



BIOLOGY

BOOKS - MODERN PUBLISHERS BIOLOGY (HINGLISH)

RESPIRATION IN PLANTS

Practice Problems Respiration

1. What is the net gain of ATP molecules during glycolysis ?



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2. What is Robinsons's ester and Newber's ester ?

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3. Name the reactant used and products formed during oxidation of pyruvic acid.

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4. What is hexose monophosphate (HMP) pathway ?

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5. Name the organic acid which undergoes both dehydrogenation and decarboxylation during aerobic respiration.

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6. What is Pasteur effect ?

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7. Name a inhibitor of oxidative phosphorylation.

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8. What is amphibolic process ?

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9. How the Kerbs cycle acts as central pathway of respiration ?

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10. Why fruits and seeds are stored at low temperature ?

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11. Why mercury is used in anaerobic respiration experiments ?

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12. At which step of respiration, hydrogen of $NADH_2$ is used ?

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13. Respiration differs from combustion in

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14. Which of the following is link between carbohydrate and fat metabolism ?

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Ncert File Exercise Questions

1. Differentiate between :

(a) Respiration and combustion.

(i) Glycolysis and Krebs' Cycle.

(c) Aerobic respiration and anaerobic respiration.

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2. What are respiratory substrates ? Name the most common respiratory substrates.

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3. Give the schematic representation of glycolysis.

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4. What are the main steps in aerobic respiration ?

Where does it take place ?

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5. Give the schematic representation of an overall view of Krebs cycle.



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6. Explain ETS.



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7. Distinguish between the following:

(a) Aerobic respiration and Anaerobic respiration

(b) Glycolysis and Fermentation

(c) Glycolysis and Citric acid Cycle

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8. What are the assumptions made during the calculation of net gain of ATP?

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9. Discuss “The respiratory pathway is an amphibolic pathway.”

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10. Define RQ. What is its value for fats?

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11. What is oxidative phosphorylation ?

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12. What is the significance of step-wise release of energy in respiration?

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[Ncert](#) [File](#) [Exemplar](#) [Problems](#) [A](#) [Multiple Choice Questions](#)

1. The ultimate electron acceptor of respiration in an aerobic organism is

A. Cytochrome

B. Oxygen

C. Hydrogen

D. Glucose

Answer: B



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2. Phosphorylation of glucose during glycolysis is catalysed by

A. Phosphoglucomutase

B. Phosphoglucoisomerase

C. Hexokinase

D. Phosphorylase

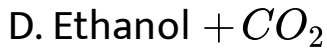
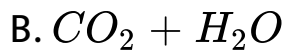
Answer: C



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3. Pyruvic acid, the key product of glycolysis can have many metabolic fates. Under aerobic condition it forms

A. Lactic acid



Answer: C



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4. Electron Transport System (ETS) is located in mitochondrial

A. Outer membrane

B. Inter membrane space

C. Inner membrane

D. Matrix

Answer: B



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5. Which of the following exhibits the highest rate of respiration?

A. Growing shoot apex

B. Germinating seed

C. Root tip

D. Leaf bud

Answer: B



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6. Choose the correct statement :

- A. Pyruvate is formed in the mitochondrial matrix.
- B. During the conversion of succinyl Co - A to succinic acid a molecule of ATP is synthesized.
- C. Oxygen vital in respiration for removal of hydrogen.
- D. There is complete breakdown of glucose in fermentation

Answer: C



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7. Mitochondria are called powerhouses of the cell.

Which of the following observations support this statement ?

A. Mitochondria synthesise ATP

B. Mitochondria have a double membrane

C. The enzymes of the Krebs' cycle and the cytochromes are found in mitochondria.

D. Mitochondria are found in almost all plants and animal cells.

Answer: A



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8. The end product of oxidative phosphorylation is

A. NADH

B. Oxygen

C. ADP

D. $ATP + H_2O$

Answer: D



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9. Match the following and choose the correct option from those given below.

