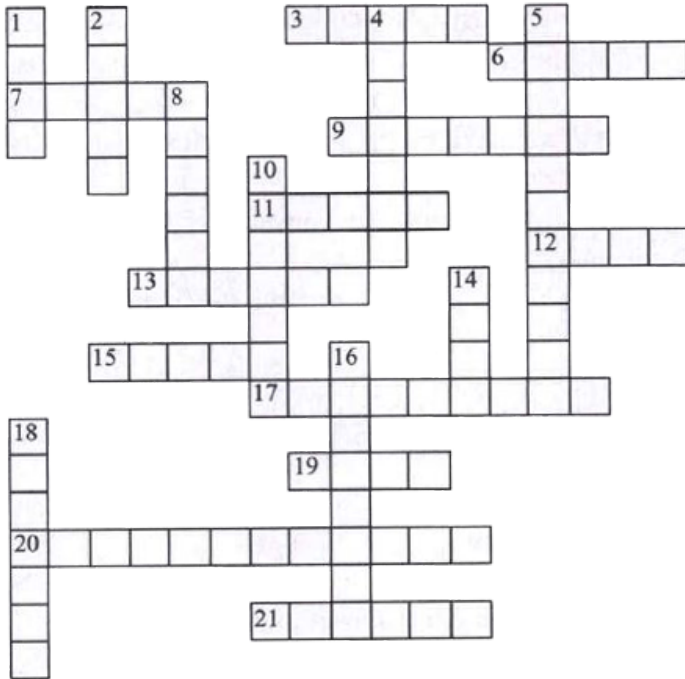
and air may pass. [7] 5. Muscular contractions of digestive tract. [11]

8. Chemical that breaks food into smaller particles .[6] 10.\_\_ juice is found in the stomach. [7]

14. Bladder that stores bile. [4]

16. Fats are broken down to fatty acids and \_\_  
[8]

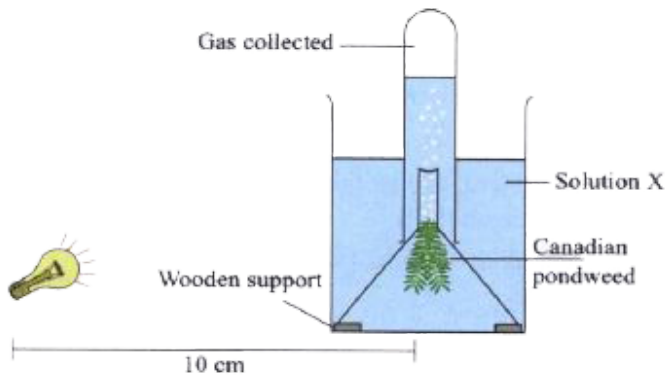
## 18. Example of simple sugar. [7]



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2. Diagram below depicts an experiment to find the effect of temperature on the rate of

photosynthesis. The average number of bubbles per minute at each temperature is given in the table.



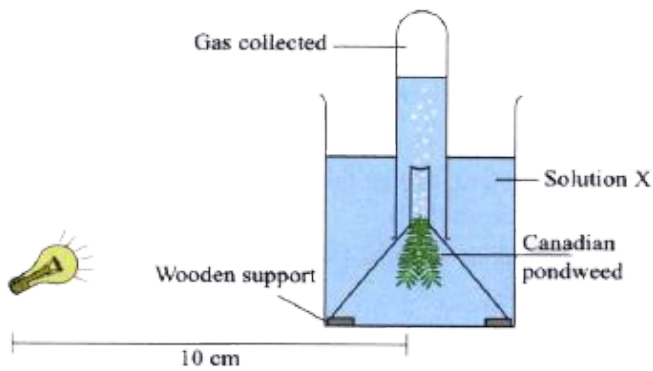
Temperature (°C)	Number of bubbles per minute
17	21
21	29
24	38
27	48
30	56
33	55
36	53
39	51
42	49

Plot a graph to show the relation between the rate of photosynthesis and temperature.



