

**Topic :- Respiration in Plants**

- 1 **(c)**  
Oxidative phosphorylation refers to the synthesis of ATP from ADP and inorganic phosphate by chemiosmosis. It occurs with the help of energy obtained from oxidation of reduced enzymes formed in cellular respiration.
- 2 **(b)**  
Krebs' cycle or citric acid cycle occurs in the matrix of mitochondria. It occurs in aerobic respiration. Acetyl Co-A is the connecting link between glycolysis and Krebs' cycle. Pyruvic acid is oxidized into acetyl Co-A (6C), which is the first or initiating organic acid of Krebs' cycle.
- 3 **(a)**  
Most cells of a plants have a part of their surface in contact with air. This is also facilitated by the loose packing of parenchyma cells in leaves
- 4 **(b)**  
A variety of enzymes control different steps of cellular respiration.
- 5 **(c)**  
NAD<sup>+</sup> and NADP<sup>+</sup> accepts two electrons and one proton to get reduced to NADH and NADPH respectively
- 6 **(b)**  
The product of glycolysis is pyruvic acid the products of Krebs' cycle are CO<sub>2</sub> and water.
- 7 **(a)**  
**Chemiosmosis** is the diffusion of ions across a selectively permeable membrane. More specifically, it relates to the generation of ATP by the movement of hydrogen ions across a membrane during cellular respiration.  
ATP synthase is the enzyme that makes ATP by chemiosmosis. The generation of ATP by chemiosmosis occurs in chloroplasts and mitochondria as well as in some bacteria.
- 8 **(d)**  
Cytochromes are small proteins (intrinsic membrane proteins) that contain a cofactor, haem, which holds an iron atom. The iron carries electrons and cycles between +2 and +3 oxidation states. These form a part of electron transport chain in mitochondria and chloroplast and act as an electron transporter or electron acceptor in respiration and photosynthesis.
- 9 **(c)**  
RQ is the ratio of volume of carbon dioxide evolved and volume of oxygen consumed. If RQ is less than one it means the oxidation of the respiratory substrate consumed more oxygen than the amount of carbon dioxide released.  
Volume of carbon dioxide < Volume of oxygen

- 10 **(a)**  
The flowchart given shows the step in glycolysis. The glucose 6-phosphate breaks into fructose 6-phosphate and then fructose 1, 6-bisphosphate. Fructose -1, 6 bisphosphate convert into 3-phosphoglyceraldehydes and then 1, 3- bisphosphoglyceric acid
- 11 **(a)**  
Cyanide reacts with one of the proteins (cytochrome-a<sub>3</sub>) in the electron transport system and prevents transfer of electron to oxygen. It leads to checking the ATP formation through oxidative phosphorylation. ATP is required for active transport of substances across the plasma membrane, besides some other metabolic reactions.
- 12 **(a)**  
Brandy and whisky requires both distillation and fermentation as fermentation inhibited at an alcohol level of 10-18%.
- 13 **(d)**  
Plants, unlike animals have no specialised organs for gaseous exchange but they have stomata and lenticels for this purpose
- 14 **(a)**  
Citric acid cycle was discovered by British Chemist Hans Krebs in 1937
- 15 **(d)**  
*Acetobacter* sp. Are of particular importance, commercially they also used in the production of vinegar by converting the ethanol in the wine to acetic acid.
- 16 **(d)**  
In glycolysis, two molecules of ATP are consumed initially in converting glucose to fructose 1, 6-bisphosphate. Two triose phosphate molecules are formed from one glucose molecule. Four molecules of ATP are produced at substrate level phosphorylation. Therefore, net gain of ATP is  $2\text{ATP} \times 2 - 2\text{ATP} = 2$ .
- 17 **(b)**  
The synthesis of ATP from ADP is called phosphorylation. Substrate level phosphorylation is directly linked to liberation of energy in chemical reaction of respiration, e.g., formation of GTP is Krebs' cycle.
- 18 **(a)**  
**Malonate** an analogue of succinate is a strong competitive inhibitor of succinate dehydrogenase and, therefore, blocks the activity of citric acid cycle.
- 19 **(d)**  
There is a total gain of 38 ATP molecules during aerobic respiration of one molecules of glucose. Out of these, two molecules of ATP are required for transporting the NADH produced in glycolysis (in cytoplasm) into the mitochondria for further oxidation. Hence, the net gain of ATP is 36 molecules.
- 20 **(a)**  
Animals are heterotrophic, *i.e.*, they obtain food from plants directly (herbivores) or indirectly (carnivores)

<b>ANSWER-KEY</b>										
<b>Q.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>A.</b>	<b>C</b>	<b>B</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>B</b>	<b>A</b>	<b>D</b>	<b>C</b>	<b>A</b>
<b>Q.</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>
<b>A.</b>	<b>A</b>	<b>A</b>	<b>D</b>	<b>A</b>	<b>D</b>	<b>D</b>	<b>B</b>	<b>A</b>	<b>D</b>	<b>A</b>

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