Column A

- (A) Molecular oxygen
- (B) Electron acceptor
- (C) Pyruvate dehydrogenase
- (D) Decarboxylation

Column B

- (i) α - Ketoglutaric acid
- (ii) hydrogen acceptor
- (iii) cytochrome C
- (iv) acetyl Co A

A. A-(ii), B-(iii), C-(iv), D-(i)

B. A-(iii), B-(iv), C-(ii), D-(i)

C. A-(ii), B-(i), C-(iii), D-(iv)

D. A-(iv), B-(iii), C-(i), D-(ii)

Answer: A



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Ncert File Exemplar Problems B Very Short Answer Type Questions

1. Energy is released during the oxidation of compounds in respiration. How is this energy stored and released as and when it is needed?



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2. Explain the term "Energy Currency". Which substance acts as energy currency in plants and animals.

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3. Different substrates get oxidised during respiration. How does Respiratory Quotient (RQ) indicate which type of substrate, i.e., carbohydrate, fat or protein is getting oxidised?

$$R. Q. = \frac{A}{B}$$

What do A and B stand for?

What type of substrates have R.Q. of 1, < 1 or > 1?

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4. $F_0 - F_1$ particles participate in the synthesis of
..... .

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5. When does anaerobic respiration occur in man and yeast?

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6. Which of the following will release more energy on oxidation? Arrange them in ascending order.



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7. The product of aerobic glycolysis in skeletal muscle and anaerobic fermentation in yeast are respectively and



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Ncert File Exemplar Problems C Short Answer Type Questions

1. If a person is feeling dizzy, glucose or fruit juice is given immediately but not cheese sandwich, which

might have more energy. Explain.



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2. What is meant by the statement 'aerobic' respiration is more efficient?



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3. Pyruvic acid is the end product of glycolysis. What are the three metabolic fates of pyruvic acid under aerobic and anaerobic conditions ? Write in the space provide in the diagram.





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4. The energy yield in terms of ATP is higher in aerobic respiration than during anaerobic respiration. Why is there anaerobic respiration even in organism that live in aerobic condition like human beings and angiosperms ?



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5. Oxygen is an essential requirement for aerobic respiration but it enters the respiratory process at the end? Discuss.



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6. Respiration is an energy releasing and enzymatically controlled catabolic process which involves a step-wise oxidative breakdown of organic process which involves a step-wise oxidative breakdown of organic substances inside living . In this statement about respiration explain the meaning of

(a) Step-wise breakdown

(b) Organic substances (used as substrates).



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7. Comment of the statement respiration is an energy producing process but ATP is being used in some steps of the process.

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8. The figure given below shows the steps in glycolysis. Fill in the missing steps A, B, C, D and also indicate whether ATP is being used up or released at step E ?



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9. Respiratory pathway is referred to as an amphibolic pathway ?

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10. We commonly call ATP as the energy currency of the cell. Can you think of some other energy carries present in a cell ? Name any two.

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11. ATP produced during glycolysis is a result of substrate level phosphorylation. Explain.



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12. Do you know any step in the TCA cycle where there is substrate level phosphorylation. Which one?



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13. In a way green plants and cyanobacteria have synthesised all the food on the earth. Comment .



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14. When a substrate is being metabolised, why does not all the energy that is produced get released in one step. It is released in multiple steps. What is the advantage of step-wise release?



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15. Respiration requires O_2 . How did the first cells on the earth manage to survive in an atmosphere that lacked O_2 ?



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16. It is known that red muscle fibres in animals can work for longer periods of time continuously. How is this possible ?

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17. The energy yield of ATP is higher in aerobic respiration than during anaerobic respiration. Explain.

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18. RuBP carboxylase, PEPcase, pyruvate dehydrogenase, ATPase, cytochrome oxidase,

hexokinase, lactate dehydrogenase. Select/ choose enzymes from the list above which are involved in

(a) Photosynthesis (b) Respiration.

Both in photosynthesis and respiration

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19. How does a tree trunk exchange gases with the environment although it lacks stomata?

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20. Write two energy yielding reactions of glycolysis.

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21. Name the site (s) of pyruvate synthesis. Also write the chemical reaction wherein pyruvic acid dehydrogenase acts as a catalyst.



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22. Mention the important series of events of aerobic respiration that occur in the matrix of the mitochondrion as well as one that take place in inner membrane of the mitochondrion.



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23. Respiratory pathway is believed to be a catabolic pathway. However, nature of TCA cycle is amphibolic. Explain.

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Ncert File Exemplar Problems D Long Answer Type Questions

1. In the following flow chart, replace the symbols a,



b, c and c with appropriate terms. Briefly explain the process and give any two application of it.