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**3.** Diagram below depicts an experiment to find the effect of temperature on the rate of photosynthesis. The average number of bubbles per minute at each temperature is given in the table.



Temperature ( $^{\circ}\text{C}$ )	Number of bubbles per minute
17	21
21	29
24	38
27	48
30	56
33	55
36	53
39	51
42	49

Describe and explain the change in rate of photosynthesis as the temperature is changed

(i) from  $17^{\circ}\text{C}$  to  $30^{\circ}\text{C}$ .

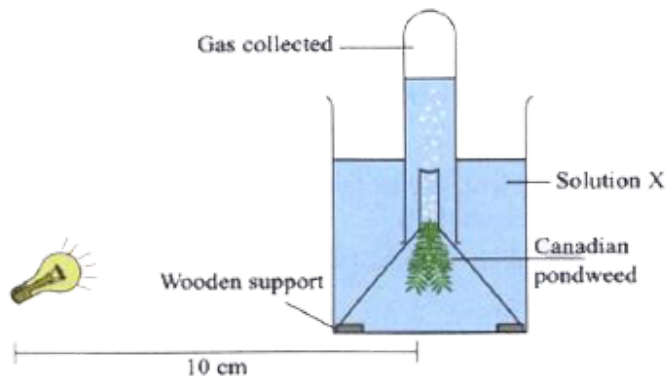
(ii) from  $33^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ .



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4. Diagram below depicts an experiment to find the effect of temperature on the rate of photosynthesis. The average number of bubbles per minute at each temperature is given in the table.





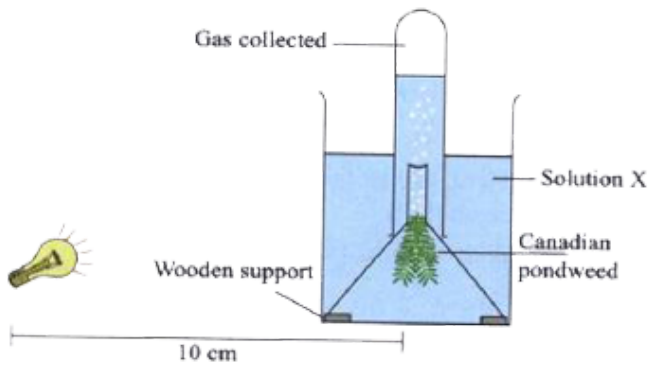
Temperature (°C)	Number of bubbles per minute
17	21
21	29
24	38
27	48
30	56
33	55
36	53
39	51
42	49

Why should the funnel be raised by wooden supports?



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5. Diagram below depicts an experiment to find the effect of temperature on the rate of photosynthesis. The average number of bubbles per minute at each temperature is given in the table.



Temperature (°C)	Number of bubbles per minute
17	21
21	29
24	38
27	48
30	56
33	55
36	53
39	51
42	49

(i) Name the gas collected.

(ii) What test would you do to identify the gas?

(iii) What is the importance of this gas to other organisms in the ecosystem?



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6. Match the following :

Column A	Column B
(a) Ingestion	(i) Transport of nutrients from lumen to blood
(b) Mechanical digestion	(ii) Enzymatic breakdown
(c) Chemical digestion	(iii) Elimination of faeces
(d) Absorption	(iv) Eating
(e) Defecation	(v) Chewing
	(vi) Churning
	(vii) Includes swallowing
	(viii) Segmentation and peristalsis



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7. Match the following :

Column A	Column B
(a) Gastrin	(i) Emulsifies fats
(b) Bile	(ii) Converts pepsinogen to pepsin
(c) Peptidase	(iii) Converts proteins into aminoacids
(d) Amylase	(iv) Stimulates secretion of HCl and pepsin
(e) Lipase	(v) Converts starch and glycogen into disaccharides
(f) Enterokinase	(vi) Activates trypsin secreted from pancreas
(g) HCl	(vii) Converts fats into fatty acids and glycerol



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8. Assertion. Gall bladder may develop small pebbles the gall stones, in it.

