CBSE TEST PAPER-03

CLASS - XI BIOLOGY (Respiration in Plants)

General Instruction:

- All questions are compulsory.
- Question No. 1 to 3 carry one marks each. Question No. 4 to 6 carry two marks each. Question No. 7 and 8 carry three marks each. Question No. 9 carry five marks..

1. What is respiration?

2. Give two types of cellular respiration.

3. How many carbon atoms are present in the molecule of each of :

(i) Glucose and (ii) Pyruvate?

4. Give difference between Breathing and Respiration?

5. Define aerobic respiration?

6. What is compensation point?

7. Write the significance of citric acid cycle.

8. Explain fermentation.

9. Give the various steps involved in Glycolysis.

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[ANSWERS]

Ans 01. A process of physiochemical change by which environmental oxygen is taken into, to oxidize the stored food, for release of CO_2, water and energy. The energy released is used for doing various life activities, whereas CO_2 is used by the plants.

Ans 02. (a) Aerobic (b) Anaerobic

Ans 03. (i) 6 carbon in glucose (ii) 3 carbon in pyruvate.

Ans 04.

Respiration	Breathing
It is an oxidation of food to form carbon dioxide, water and energy.	It is simply an intake of fresh air and removal of foul air.
Oxidative process	Diffusion process
It is an involuntary action.	It is an voluntary action.
In occurs inside the cells, hence it is an intracellular process..	It occurs outside the cells; hence it is an extracellular process.
It is a biochemical process	It is physical process.
Takes place in two stages: Glycolysis and Krebs cycle.	Takes place by inspiration and expiration.
Energy is released in the form of ATP.	No energy is released, rather used or ATP is used.
A large number of enzymes are involved in the process.	No enzymes are involved in the process.
Gaseous exchange through the cell or within the cell organelles like mitochondrion.	Gaseous exchange through respiratory organs such as lungs.

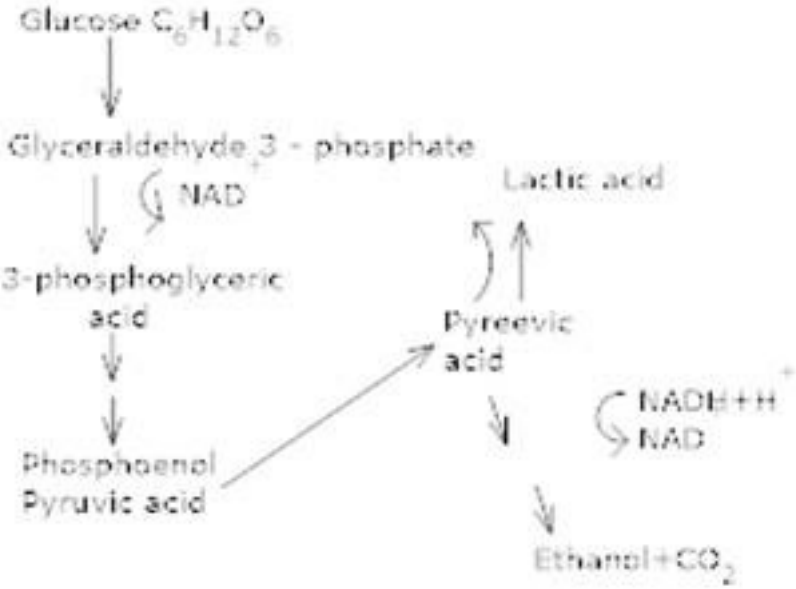
Ans 05. The process of release of energy through intake of molecular oxygen and release of CO_2 is known as aerobic respiration.

Ans 06. At low concentration of CO_2 and non-limiting light intensity, photosynthetic rate of a given plant will be equal to the total amount of respiration. Atmospheric concentration of CO_2 at which photosynthesis just compensates for respiration is referred to as the CO_2 compensation point.

Ans 07. i) It explains the process of breaking of pyruvate into CO_2 and water.
It is major pathway of generation of ATP.
(ii) More energy is released (30 ATP) in this process as compared to glycolysis.
(iii) Many intermediates compounds are formed. They are used in the synthesis of other bimolecules like amino-acids, nucleotides, Chlorophyll, cytochromes and fats.

Ans 08. It occurs in some organisms like some bacteria that produce lactic acid from pyruvic acid. In animal cells, such as muscles during exercise, when O_2 is inadequate for cellular exercise, the pyruvic acid is reduced to lactic acid by lactate dehydrogrogenase. Reducing agent is NADH + H^+ that is reoxidised to NAD^+ in both processes.
In both lactic acid and alcohol fermentation not much energy is released; less than seven per cent of the energy in glucose is released and not all it is trapped as high energy bonds of ATP. The processes are hazardous either the acid or alcohol is produced. Yeasts poison themselves to death when the concentration of alcohol reaches approximately 13%.