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2. Given below is a diagram showing ATP synthesis during aerobic respiration, replace the symbols A, B, C, D and E by appropriate terms given in the box.



F_i , Particle, P_i , $2H^+$, Inner mitochondrial membrane, ATP, F_o particle, ADP.

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3. oxygen is critical for aerobic respiration. Explain its role with respect to ETS.

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4. Enumerate the assumptions that we undertaker in making the respiratory balance Sheet . Are these assumptions valid for a living system? Compare fermentation and aerobic respiration in this context.



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5. Given an account of Glycolysis. Where does it occur ? What are the end products ? Trace the fate of these products in both aerobic and anaerobic respiration .



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Higher Order Thinking Skills Brain Twisting Very Short Answer Questions

1. Who discovered ATP ?



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2. Which enzyme hands over electrons to oxygen during oxidative phosphorylation ?



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3. What are other names of Krebs' cycle ?



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4. What is floating respiration ?

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5. Name the first chemical produced in Krebs' cycle.

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6. How much energy is stored during formation of ATP from ADP ?

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7. Which type of cells do not obtain their requirements of food from outside ?



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Higher Order Thinking Skills Brain Twisting Short Answer Questions

1. Anaerobic respiration cannot continue for long in higher organisms. Why ?



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2. Comment of the statement respiration is an energy producing process but ATP is being used in some steps of the process.

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3. When lactic acid is formed during fermentation ?

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4. Write two energy yielding reactions of glycolysis.

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5. How many protons pass through complex V for synthesis of 2 molecules of ATP ?

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6. Where the cytochrome - c is located ? Write its function.

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7. RuBP carboxylase, PEPcase, pyruvate dehydrogenase, ATPase, cytochrome oxidase, hexokinase, lactate dehydrogenase. Select/ choose enzymes from the list

above which are involved in

(a) Photosynthesis (b) Respiration.

Both in photosynthesis and respiration



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8. Define respiratory quotient. What is its value for fats ?



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9. Respiratory pathway is believed to be a catabolic pathway. However, nature of TCA cycle is amphibolic. Explain.



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10. Where pyruvate synthesis takes place ? In which chemical reaction, pyruvic acid dehydrogenase acts as catalyst ?



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11. Give the schematic representation of glycolysis.



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12. What are the major pathways of anaerobic respiration ?

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Higher Order Thinking Skills Brain Twisting Long Answer Questions

1. Explain the major steps of Krebs' cycle.

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2. Explain ETS.

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3. How many ATP molecules are produced by the aerobic oxidation of one molecule of glucose ?

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4. Draw well labelled diagrammatic representation of TCA cycle.

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5. Describe the chemiosmotic production of ATP.

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Memory Test A Say True Or False

1. Three molecules of ATP are synthesized during glycolysis.

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2. Anaerobic respiration in muscle cell lead to formation of lactic acid.

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3. In most eukaryotic cell, the net gain of ATP per glucose molecule oxidised is 38 ATP.

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4. Glycolysis takes place in the matrix of mitochondria.

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5. Fermentation is conducted by all micro - organisms.

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6. End product of Kreb's cycle is pyruvic acid.



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7. Terminal cytochrome of the respiratory chain is a_3 .



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8. Aerobic respiration produces energy about 18 times than in anaerobic respiration.



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9. R.Q. for malic acid is less than one.

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10. Oxidation of one molecule of pyruvic acid produces 15 ATP molecules.

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Memory Test B Complete The Missing Links

1. is the process of respiration which occurs in the absence of oxygen.



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2. During glycolysis, molecules of $NADH_2$ are formed.



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3. Enzymes taking part in glycolysis are present in



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4. Other name of glycolysis is



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5. During respiration, pyruvic acid is formed by the process of

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6. The universal hydrogen acceptor is

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7. Final electron acceptor in respiration is

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8. The enzyme ATP-synthetase is located in

.



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9. Mitochondrial matrix has enzymes for



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10. Main source of ATP in a cell is



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11. Respiratory quotient for glucose is

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12. Tricarboxylic acid cycle is another name of

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13. Coenzyme FAD removes H-atoms from

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14. Fermentation of glucose by the yeast cells produces and

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15. Anaerobic respiration was first reported by

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16. Acetyl Co-A is formed from and coenzyme A.