Reason. Cholesterol sometimes precipitates as crystals and combines with bile salts and pigments forming stones.

A. If both Assertion and Reason are true,

Reason is the correct explanation of Assertion.

B. If both Assertion and Reason are true

but Reason is not the correct explanation of Assertion.

C. If Assertion is true but Reason is false

D. If both Assertion and Reason are false.

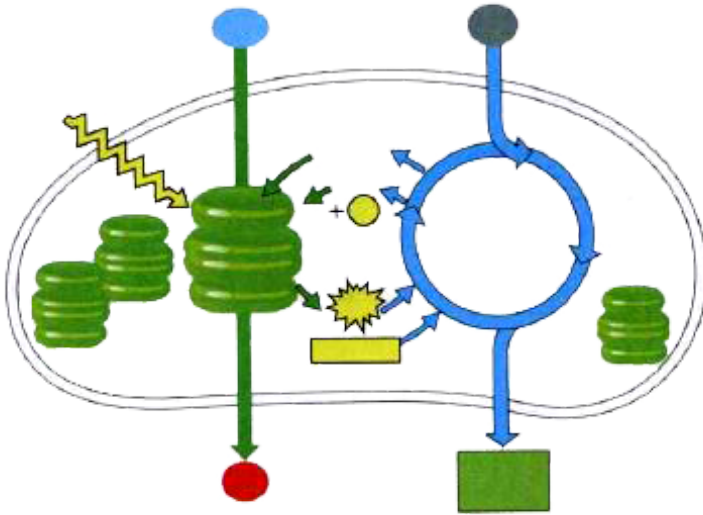
**Answer: A**



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9. Label the following diagram using these labels: Water, carbohydrate, carbon dioxide,

oxygen , ATP, ADP+(Pi), NADPH, and  $NADP^+$



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## Consolidated Exercise Mcqs

1. Photosynthesis requires



A. Chlorophyll

B.  $CO_2$

C. water

D. All of these

**Answer: B::C**



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2. Which is incorrectly matched?

A. Renin-liver

B. Ptyalin-mouth

C. Pepsin-stomach

D. Trypsin-oesophagus

**Answer: A::D**



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**3.** A few drops of iodone solution were added to rice water. The solution turned blue-black in colour. This indicates that rice water contains

A. complex proteins

B. starch

C. fats

D. glucose molecules

**Answer: B**



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**4. The Calvin cycle reactions**

A. produce carbohydrate

B. convert solar energy to mechanical energy

C. regenerate one RuBP

D. Both A and C

**Answer: A:C**



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5. Which of the following are incorrectly matched?

A. Protein-trypsin

B. Starch-amylase

C. Fat-lipase

D. Maltose-pepsin

**Answer: A::B::C**



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**6. The longest small intestine is found in a/an**

A. Carnivore

B. Omnivore

C. Herbivore

D. Autotroph

**Answer: C**



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7. The process of obtaining food by Amoeba is known as

A. Dialysis

B. Cytokinin

C. Phagocytosis

D. Amoebiasis

**Answer: C**



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**8.** The organism which has a saprophytic mode of nutrition is

A. Mushroom

B. Malarial parasite

C. Leech

D. Lice

**Answer: B**



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**9.** The length of small intestine in a human adult is about :

A. 4.5 m



B. 1.5 m

C. 3.5 m

D. 6.5 m

**Answer: D**



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**10.** The process of digestion of food in human being does not take place at

A. Stomach

B. Food pipe

C. Mouth

D. Small intestine

**Answer: B**



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**11.** The process of digestion in humans is completed in:

A. Oesophagus

B. Small intestine

C. Stomach

D. Large intestine

**Answer: C**



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**12.** The autotrophic mode of nutrition requires