Ans 09. The steps are as follows-

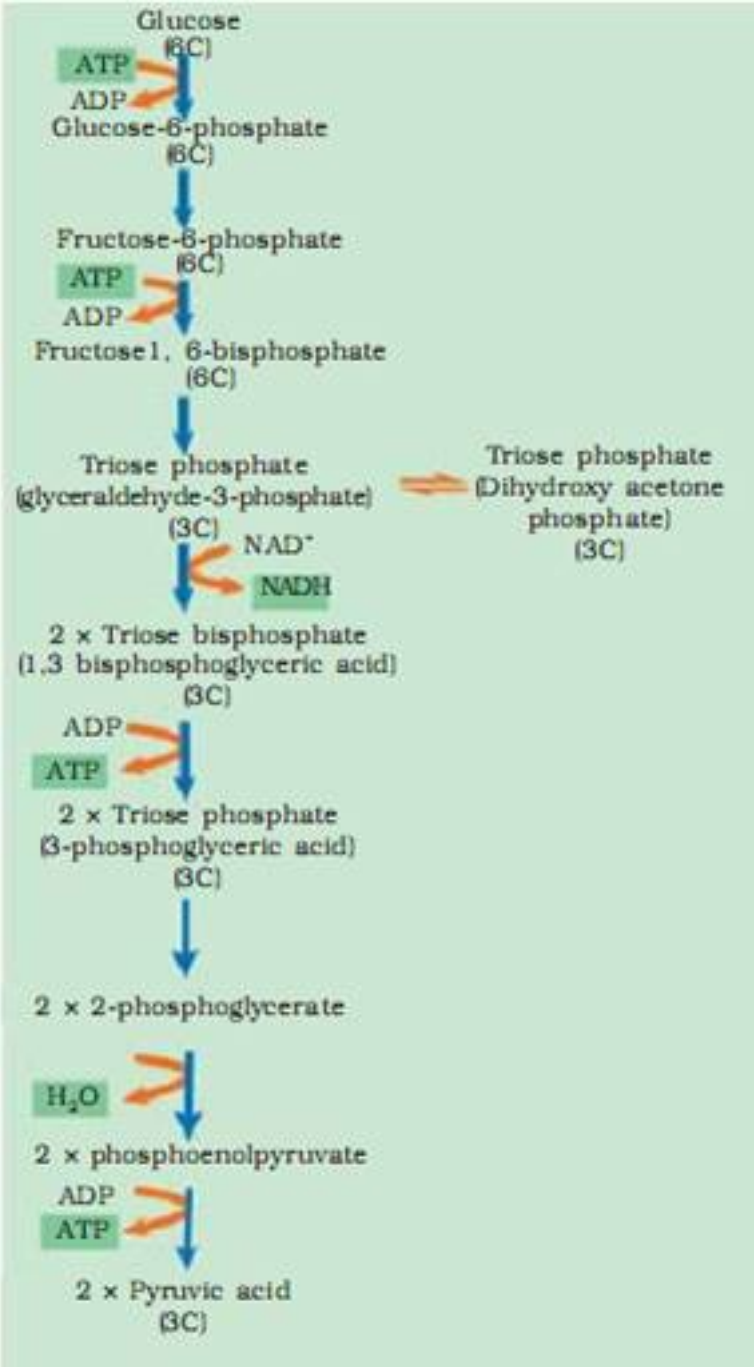


Major pathway of anaerobic respiration

1) Glucose is phosphorylated in the presence of ATP, catalyzed by the enzyme hexokinase.

2) Glucose – 6 – phosphate is changed into its isomer fructose – 6 – phosphate catalyzed by phosphohexose isomers.

3) Fructose – 6 – phosphate is phosphorylated in the presence of ATP to form Fructose 1, 6 biphosphate.



4) Fructose 1, 6 biposphate is split into two molecules of triose phosphate one of 3 – phosphoglyceral dehyde and one of dihydroxyacetose phosphate, which are

interconvertible. This reaction is catalysed by phosphofructokinase.

5) 3 – phosphoglyceraldehyde is oxieised to 1,3 biphosphoglycerate, with the reduction of NAD to NADH.

6) Phosphoglycerate kinase catalyses the formation of 3-phosphoglycerate to 1,3 biposphoglycerate and 1 molecule of ATP is produced directly (substrate phosphation).

7) 3-phosphoglycerate is converted into 2-phosphoglycerate and then into phosphoenlpysuvate (PEP)

8) PEP is converted into pyrucate long with the formation of one molecule of ATP directly. The enzyme pyruvate kinase catalyses this step.
The end products of glycolysis are 2 molecules of pyruvc acid + 2 NADH + 2ATP.