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17. In Prokaryotes _____ molecules of ATP are formed per molecule of glucose oxidised.

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18. Breakdown of glucose is called while formation of glucose from non - carbohydrate sources is called

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19. involves the removal of amino group as ammonia from amino acid while involves

transfer of amino group from one amino acid to a α -keto acid to form a new amino acid.

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20. Acceptor molecule of Krebs' cycle is
while the substrate molecule of Krebs' cycle is

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Memory Test C Choose The Correct Alternative

1. Combustion/respiration is a biochemical process.

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2. Glycolysis/fermentation forms two 2 ATP molecules per glucose molecule.

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3. Electron transport is absent in fermentation / aerobic respiration.

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4. If the respiratory substrate is fat/carbohydrate, then RQ of the respiring cells will be less than 1.



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5. The term amphibolic / cyclic is used to denote a biochemical pathway involving both catabolism and anabolism.



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Revision Exercises Very Short Answer Questions

1. Name the unit of oxidative phosphorylation.



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2. Give the location of enzymes of TCA - cycle.



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3. Give the full form of EMP - pathway.



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4. How many ATP molecules are produced by aerobic oxidation of one molecules of glucose ?



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5. Which organic compound acts as link between glycolysis and Krebs' cycle ?

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6. The end product of glycolysis is

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7. How many $NADH_2$ molecules are produced from one molecule of Acetyl CoA in TCA - cycle ?

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8. Name the final acceptor of electrons in ETC.



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9. Number of ATP molecules produced from 1 glucose molecule in aerobic respiration



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10. Name four parts of cell respiration.



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11. Name the first product formed in TCA cycle.



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12. Give the location of glycolysis.



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13. Name energy - currency of all the living organisms.



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14. Who proposed the chemiosmotic mechanism of ATP synthesis ?

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15. What is the first electron carrier on the Route II of ETC.

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16. By which process, the fatty acid changes into acetyl Co-A.

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Revision Exercises Short Answer Questions

1. Anaerobic respiration produces less energy than aerobic respiration.

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2. Name the four steps of oxidation in Krebs' cycle.
(TCA)

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3. What is fermentation ? Name any two organic compounds produced in this process.



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4. What is glycolysis ? Name the two monosaccharides which readily enter the glycolytic pathway.



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5. What is meant by Respiration Quotient (RQ) ? When will the value of RQ be 1 and when will it be less than 1 ?



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6. What are the chemical changes in a pyruvic acid molecule before it enters mitochondria ?



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7. Name the end products of aerobic and anaerobic glycolysis. List the two ways by which molecules of ATP are produced in glycolysis during aerobic respiration in a cell.



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8. (a) Where is electron transport system located in the cell ?

(b) Differentiate between glycolysis and Krebs' cycle.

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9. Define R.Q. What is its significance ?

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10. What is oxidative decarboxylation ? What happens to pyruvate immediately after this reaction ? Name the enzyme involved in this reaction.

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11. What is the end product of glycolysis in aerobes and where does this process occur ? List the conditions under which the fermentation occurs in plant cells ?

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12. What is the importance of $F_0 - F_1$ particles in ATP production during aerobic respiration.

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13. What is compensation point ? Explain it briefly.



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14. Define R.Q. (Respiratory quotient). Give R.Q., if respiratory substrate is oxalic acid, tripalmitin and glucose.



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15. What is fermentation ? Name any two organic compounds produced in this process.



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16. What is glycolysis ? Name the two monosaccharides which readily enter the glycolytic pathway.



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17. What is meant by R.Q. ? Why does its value differ for different substrates ?



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18. Describe the process of oxidation of pyruvic acid during anaerobic respiration.

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19. Give list of components of ETS.

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20. Write the significance of citric acid cycle (or TCA cycle).

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21. What are redox reactions ?



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22. Where is electron transport system operative in mitochondria ? Explain the system highlighting the role of oxygen.



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23. What is RUBISCO ? How does it act as oxygenase ?



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24. Write brief account of photorespiration.

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25. What is anaerobic respiration ? Explain the types of fermentation. Give the importance of anaerobic respiration.

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26. Give schematic representation of Citric acid cycle. Give its significance.