:

A.  $CO_2$  and  $H_2O$

B. Chlorophyll

C. Sunlight

D. All of the above

**Answer: C**



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**13.** The correct order of steps occurring in nutrition in animals is :

A. Ingestion-Absorption-Digestion -

Assimilation-Egestion

B. Ingestion-Digestion-Assimilation -

Absorption-Egestion

C. Ingestion-Digestion-Absorption -

Assimilation-Egestion

D. Ingestion-Absorption-Digestion -

Assimilation-Egestion

**Answer: C**



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14. An example of total root parasite is

A. Wolfia

B. Rafflesia

C. Monotropa

D. Cuscuta

**Answer: B**



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15. A saprophytic plant among the following is

A. Rafflesia

B. Orobanchae

C. Striga

D. Monotropa

**Answer: A**



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**16.** A total stem parasite among the following is

A. *Cuscuta*

B. *Orobanchae*

C. *Rafflesia*

D. *Monotropa*

**Answer: D**



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17. Which of the following is a partial root parasite?

A. Santalum

B. Viscum

C. Loranthus

D. All of the above

**Answer: A**



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**18.** Which of the following is an insectivorous plant?

A. Nepenthes

B. Utricularia

C. Dionea

D. All of the above

**Answer: D**



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19. Aldrovanda (water flea trap) is a \_\_\_\_\_ plant.

A. Insectivorous

B. Saprophyte

C. Parasite

D. Symbiotic

**Answer: A**



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20. Insectivorous plants are deficient in

A. Nitrogen

B. Oxygen

C. Water

D. Potassium

**Answer: A**



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21. Smallest angiospermic parasitic plants are

A. Rafflesia

B. Cuscuta

C. Arceuthobium

D. Striga

**Answer: C**



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22. The first enzyme to mix with food in the digestive tract is:

A. Pepsin

B. Cellulose

C. Amylase

D. Trypsin

**Answer: C**



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**23.** The internal energy (cellular energy) reserve in autotrophs is :

A. Proteins

B. Fatty acids

C. Glycogen

D. Starch

**Answer: D**



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24. Which of the following is the correct statement regarding bile ?

A. It is secreted by bile duct and stored in liver.

B. It is secreted by gall bladder and stored in liver.

C. It is secreted by liver and stored in bile duct.



D. It is secreted by liver and stored in gall bladder.

**Answer: D**



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**25.** The proteins first digested in the alimentary canal is

A. Small intestine

B. Oesophagus

C. Mouth

D. Stomach

**Answer: D**



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**26.** The part of alimentary canal secretes bile from the liver is

A. Oesophagus

B. Small intestine

C. Stomach

D. Large intestine

**Answer: B**



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**27. Anti- Sterility vitamin is:**

A. A

B.  $B_{12}$

C. C

D. D

**Answer: C**



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**28.** The chemical name of vitamin A is

A. Thiamine

B. Retinol

C. Phylloquinone

D. Calciferol

**Answer: B**



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**29. Tocopherol is vitamin**

A. E

B. D

C. B

D. A

**Answer: A**



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**30. Anti-xerophthalmic vitamin is**

A. K

B. E

C. D

D. A

**Answer: D**



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**31.** Maximum energy is liberated on respiratory breakdown of

A. Protein

B. Fat

C. Carbohydrate

D. Nucleic acid

**Answer: B**



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**32.** A steroid vitamin is

A. A

B. B

C. C

D. D

**Answer: D**



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**33.** Human beings are

A. Omnivorous

B. Herbivorous

C. Carnivorous

D. Autotrophic

**Answer: A**



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**34.** Beri-Beri disease is due to the deficiency of  
vitamin

A. A

B. C

C. D

D. B

**Answer: A**



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**35.** Dental decay is caused due to

A. Fluorine

B. Iron

C. Calcium

D. Nitrogen

**Answer: A**



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**36.** Folic acid and pantothenic acid are vitamins belonging to group

