



BIOLOGY

BOOKS - KUMAR PRAKASHAN KENDRA BIOLOGY (GUJRATI ENGLISH)

RESPIRATION IN PLANTS

Section A Exam Oriented Questions Answer From Darpan

1. Give the necessity of respiration in living organisms.



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2. What is respiration ? Explain about respiratory substrates

.

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3. Do plants breathe ?

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4. Why do plants don't have respiratory organs ?

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5. Explain : The major surface of plant is in contact of air



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6. Mention the stages of respiration.



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7. Describe first stage of respiration.



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8. Describe the process of respiration occurring in cytoplasm.



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9. Describe anaerobic phase of aerobic respiration

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10. Explain EMP (Embden, meyrhof and parnas) Pathway.

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11. Describe the phase till formation of two molecules of pyruvic acid from Glucose takes place. OR Describe :



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12. Describe the process of fermentation in detail.

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13. Which main events occur in aerobic respiration ?

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14. Which are intermediate processes occurring in Glycolysis and Krebs cycle ?

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15. Describe : Tricarboxylic acid cycle OR describe Kreb's cycle

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16. Describe the process occurring in matrix of mitochondria.

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17. What is oxidative phosphorylation ?

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18. Describe the reaction occurring in membrane of Cristae of mitochondria .

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19. Explain chemiosmotic hypothesis

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20. Give explanation of synthesis of ATP in mitochondria.

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21. Describe the respiratory balance sheet.



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22. Discuss "The respiratory pathway is an amphibolic pathway "



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23. Describe metabolic processes of respiratory pathway.



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24. Describe : Respiratory Quotient.



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Section B Difference Scientific Reasons

1. Aerobic respiration and Anaerobic respiration



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2. Glycolysis and Fermentation .



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3. Glycolysis and citric acid cycle



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4. The actual process of respiration occurs in protoplasm of the cell.

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5. The rate of respiration is slow in plants.

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6. Krebs. cycle is an important process.

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7. Amphibolic Pathway is seen in respiration.



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Section C Location Function Full Name Formulas

1. What are called stomata ?



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2. Matrix :



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3. Cristae :



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4. ATPase :

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5. RQ :

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6. TCA:

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7. FAD:



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8. NAD:



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9. GTP:



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10. GDP:



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11. Pi :



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12. PGAL :



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13. DHAP:



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14. CoA :



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15. BPGA :

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16. PGA:

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17. PEP :

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18. TPP :



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19. ATPase :



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20. EMP :



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21. $C_6H_{12}O_6$:



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22. C_2H_5OH :

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23. $CH_3COH \cdot COOH$:

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24. $CH_3CO \cdot COOH$:

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25. $2(COOH)_2$:

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26. $2(C_{51}H_{98}O_6)$:

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Section D Textual Exercise

1. Differentiate between : Respiration and Combustion

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

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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 overview of Krebs cycle.

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6. Distinguish between the following : (a) Aerobic respiration and anaerobic respiration (b) Glycolysis and fermentation (C) Glycolysis and Citric acid cycle.

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

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8. Discuss "The respiratory pathway is an amphibolic pathway "

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

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10. What is oxidative phosphorylation ?

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

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Section E Solution Of Ncert Exemplar Multiple Choice Question

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

(A) Cytochrome

(B) Oxygen

(C) Hydrogen

(D) Glucose

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

A. Phosphoglucomutase

B. Phosphoglucoisomerase

C. Hexokinase

D. Phosphorylase

Answer: A::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

(B) $CO_2 + H_2O$

(C) Acetyl CoA + CO_2

(D) Ethanol + CO_2

A. Lactic acid

B. $CO_2 + H_2O$

C. Acetyl CoA + CO_2

D. Ethanol + CO_2

Answer: A::B::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

- A. Outer membrane
- B. Inter membrane space
- C. Inner membrane
- D. Matrix

Answer: A::B::C



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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

A. Growing shoot apex

B. Germinating seed

C. Root tip

D. Leaf bud

Answer: A::B::D



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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 is vital in respiration for removal of hydrogen.
- (D) There is complete breakdown of glucose in fermentation.