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27. How do plants synthesize ATP during respiration ?



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28. How does oxidative phosphorylation differ from photophosphorylation ? Explain.



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29. Differentiate between C_3 and C_4 photosynthetic pathways.



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30. Explain the major steps in Krebs' cycle. Why this cycle also called citric acid cycle ?

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31. Give the graphic representation of citric acid cycle.

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32. Glycolysis is the partial oxidation of glucose to produce two molecules of pyruvic acid.

(a) Where does glycolysis occur ?

(b) Steps of glycolysis are given below. Fill up the blank boxes.



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Revision Exercises Long Answer Questions

1. Write down six differences between glycolysis and Krebs' cycle.



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2. What is the shuttle system ? Give its role also.



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3. Depict an outline of pathways of anaerobic respiration.



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4. Explain the process of crassulacean acid metabolism ? How is it advantageous to plants ?



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5. Explain the major steps in Krebs' cycle. Why this cycle also called citric acid cycle ?



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Competiton File Objective Type Questions A Multiple Choice Questions

1. The process by which ATP is produced in the inner mambrane if a mitochondrion.The electron transport system transfer protons from the inner comartment of the outer,as the proton flow back to the inner compartment,the energy of their movements is used to add phosphate to ADP,forming ATP.

- A. Chemiosmosis
- B. Phosphorylation
- C. Glycolysis
- D. Fermentation

Answer: A



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2. In citric acid cycle, the step which is not mediated by dehydrogenase enzyme is :

- A. Oxaloacetic acid to citric acid
- B. Citric acid to α - ketoglutaric acid

C. Succinic acid to fumaric acid

D. Malic acid to oxaloacetic acid

Answer: A



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3. In mitochondrial electron transport system, for every two pairs of electrons that pass from NADH molecules through a sequential series of cytochrome enzymes to molecular oxygen generate :

A. 3 ATP

B. 4 ATP

C. 6 ATP

D. 2 ATP

Answer: C



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4. During alcoholic fermentation by yeast two molecules of glucose produce

A. 2 molecules of ethanol + 2 molecules of CO_2

B. 4 molecules ethanol + 4 molecules of CO_2

C. 6 molecules of ethanol + 6 molecules of CO_2

D. 3 molecules of ethanol + 3 molecules of CO_2

Answer: B



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5. In photophosphorylation, under the circumstances when NADP is not longer available as acceptor the electrons are passed to :

- A. Cytochrome f
- B. Plastocyanin
- C. Cytochrome B_6
- D. Quinone

Answer: C



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6. Which of these steps in Kreb's cycle indicates substrate level phosphorylation

- A. Conversion of succinic acid of - ketoglutaric acid
- B. Conversion of succinic acid to malic acid
- C. Conversion of succinyl CoA to succinic acid
- D. Conversion of malic acid to oxaloacetic acid

Answer: C



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7. In the electron transport system present in the inner mitochondrial membrane, complexes I and IV are respectively.

A. NADH dehydrogenase and FADH₂

B. FADH₂ and NADH dehydrogenase

C. NADH dehydrogenase and cytochrome oxidase complex

D. NADH dehydrogenase and ATP synthase

Answer: C



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8. Select the wrong statement :

A. When tripalmitin is used as a substrate in respiration the R.Q. is 0.7.

B. The intermediate compound which links glycolysis with Kreb's cycle is malic acid

C. One glucose molecule yields a net gain of 36 ATP molecules during aerobic respiration

D. One glucose molecule yields a net gain of 2 ATP molecules during fermentation

Answer: B



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9. Which of the following minerals activate the enzymes involved in respiration.

- A. Nitrogen and phosphorus
- B. Magnesium and manganese
- C. Potassium and calcium
- D. Sulphur and iron

Answer: B



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10. The site of glycolysis is

A. Cytoplasm

B. Chloroplast

C. Mitochondrial matrix

D. Mitochondrial inner membrane

Answer: A



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11. The first stable product in C_4 pathway is

A. OAA

B. PGA

C. PGAL

D. DHAP

Answer: A



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12. Energy equivalent of a NADH is which of the following numbers of ATP molecules ?

