BIOLOGY

NEET

CRASH COURSE

RESPIRATION IN PLANTS

SMART ACHIEVERS

JEE | NEET | FOUNDATION

587, Nitikhand-1, Indirapuram, Gzb.

7292077839 / 7292047839 | smartachievers.online

A Unit of SMARTACHIEVERS LEARNING Pvt. Ltd., Delhi

RESPIRATION IN PLANTS

1. Plants unlike animals have no special systems for breathing or gaseous exchange.
2. Stomata and lenticels allow gaseous exchange by diffusion. Almost all living cells in a plant have their surfaces exposed to air.
3. The breaking of C-C bonds of complex organic molecules by oxidation cells leading to the relase of a lot of energy is called cellular respiration.
4. Glucose is the favoured substrate for respiration.
5. Fats and proteins can also be broken down to yield energy.
6. The initial stage of cellular respiration takes place in the cytoplasm.
7. Each glucose molecule is broken through a series of enzyme catalysed reactions into two molecules of pyruvic acid. This process is called glycolysis.
8. The fate of the pyruvate depends on the availability of oxygen and the organism.
9. Under anaerobic conditions either lactic add fermentation or alcohol fermentation occurs.
10. Fermentation takes place under anaerobic conditions in many prokaryotes, unicellular eukaryotes and in germinating seeds.
11. In eukaryotic organisms aerobic respiration occurs in the presence of oxygen. Pyruvic add is transported into the mitochondria where it is converted into acetyl CoA with the relase of CO_2.
12. Acetyl CoA then enters the tricarboxylic acid pathway or Krebs cycle operating in the matrix of the mitochondria. NADH $+H^+$ and $FADH_2$ are generated in the Krebs cycle.
13. The energy in these molecules as well as that in the NADH + H^+ synthesised during, glycolysis are used to syrithesise ATP. This is accomplished through a system of electron carriers called electron transport system (ETS) located on the inner membrane of the mitochondria.
14. The electrons, as they move through the system, release enough energy that are trapped to synthesise ATP. This is called oxidative phosphorylation.
15. In this process O_2 is the ultimate acceptor of electrons and it gets reduced to water.
16. The respiratory pathway is an amphibolic pathway as it involves both anabolism and catabolism.
17. The respiratory quotient depends upon the type of respiratory substance used during respiration.

EXERCISE

Q.1 What is the importance of respiration in organisms?
(1) It provides oxygen to plant (2) It liberates energy
(3) It liberates CO_2 (4) All the above

Q.2 Which component of ETS is mobile, carrier ?
(1) UQ (CO-Q) (2) Cyto a (3) Cyto - b (4) Cyto - f

Q.3 Number of ATP produced from one pyruvic acid during conversion to acetyl Co-A –
(1) 6 (2) 3 (3) 12 (4) 15

Q.4 Mineral activator needed for the enzymes Aconitase of TCA cycle is
(1) Mn (2) Fe (3) Mg (4) Cu

Q.5 Conversion of pyruvic acid into ethyl alcohol is mediated by –
(1) Phosphatase (2) Dehydrogenase
(3) Decarboxylase & dehydrogenase (4) Catalase

Q.6 The commonest living, which can respire in the absence of O_2 is –
(1) Fish (2) Yeast (3) Potato (4) Chlorella

Q.7 The formation of Acetyl Co-A from pyruvic acid is the result of its
(1) Reduction (2) Dehydration (3) Phosphorylation (4)Oxidative decarboxylation

Q.8 The first compound of TCA cycle is
(1) Oxalo succinic acid (2) Oxalo acetic acid
(3) Citric acid (4) Cis aconitic acid

Q.9 Excess of ATP inhibits the enzyme –
(1) Phosphofructokinase (2) Hexokinase
(3) Aldolase (Lyases) (4) Pyruvate decarboxylase

Q.10 The universal hydrogen acceptor is
(1) NAD (2) ATP (3) Co-A (4) FMN

Q.11 The end product of fermentation when sugar are used as raw materials are
(1) Alcohol and CO_2 (2) Alcohol, Pyruvate (3) CO_2 (4) Alcohol