A. Pyruvate is formed in the mitochondrial matrix

B. During the conversion of succinyl Co-A to succinic acid
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C. Oxygen is vital in respiration for removal of hydrogen.

D. There is complete breakdown of glucose in fermentation.

Answer: A::C::D



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7. Mitochondria are called powerhouses of the cell. Which of the following observations supports this statement ?

(A) Mitochondria synthesis 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.

A. Mitochondria synthesis 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::C::D



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8. The end product of oxidative phosphorylation is

(A) NADH

(B) Oxygen

(C) ADP

(D) $ATP + H_2O$

A. NADH

B. Oxygen

C. ADP

D. $ATP + H_2O$

Answer: A::B::D



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9. Match the following column .

Column -I

- (a) Molecular oxygen
- (b) Electron acceptor
- (c) Pyruvate dehydrogenase
- (d) Decarboxylation

Column-II

- (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)

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::B::C::D



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Section E Solution Of Ncert Exemplar Very Short Type Questions

1. Energy is released during the oxidation of compounds in respiration. How is this energy stored and released as and when its 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 oxidized during respiration. How does Respiratory Quotient (RQ) indicate which type of substrate, i.e., carbohydrate, fat or protein is getting oxidized? $R.Q. = \frac{A}{B}$. 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 .

(a) 1 gm of fat

(b) 1 gm of protein

(c) 1 gm of glucose

(d) 0 . 5 gm of protein + 0 . 5 gm glucose

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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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Section E Solution Of Ncert Exemplar Short Answer Type Question

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



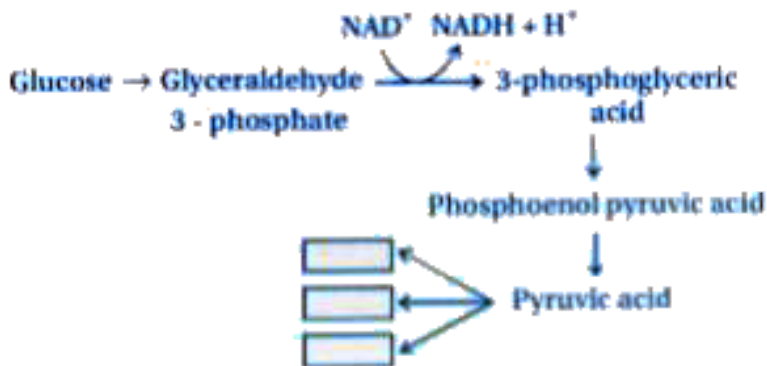
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2. What is meant by the statement "aerobic respiration is more efficient " ?



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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 provided 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 organisms 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 substances inside living cells. In this statement about respiration explain the meaning of (a) Step-wise oxidation breakdown (b) Organic substances (used as substrates)



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7. Comment on 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. Discuss "The respiratory pathway is 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 carriers 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 metabolized, 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 in terms 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
- (c) 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 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. Respiratory pathway is believed to be a catabolic pathway. However, nature of TCA cycle is amphibolic .

Explain.



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23. 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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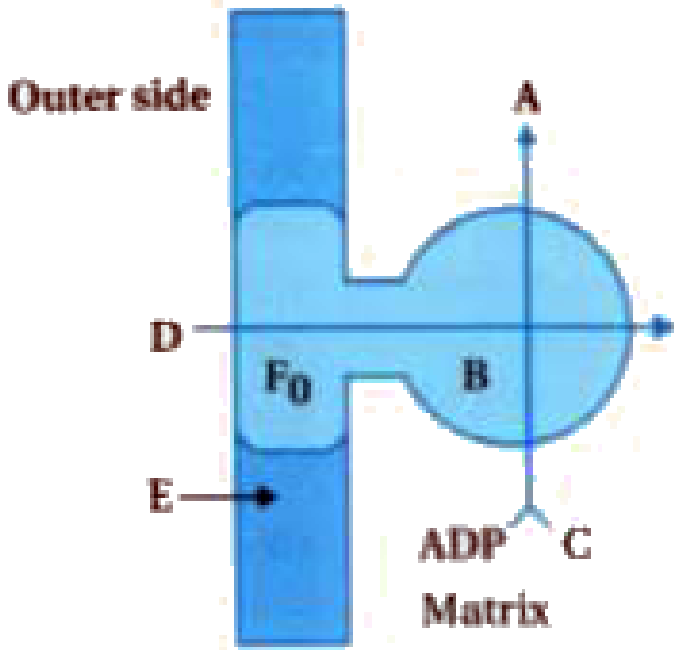
Section E Solution Of Ncert Exemplar Long Answer Type Questions