A. 2

B. 3

C. 38

D. 36

Answer: B



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13. When fats are respiratory substrate the value of R.Q would be

A. Approx. 0.7

B. Approx. 1.0

C. More than 1.0

D. None of these

Answer: A



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14. Glycolysis term has originated from Greek words

- A. Glycose and lysis
- B. Glycos and lysis
- C. Glyco and lysis
- D. Glucose and lysis

Answer: B



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15. Which of the following carbon is anomeric in glucose

A. C_1

B. C_2

C. C_4

D. None of these

Answer: A



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16. The cofactor of nitrate reductase is

A. Cu

B. Zn

C. Ca

D. Mo

Answer: D



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17. The substrate for pentose phosphate pathway is

A. Glucose - 6 - phosphate

B. Glycose - 1 - phosphate

C. Fructose - 6 - phosphate

D. Fructose - 1 - phosphate

Answer: A



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18. TCA cycle is named after

A. Embden

B. Hans Krebs'

C. Melvin Calvin

D. Robert Emerson

Answer: B



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19. Number of ATP molecules produced from 1 glucose molecule in aerobic respiration

A. 28

B. 32

C. 36

D. 20

Answer: C



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20. Consider the following statements with respect to respiration :

A. Glycolysis occurs in the cytoplasm of the cell.

B. Aerobic respiration takes place within the mitochondria.

C. Electron transport system is present in the outer mitochondrial membrane.

D. $C_{51}H_{98}O_6$ is the chemical formula of Tripalmitin, a fatty acid.

Answer: A



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21. Which of the metabolites is common to respiration mediated breakdown of fats, carbohydrates and proteins ?

- A. Acetyl CoA
- B. Glucose 6 phosphate
- C. Fructose 1, 6 biphosphate
- D. Pyruvic acid

Answer: A



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22. Substrate level phosphorylation occurs in TCA cycle during conversion of :

- A. Oxaloacetic acid to citric acid
- B. Succinyl CoA to succinic acid
- C. Succinic acid to fumaric acid
- D. Fumaric acid to malic acid

Answer: B



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23. Small protein attached to outer surface of inner mitochondrial membrane which acts as mobile carrier for transfer of electrons between complex III and IV is :

A. Cyt. a

B. Cyt. b

C. Cyt. c

D. Cyt. d

Answer: C



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24. Respiratory quotient of glucose is

A. 0.5

B. 0.7

C. 1.0

D. 1.5

Answer: C



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25. Which one is the first compound which is common for both glucose and fructose in glycolysis

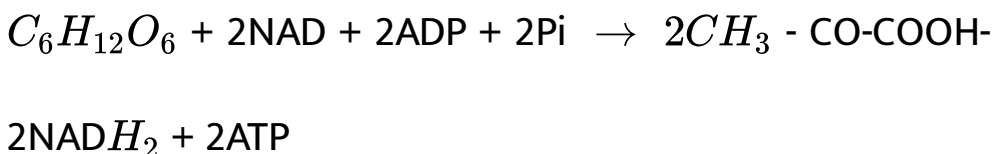
- A. Fructose 6 phosphate
- B. Glucose 6 phosphate
- C. Glucose 1,6 biphosphate
- D. Fructose 1 phosphate

Answer: A



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26. Which process does the following equation represent



- A. complete glycolysis
- B. complete aerobic respiration
- C. complete anaerobic respiration
- D. complete fermentation

Answer: A



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27. Which statement is wrong for Krebs' cycle ?

- A. There is one point in the cycle where FAD^+ is reduced of $FADH_2$

- B. During conversion of succinyl CoA to succinic acid, a molecule of GTP is synthesised
- C. The cycle starts with condensation of acetyl group (acetyl CoA) with pyruvic acid to yield citric acid
- D. There are three points in the cycle where NADP is reduced to $NADH + H^+$

Answer: C



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28. What is the role of NAD^+ in cellular respiration

- A. It functions as an electron carrier.
- B. It is a nucleotide source for ATP synthesis
- C. It functions as an enzyme.
- D. It is the final electron acceptor for anaerobic respiration.

Answer: B



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29. Which of the following is not a product of light reaction of photosynthesis

- A. NADH

B. NADPH

C. ATP

D. Oxygen

Answer: B



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30. Which of these statements is incorrect ?

A. Glycolysis occurs in cytosol.

B. Glycolysis operates as long as it is supplied with

NAD that can pick up hydrogen atoms.

