CHAPTER – 6

RESPIRATION IN PLANTS

P. 72 Check Your Progress 1

A. Fill in the blanks.

1. organic molecules (glucose)
2. cytoplasm, mitochondria
3. hydrolyzed
4. Mitochondria

B. Answer these questions.

1. Two
2. Cytoplasm
3. 38 ATP molecules
4. **a.** Chloroplasts **b.** Mitochondria
5. Stomata, cuticle and lenticels

P. 73 Exercises

I. Multiple-Choice Questions

A. Choose the most appropriate answer.

1. b	**2.** c	**3.** d	**4.** b
5. b	**6.** b	**7.** d	**8.** a
9. a	**10.** c		

II. Assertion–Reason Type Questions

A. **1.** c **2.** c **3.** b **4.** a

III. Very Short Answer Type Questions

A. Name the following.

1. ATP
2. Respiration
3. Aerobic respiration
4. 38 molecules of ATP, CO_2 and H_2O
5. 2 molecules
6. Ethyl alcohol + CO_2 + ATP (2 molecules)
7. Aerobic respiration
8. Cytoplasm

B. Complete the following paragraph by filling in the blanks (1) to (5) with appropriate words.

1. cytoplasm
2. glucose
3. pyruvic acid
4. 2
5. anaerobic

C. Match the items in Column A with those in Column B and write down the matching pairs.

1. b **2.** a **3.** d **4.** c

IV. Short Answer Type Questions

A. Answer the following.

1. Respiration is essentially the release of energy in the form of ATP when glucose molecules are broken down to carbon dioxide and H_2O. It is initiated in the cytoplasm and completed in the mitochondria. The two types of respiration are aerobic and anaerobic respiration.
2. The process of respiration takes place all day and night (24 hours a day) in plants.
3. Respiration is a catabolic process. 38 ATP molecules are produced on complete oxidation of one molecule of glucose.
4. **a. Stomata:** Gases generally enter and leave the plants through the stomata present on leaves during respiration. In most plants, stomata are closed at night.
   b. Lenticels: To facilitate gaseous exchange, special structures called lenticels are present on the plant cuticle. These structures remain open during the day and night, irrespective of the intensity of light falling on them.
   c. Cuticle: Respiration at night by the plants takes place through the cuticle.
5. Aerobic respiration releases more energy (38 ATP).
6. The energy released during respiration is immediately stored in the form of ATP in the cells of the body. This energy is used for carrying out biological functions necessary for survival and maintenance of an organism.

V. Long Answer Type Questions

A. Answer these questions.

1. Respiration is a process which takes place 24 hours a day. The end products of respiration in plants are CO_2 and H_2O which are released day and night but as plants prepare their food only during day time in the presence of sunlight, they utilize the released CO_2 during day time in food preparation. During day time plants also release large amount of oxygen as a byproduct of photosynthesis. Therefore, it is advisable not to sleep under the tree at night as the CO_2 released at night is not utilized by the plant for photosynthesis and is harmful for the human body.
2. Photosynthesis takes place in daytime. In this process, plants take in CO_2 and give out O_2. However, at night, photosynthesis does not occur. Therefore, no release of O_2 takes place. Respiration is a continuous process in which plants take in O_2 and give out CO_2. Hence, there

is a continuous release of CO_2 in entire day and night. During daytime, this CO_2 is utilized by the plant for photosynthesis. The balance of O_2 and CO_2 remains constant because plants take in more CO_2 and also give out large amount of O_2. During respiration they take very less O_2 as compaired to when they give out O_2 in photosynthesis.

B. **1.** Aerobic respiration

2. Glycolysis in cytoplasm and Krebs cycle in mitochondria.

3. $C_6H_{12}O_6 \xrightarrow[\text{no } O_2]{\text{glycolysis}} 2CH_3COCOOH$

$\xrightarrow[6\ O_2]{\text{Krebs cycle}} 6CO_2 + 6H_2O + 38ATP$

C. **1.** $6CO_2$, 38

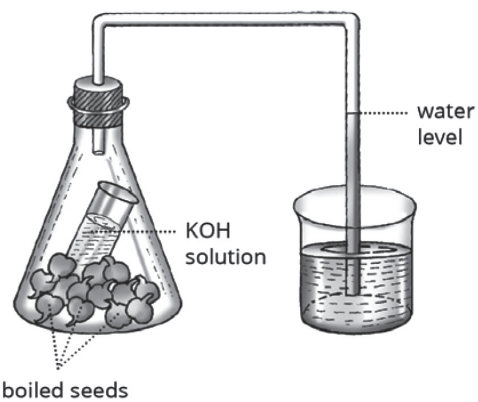
2. Respiration

VI. Structured/Application/Skill Type Questions

A. **1.** KOH absorbs CO_2

2. Level of water rises as CO_2 is absorbed by KOH.

3. In the control experimental set-up, the flask will contain boiled seeds and water will not rise from the beaker because boiled seeds are not germinating and respiring.



4. $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + 38ATP$

B. **1.** To absorb CO_2

2. Tube Y is the control set-up. To prevent any bacterial growth on boiled(dead) seeds disinfectant is used.

3. Because there is no oxygen in tube 1 as oxygen has been consumed by germinating peas.

4. Respiration

5. Respiration is a catabolic process during which food material is broken down and energy is released.

C. **1.** Respiration of germinating seeds.

2. Soda lime absorbs CO_2 if released by seeds. Lime water turns milky if CO_2 is present.

3. Lime water turns milky in flask D.

4. $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + 38$ ATP

5. To prevent photosynthesis, so that any CO_2 produced during respiration is not used up for photosynthesis.

6. High rise in temperature because germinating seeds give out heat during respiration.

D. **1.** Respiration

2. To show that green plants produce CO_2 during respiration.

3. Absorbs CO_2

4. Air pumped into the apparatus passes through soda lime which absorbs CO_2 and the air that passes over to flask A is CO_2 free air. So lime water does not turn milky when CO_2 free air passes through it. Flask B has lime water which turns milky because air in the bell jar has CO_2 which passes on to flask B.

5. Seal all connections with vaseline to make them air-tight.

6. $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + 38ATP$

E. **1.** To show that heat is evolved during respiration.

2. In flask A moist germinating seeds gave out heat during respiration.

3. 5% formalin disinfects the boiled seeds. If bacterial growth was allowed (by not using formalin), temperature would have risen considerably.

4. Hot air rises up and will not leak through plugged cotton wool.

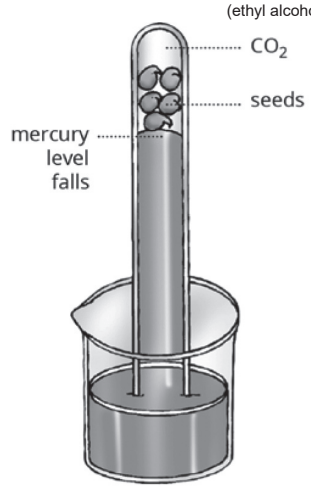
F. **1.** To demonstrate anaerobic respiration.

2. $C_6H_{12}O_6 \xrightarrow[\text{no } O_2]{\text{glucose}} CH_3COCOOH \xrightarrow{\text{no } O_2}$

$2C_2H_5OH + 2CO_2 + 2ATP$

(ethyl alcohol)

3.



4. It will increase the diffusion of CO_2 from seeds.