A. K

B. A

C. B-complex

D. Both A and B

**Answer: C**



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37. Digestive juice contains catalytic agents called

A. Vitamins

B. Hormones

C. Enzymes

D. Nitrates

**Answer: C**



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**38.** Animals do not synthesis

A. Proteins

B. Vitamins

C. Glycogen

D. Phospholipids

**Answer: B**



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**39.** Maximum photosynthesis occurs in

A. Blue light

B. Red light

C. Green light

D. White light

**Answer: B**



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**40.** The site of photosynthesis is

A. Leaves

B. Stem cells

C. Plants

D. Chloroplasts

**Answer: A**



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41. Which element is present at the centre of chlorophyll?

A. Mg

B. Fe

C. Cu

D. K

**Answer: A**



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42. Photolysis of water takes place during

A. PS I

B. PS II

C. Both A and B

D. None of these

**Answer: B**



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43. Light reaction takes place in

A. Stroma

B. Grana

C. Both A and B

D. None of these

**Answer: B**



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**44. Phosphorylation means**

A. Formation of ATP

B. Formation of glucose

C. Formation of  $NADPH_2$

D. Formation of starch

**Answer: A**



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**45.** ATP and  $NADPH_2$ , are called

A. Assimilatory power

B. Energy currency

C. Regular

D. Transporter molecule

**Answer: A**



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**46.** A  $C_4$  plant is

A. Sugarcane

B. Tomato

C. Mango

D. Apple

**Answer: A**



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**47.** In CAM plants, stomata open during

A. Day time

B. Night

C. Day and night

D. Always

**Answer: B**



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**48.** Guard cell is present in

A. Stomata

B. Fruit

C. Seed

D. All of these

**Answer: A**



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**49.** Dark reaction consists of

A.  $C_3$  cycle

B.  $C_4$  cycle

C. CAM cycle

D. All of these

**Answer: D**



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50. Red colour of tomato is due to

A. Lycopene

B. Phytochrome

C. Anthocyanin

D. Chlorophyll

**Answer: A**



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51. Non-cyclic photophosphorylation involves

A. PS I only

B. PS II only

C. Stroma matrix

D. Both A and B

**Answer: D**



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52. PEPcase is associated with

A.  $C_3$  plants

B.  $C_4$  plants

C.  $C_2$  plants

D. Both B and C

**Answer: B**



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**53.** Dimorphic chloroplasts occur in

A. Pea

B. Mango

C. Sugarcane

D. Cotton

**Answer: C**



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54. Food is transported in plants in the form of

A. Sucrose

B. Glucose

C. Glycogen

D. Starch

**Answer: A**



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55. Reaction centre of PS I is

A.  $P_{700}$

B.  $P_{680}$

C.  $chl_{715}$

D.  $chl_{685}$

**Answer: A**



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56. Reaction centre of PS II is

A.  $P_{700}$

B.  $P_{680}$

C.  $chl_{715}$

D.  $chl_{685}$

**Answer: A**



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**57. Sunken stomata are usually found in**

A.  $C_3$  plant

B. CAM plant

C.  $C_4$  plant

D. Insectivorous plant

**Answer: A**



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**58.** The presence of bundle of sheath is a characteristic of

A.  $C_4$  plant



B.  $C_3$  plant

C. CAM Plant

D. All of the above

**Answer: A**



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**59.** Optimum temperature for photosynthesis

is

A.  $35^{\circ} - 40^{\circ} \text{ C}$

B.  $25^{\circ} - 35^{\circ} C$

C.  $20^{\circ} - 25^{\circ} C$

D.  $10^{\circ} - 15^{\circ} C$

**Answer: C**



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**60.**  $C_4$  cycle was discovered by

A. Hatch and Slack

B. Calvin

C. Hill

D. Arnon

**Answer: A**



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**61. Water soluble pigment is**