C. Enzymes of TCA cycle are present in mitochondrial matrix.

D. Oxidative phosphorylation takes place in outer mitochondrial membrane.

Answer: D



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Competiton File B Matching Type Questions

1. Match the terms in column A with suitable terms in column B :



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2. Match the terms in column A with suitable terms in column B :



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Competiton File C Assertion Type Questions

1. Assertion : With in the mitochondrion, the proton grandient develops across the inter membrane space.

Reason : The place in mitochondrion where pH is lowest is inter membrane space.

A. If both Assertion and Reason are true and

Reason is correct explanation of Assertion.

B. If both Assertion and Reason are true but

Reason is not a 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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2. Assertion : In animal cells, first phase in breakdown of glucose is Krebs' cycle.

Reason : EMP pathway is another name for Krebs' cycle.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertion.

B. If both Assertion and Reason are true but Reason is not a correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: D

3. Assertion : Ubiquinone is non - protein coenzyme.

Reason : Ubiquinone acts as an activator in ETS.

- A. If both Assertion and Reason are true and Reason is correct explanation of Assertion.
- B. If both Assertion and Reason are true but Reason is not a correct explanation of Assertion.
- C. If Assertion is true but Reason is false.
- D. If both Assertion and Reason are false.

Answer: C

4. Assertion : There are 4 carbon atoms in an oxaloacetic acid molecule, which joins with an acetyl group during step 1 Krebs' Citric acid cycle.

Reason : There are 6 carbon atoms in citric acid molecule.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertion.

B. If both Assertion and Reason are true but Reason is not a 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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5. Assertion : Substrate for photorespiration is glycolate.

Reason : Glycolate acts as a respiratory substrate during during photorespiration as O_2 amount increases during photosynthesis.

A. If both Assertion and Reason are true and

Reason is correct explanation of Assertion.

- B. If both Assertion and Reason are true but Reason is not a 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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6. Assertion : Series of reactions in TCA cycle takes place in mitochondria.

Reason : Mitochondrial envelope contains all the

respiratory enzymes required for respiratory reactions.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertion.

B. If both Assertion and Reason are true but Reason is not a correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: C



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7. Assertion : Function of coenzymen A is to isomerize pyruvic acid.

Reason : Coenzyme A which combines with acetyl group is formed in part from one of the organic acids.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertion.

B. If both Assertion and Reason are true but Reason is not a correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: D



8. Assertion : Two ATP molecules are produced during anaerobic respiration.

Reason : Glucose is converted into pyruvic acid through a series of reactions with net gain of two ATP molecules.

A. If both Assertion and Reason are true and

Reason is correct explanation of Assertion.

B. If both Assertion and Reason are true but

Reason is not a correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: B



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9. Assertion : One $NADH_2$ yields three ATP molecules.

Reason : For transfer over ETS, H^+ atom dissociates into H^+ and e^- . During transfer of electrons at three stages ATP is generated over $F_0 - F_1$ complex.

A. If both Assertion and Reason are true and

Reason is correct explanation of Assertion.

- B. If both Assertion and Reason are true but Reason is not a 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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10. Assertion : The rate of respiration is reduced during storage of green at low temperature.

Reason : At low temperature, lot of CO_2 is produced thereby reducing the metabolism.

- A. If both Assertion and Reason are true and Reason is correct explanation of Assertion.
- B. If both Assertion and Reason are true but Reason is not a correct explanation of Assertion.
- C. If Assertion is true but Reason is false.
- D. If both Assertion and Reason are false.

Answer: C



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11. Assertion : Mitochondria is known as power house of cell.

Reason : ATP production takes place here.

- A. If both Assertion and Reason are true and Reason is correct explanation of Assertion.
- B. If both Assertion and Reason are true but Reason is not a 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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12. Assertion : Glycolysis takes place in the cytoplasm and produces only 2 ATP and 2 NADH.

Reason : Glycolysis is anaerobic process and cannot oxidise the substrate fully.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertion.

B. If both Assertion and Reason are true but Reason is not a 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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Competiton File D Reasoning Type Questions

1. R.Q. is less than one when aerobic respiration takes place in fats or proteins.

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2. Glycolysis is also called EMP pathway.