Q.12 Respiratory enzymes are localised in
(1) Ribosomes (2) Chloroplast (3) Mitochondria (4) none of the above

Q.13 Respiration is an
(1) Exothermic process (2) Endothermic process
(3) Anabolic process (4) None of these

Q.14 Number of ATP molecules formed during aerobic respiration in break down of one glucose molecule via malate aspartate shuttle.
(1) 38 (2) 18 (3) 28 (4) 4

Q.15 How many times CO_2 released in aerobic respiration
(1) One or two (2) Three (3) Six (4) Twelve

Q.16 The value of RQ of starved cell is
(1) Zero (2) 0.8 / Less than one (3) 1 / unity (4) infinite

Q.17 RQ of an actively photosynthesizing tissue is
(1) Unity (2) < 1 (3) > 1 (4) Zero

Q.18 The value of RQ of a ripening fatty seed is
(1) <1 (2) >1 (3) zero (4) Unity

Q.19 The common phase between aerobic & anaerobic respiration is
(1) TCA cycle (2) Kreb's cycle (3) Glycolysis (4) Photo respiration

Q.20 Glycolysis give rise to
(1) 8ATP, $2NADH_2$, 2 Pyruvate (2) 2ATP, 2CoA, $2NADH_2$
(3) 2ATP, $2NADH_2$,2 Pyruvate (4) 2ATP, 2 acetate, $2NADPH_2$

Q.21 During glycolysis the mineral needed as an enzyme activator is
(1) Mn^{++} (2) Fe^{++} (3) Ca^{++} (4) Mg^{++}

Q.22 Which of the following ETS complex is inhibited by cyanide –
(1) Complex II (2) Complex V (3) Complex IV (4) Complex III

Q.23 Final H_2 acceptor of mitochondria is
(1) Pyruvate (2) NADP (3) O_2 (4) OAA

Q.24 How many molecules of ATP are produced per molecule of FADH2 oxidised
(1) One (2) Two (3) Three (4) four

Q.25 How many ATP molecules produced from the complete oxidation of a molecule of active acetate or acetyl Co-A.
(1) 38 ATP (2) 15 ATP (3) 12 ATP (4) 4 ATP

Q.26 Vitamin serves the function of
(1) An enzyme (2) A coenzyme (3) A substrate (4) A hormone

Q.27 An enzyme is made up of :
(1) Vitamin (2) Growth factor (3) Protein (4) Carbohydrates

Q.28 How many ATP generates in aerobic respiration via glycerol phosphate shuttle in eukaryotes ?
(1) 38 ATP (2) 36 ATP (3) 40 ATP (4) 80 ATP

Q.29 By aerobic respiration of 1 molecule of PGAL how many ATP get synthesized –
(1) 8 ATP (2) 2 ATP (3) 19 ATP (4) 36 ATP

Q.30 1 mole of glucose when oxidised through EMP & TCA-cycle would yield –
(1) 30 ATP gross (2) 40 ATP net (3) 36 or 38 ATP net (4) 38 ATP only

Q.31 How many ATP molecules produced by aerobic oxidation of one molecule of glucose?
(1) 2 (2) 4 (3) 38 (4) 34

Q.32 R.Q. of maturing fatty seeds will be –
(1) 1 (2) More than one (3) 0 (4) 0.7

Q.33 Anaerobic degradation of proteins by microbes is known as –
(1) Putreification (2) Degradation (3) Decomposition (4) None

Q.34 In glycolysis, during oxidation electrones are removed by :
(1) Molecular oxygen (2) ATP (3) Glyceraldehyde (4) NAD^+

Q.35 Aerobic respiration is how many times useful than anaerobic respiration :
(1) 2 (2) 8 (3) 19 (4) 38

Q.36 During which stage in the complete oxidation of glucose are the greatest number of ATP molecules formed from ADP ?
(1) Conversion of pyruric acid to acetyl Co A (2) Electron transport chain
(3) Glycolysis (4) Krebs cycle

Q.37 Chemiosmotic theory of ATP synthesis in the chloroplast and mitochondria is based on :
(1) Proton gradient (2) Accumulation of K ions
(3) Accumulation of Na ions (4) Membrane potential

AIIMS Special

Instructions for following questions (Q.38 to Q.56).