A. Chlorophyll

B. Carotene

C. Anthocyanin

D. Xanthophyll

**Answer: C**



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**62. Bacterial photosynthesis contains**

A. PS I

B. PS II

C. PS I and PS II

D. None of these

**Answer: A**



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**63.** Leaves are green because they

- A. absorb green light
- B. do not absorb green light
- C. utilise green light
- D. absorb and reflect green light

**Answer: B**



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## Olympiad And Ntse Level Exercises

1. In an attempt to find out where a growing plant gets its mass, Van Helmont planted a willow seedling in a pot of soil. After five years, the willow weighed 76.8 kg, and the soil had lost 0.06 kg of weight. Only water had been added to the pot. Which of the following conclusions should Van Helmont have drawn?

- A. Plants get their mass from water
- B. Plants get their mass from water and air
- C. Plants get their mass from water and atmospheric  $CO_2$
- D. Plants get all or almost all of their mass from a source other than soil

**Answer: D**



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2. If thylakoids are removed and kept in a culture medium containing  $CO_2$  and  $H_2O$  and the set up is exposed to light, hexose sugars are not formed as the end product. The most appropriate reason for this is

A. carbon assimilation cannot take place

B. the pigments are not linked

C. enzymes are not available

D. the light trapping device is non-functional



**Answer: D**



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**3. Assertion (A):** Calcium is required by meristematic and differentiating tissues.

**Reason (R):** Calcium participates in middle lamella synthesis.

A. Both (A) and (R) are true and (R) is the correct explanation of A.

B. Both (A) and (R) are true and (R) is not the correct explanation of A.

C. (A) is a true statement but (R) is false.

D. Both (A) and (R) are false.

**Answer: B**



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4. When an electron has been excited to a higher energy state, it can then drop back to the original level, re-emitting the light as

fluorescence. When chlorophyll is extracted in solution and a bright red or blue light is shown on it, the chlorophyll fluoresces brightly. However, when the chlorophyll is packaged inside chloroplasts and the red or blue light is turned on, there is no fluorescence. This most likely indicates that

A. the red and blue light waves are reflected by the chlorophyll membrane

B. chlorophyll in solution is a different molecule than chlorophyll in a

chloroplast

- C. the excited electrons are transferred to  
electron acceptors in the chloroplast
- D. the green light must be used to make  
living cells fluorescence

**Answer: C**



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5. The naturally occurring growth inhibitor is

A. IAA (indoleacetic acid)

B. ABA (abscisic acid)

C. NAA (naphthalene acetic acid)

D. GA (gibberellic acid)

**Answer: A**



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**6.** Match the following columns and choose the option from the following which best

describes the correct matching.

**Column I**

- A. Manganese
- B. Magnesium
- C. Phosphorus
- D. Nitrogen

**Column II**

- 1. Macronutrient
- 2. Component of biomolecules
- 3. Micronutrient
- 4. In formation of ATP

A. A-4,B-3,C-1,D-2

B. A-4,B-2,C-3,D-1

C. A-1,B-3,C-4,D-2

D. A-3,B-1,C-4,D-2

**Answer: D**



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7. If you chew on a piece of bread long enough, it begins to taste sweet because

A. maltose is formed by maltase

B. fatty acids are formed by lipase

C. disaccharides are formed by breaking down of starches by amylase

D. glucose is formed from disaccharides

**Answer: C**



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8. In mammals, trypsin enzyme is formed from the

A. trypsinogen by the action of enterokinase

B. trypsinogen by the action of protein

C. trypsinogen by the action of fat

D. trypsinogen by the action of HCl

**Answer: A**



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9. Which of the following groups of organic compounds represent the proteins present in human blood?