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3. During strenuous exercise or physical work, the demand for oxygen increase several fold so that it does not diffuse into skeletal muscle fibres at the rates required by them.



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4. In Kerbs' cycle malate is dehydrogenated to produce oxaloacetate.



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5. NAD functions in cell respiration as an co-enzyme.



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6. Transfer of energy in animal cell is in the form of ATP.



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7. During which stage in the complete oxidation of glucose are the greatest number of ATP molecules formed from ADP

Or

Largest amount of phosphate bond energy is produced in the process of respiration during

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8. Potential energy stored in organic molecules is converted into chemical energy in high energy phosphate bonds of ATP.

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9. The inner membranes of mitochondria and chloroplasts have ATPase enzymes attached to one face only and contain molecules of the electron transport system.

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1. In which of the following reaction of glycolysis, a molecule of water is removed from the substrate

A. Fructose - 6 - phosphate \rightarrow fructose 1, 6-
bisphosphate

B. 3 - phosphate glyceraldehyde \rightarrow 1, 3
bisphosphoglyceric acid

C. PEP \rightarrow pyruvic acid

D. 2-phosphoglycerate \rightarrow PEP

Answer: D





2. The chemiosmotic coupling hypothesis of oxidative phosphorylation proposes that adenosine triphosphate (ATP) is formed because

A. A proton gradient forms across the inner membrane

B. There is a change in the permeability of the inner membrane

C. There is a change in the permeability of the inner mitochondrial proteins

D. ADP is pumped out of the matrix into the intermembrane space.

Answer: A



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3. In germinating seeds fatty acids are degraded exclusively in the

- A. Peroxisomes
- B. Mitochondria
- C. Proplastids
- D. Glyoxysomes

Answer: B



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4. The energy-releasing process in which the substrate is oxidised without an external electron acceptor is called

- A. Aerobic respiration
- B. Glycolysis
- C. Fermentation
- D. Photorespiration

Answer: B



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5. In cellular respiration, the final acceptor molecule of proton is :

A. NAD

B. FAD

C. NADP

D. Oxygen

Answer: A



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6. The enzyme for TCA cycle are present in

A. Cytoplasm

B. Inter membrane space of mitochondria

C. Mitochondrial matrix

D. Inner membrane of mitochondria

Answer: C



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7. In hurdle race, what is major source of energy to leg muscle

A. Preformed ATP

B. Glycolysis

C. Pyruvate and lactate

D. Oxidative metabolism

Answer: C



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8. Oxidative phosphorylation refers to

A. Anaerobic production of ATP

B. Citric acid cycle production of ATP

C. Production of ATP by chemiosmosis

D. Alcoholic fermentation

Answer: C



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9. Acetyl CoA is produced from pyruvate by

A. Oxidative decarboxylation

B. Oxidative photophosphorylation

C. Oxidative hydrogenation

D. Oxidative photorespiration

Answer: A



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10. Aerobic respiratory pathway is appropriately termed

A. Catabolic

B. Parabolic

C. Amphibolic

D. Anabolic

Answer: C



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Chapter Practice Test

1. Why oxygen is an ultimate acceptor of electrons in electron transport chain in respiration ?



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2. Name a inhibitor of oxidative phosphorylation.



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3. Find the value of RQ when fats (E.g. Tripalmitin) are used in respiration.

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4. Name the substrate entrant of Krebs' cycle.

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5. At which steps ATP is synthesized in glycolysis ?

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6. When metabolic water is formed during respiration ?

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7. What is biological oxidation ?

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8. Which intermediate is oxidised during glycolysis to form $NADH + (H^+)$?

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9. If a person is feeling dizzy, glucose or fruit juice is given immediately but not cheese sandwich, which might have more energy. Explain.



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10. How many molecules of $NADH(+H^+)$ are produced in single turn of Krebs' cycle ?



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11. (i) Expand ATP

(ii) Name any three ETC inhibitors.

(iii) What is Pasteur effect ?



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12. How fatigue occurs in human beings ?



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13. Distinguish between the following :

(a) Aerobic respiration and anaerobic respiration.



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14. Describe 'Pentose phosphate pathway' briefly.



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15. Differentiate between alcoholic fermentation and lactic acid fermentation.



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16. Explain the major steps of glycolysis. Where does this process occur in a cell ?



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