(1) If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1).
(2) If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).
(3) If Assertion is true statement but Reason is false, then mark (3).
(4) If both Assertion and Reason are false statements, then mark (4).

Q.38 **Assertion :** 2, 4 DNP is an uncoupling agent of ETS.
Reason : It is soluble in lipids.
Q.39 **Assertion :** Glucose - 6 - P dehydrogenase deficiency impairs PPP (HMS).
Reason : It is a X-linked recessive disorder
Q.40 **Assertion :** RQ of maturing fatty seeds is > 1.
Reason : Fats are preferred energy fuels.

Q.41 **Assertion :** In cellular respiratory ETS electron movement is a downhill journey.
Reason : Electrons move from high redox potential to low redox potential.

Q.42 **Assertion :** Succinyl CoA is the precursor of pyrrole group containing compounds.
Reason : Succinyl CoA is an intermediate of TCA cycle.

Q.43 **Assertion :** In the process of alcoholic fermentation, the hexose molecule is converted in starch.
Reason : Alcoholic fermentation is aerobic.

Q.44 **Assertion :** Pentose phosphate pathway is also known as cytosolic decarboxylation.
Reason : All the carbon dioxide is released in cytosol during this pathway.

Q.45 **Assertion :** Value of R.Q. is more than one during the germination of fatty seeds.
Reason : More CO_2 liberated than absorbed O_2 in fat-oxidation.

Q.46 **Assertion :** Kerbs cycle is called as amphibolic pathway of respiration.
Reason : Krebs cycle takes place in cytosol.

Q.47 **Assertion :** Fermentation is an incomplete oxidation of substrate outside the cell.
Reason : In Alocholic fermentation the hexose converts in to glucose & fructose.

Q.48 **Assertion :** Only 2 molecules of ATP generates in anaerobic respiration.
Reason : Anaerobic respiration is incomplete oxidation of respiratory substrate.

Q.49 **Assertion :** Lactic acid is produced anaerobically in human muscles.
Reason : The reaction is catalysed by lactobacillus.

Q.50 **Assertion :** Glycolysis is also known as oxidative anabolism.
Reason : Glucose splits during this and some intermediates involve in anabolism.

Q.51 **Assertion :** HMP-shunt is alternate of Glucose oxidation.
Reason : This take place in cytoplasm.

Q.52 **Assertion :** Respiration is a vital process.
Reason : Respiration is characteristic of only living cells.

Q.53 **Assertion :** HMP shunt is also known as Reductive pentose phosphate pathway.
Reason : Reduction of pentose sugar ribulose occurs during HMP shunt.

Q.54 **Assertion :** Reduction of NAD in glycolysis is energy conserving step.
Reason : Energy neither be created nor be destroyed.

Q.55 **Assertion :** Lactobacillus Perfoms fermentation.
Reason : Lactobacillus is an anaerobic bacteria.

Q.56 **Assertion :** Formation of Acetyl CoA in mitochondria is known as link reaction.
Reason : Acetyl CoA is a compound which links the glycolysis & TCA-cycle.

ANSWER KEY

Q.1	2	Q.2	1	Q.3	2	Q.4	2	Q.5	3	Q.6	2	Q.7	4
Q.8	3	Q.9	1	Q.10	1	Q.11	1	Q.12	3	Q.13	1	Q.14	1
Q.15	2	Q.16	2	Q.17	1	Q.18	2	Q.19	3	Q.20	3	Q.21	4
Q.22	3	Q.23	3	Q.24	2	Q.25	3	Q.26	2	Q.27	3	Q.28	2
Q.29	3	Q.30	3	Q.31	3	Q.32	2	Q.33	1	Q.34	4	Q.35	3
Q.36	2	Q.37	1	Q.38	2	Q.39	2	Q.40	3	Q.41	3	Q.42	2
Q.43	4	Q.44	1	Q.45	4	Q.46	3	Q.47	3	Q.48	1	Q.49	3
Q.50	1	Q.51	2	Q.52	1	Q.53	4	Q.54	2	Q.55	2	Q.56	1