1. In the following flow chart, replace the symbols a, b, c and d 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 below, F_1 , particle, formation of H^+ , 2H^+ , inner mitochondrial membrane, ATP, F_0 particle,

ADP.



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

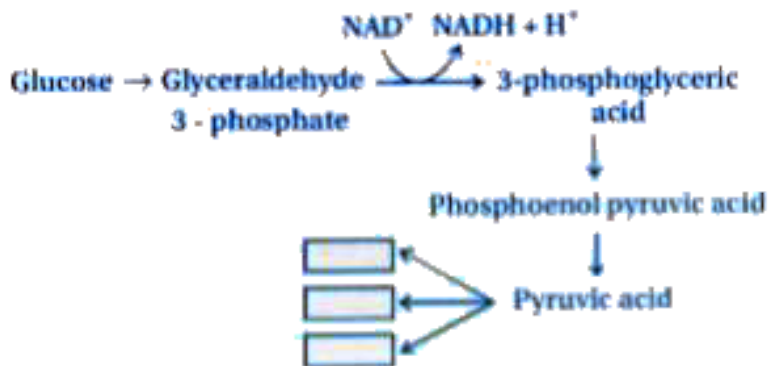
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4. Enumerate the assumptions that we undertake in making the respiratory balance sheet. Are these assumptions valid for a living system ? Compare fermentation and aerobic respiration in this context .

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5. 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 provided in the

diagram



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Questions From Module Important Mcq For Neet

1. Which common biomolecules obtained from the following due to breakdown of fat carbohydrates and protein ?

(A) Fructose -1,6-biphosphate

(B) Pyruvic acid

(C) Acetyl CO-A

(D) Glucose 6-phosphate

A. Fructose 1-6 biphosphate

B. Pyruvic acid

C. Acetyl COA

D. Glucose 6-phosphate

Answer: A::C



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2. Cytochrome is found in

(A) Cristae of mitochondria

(B) Lysosomes

(C) Matrix of mitochondria

(D) Outer membrane of mitochondria

A. Cristae of mitochondria

B. Lysosomes

C. Matrix of mitochondria

D. Outer membrane of mitochondria

Answer: A::C::D



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3. In which process CO_2 is not released ?

(A) Aerobic respiration in plants

(B) Aerobic respiration in animals

(C) Alcoholic fermentation

(D) Lactic acid fermentation

A. Aerobic respiration in plants

B. Aerobic respiration in animals

C. Alcoholic fermentation

D. Lactic acid fermentation

Answer: A::C::D

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4. When tripalmitin (fatty acid) is used as respiratory substance, which of the following figure shows true respiratory quotient ?

(A) 1

(B) 0.7

(C) 0.9

(D) 1.1

A. 1

B. 0.7

C. 0.9

D. 1.1

Answer: A::D



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Questions From Module Question Paper

1. Write following answers briefly : (Each of 1 mark)

1) Why respiratory organs are absent in plants ?

2) Why RQ of lipid is less ?

3) Why is less energy produced in anaerobic respiration ?

4) Which component links glycolysis and krebs cycle ?

5) State the location and importance of chemiosmotic process.

6) In amphibolic pathway which component links DHAP and lipid ?



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2. Answer the following question : (2 marks) 1) Why is glycolysis known as anaerobic phase of aerobic respiration ?

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3. Answer the following questions with specific points :

1) Explain formation of H_2O and ATP during electron transport system and oxidative phosphorylation.

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