- A. Pepsin, trypsin and chymotrypsin
- B. Albumins, globulins and prothrombin
- C. Valine, glycine and alanine
- D. Glucose, fructose and galactose

**Answer: B**



10. Which of the following statements is false?

A. Stems and leaves depend on the water and minerals absorbed by the roots.

B. Roots depend upon sugars produced in photosynthetic organs such as leaves.

C. Plant roots absorb carbon dioxide needed for photosynthesis from the soil.

D. The terminal bud in many plants produces hormones that inhibit growth in the axillary buds

**Answer: C**



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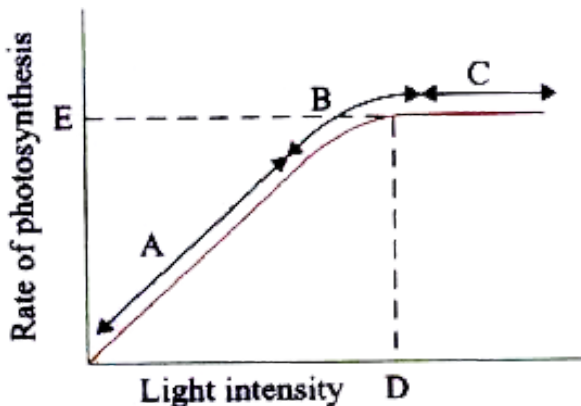
## Challenging Exercise

1. (A) Describe peristalsis and explain why it is necessary for digestion.

(B) Explain why eating high fiber foods can help prevent constipation.

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2. Figure shows the effect of light on the rate of photosynthesis.



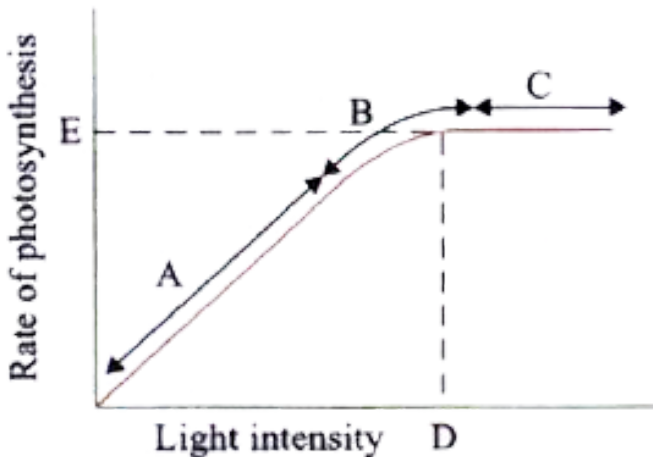
Based on the graph, answer the following

questions.

At which point/s (A, B, or C) in the curve is light a limiting factor?

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3. Figure shows the effect of light on the rate of photosynthesis.



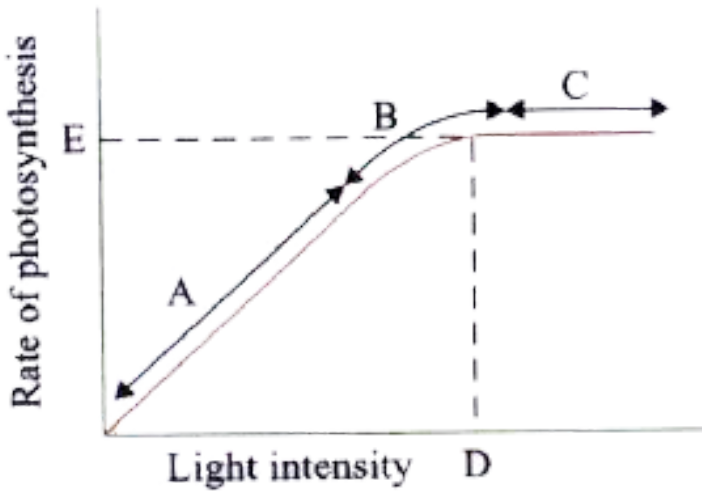
Based on the graph, answer the following questions.

What would be the limiting factors in region A?



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4. Figure shows the effect of light on the rate of photosynthesis.



Based on the graph, answer the following questions.

What do C and D represent on the curve?

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