

# BOTANY

ENTHUSIAST | LEADER | ACHIEVER



## EXERCISE

### Respiration in Plants

---

ENGLISH MEDIUM

---

## EXERCISE-I (Conceptual Questions)

## Build Up Your Understanding

**INTRODUCTION TO AEROBIC RESPIRATION (KREBS CYCLE)**

1. Energy obtained by a cell from catabolic reaction is stored immediately in the form of  
 (1) Pyruvic acid (2) Glucose  
 (3) ATP (4) DNA

CR0001

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

CR0004

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

CR0007

4. Pyruvate dehydrogenase complex is used in converting –  
 (1) Pyruvate to glucose  
 (2) Glucose to pyruvate  
 (3) Pyruvic acid to lactic acid  
 (4) Pyruvate to acetyl Co-A

CR0009

5. The first member or acceptor of acetyl Co-A in TCA cycle is :-  
 (1) Oxalo succinic acid  
 (2) Oxalo acetic acid  
 (3) Citric acid  
 (4) Cis aconitic acid

CR0010

6. Excess of ATP inhibits the enzyme :-  
 (1) Phosphofructokinase  
 (2) Hexokinase  
 (3) Aldolase (Lyases)  
 (4) Pyruvate decarboxylase

CR0011

7. End product of glycolysis is :-  
 (1) Citric acid  
 (2) Glyceraldehyde  
 (3) Phosphoglyceraldehyde  
 (4) Pyruvic acid

CR0012

8. Respiration in plants :-  
 (1) Occurs only during day  
 (2) Results in the formation of vitamins  
 (3) Occurs both during day and night  
 (4) Often requires CO<sub>2</sub>

CR0014

9. The end products of respiration in plants are :-  
 (1) CO<sub>2</sub>, H<sub>2</sub>O and energy  
 (2) Starch and O<sub>2</sub>  
 (3) Sugar and O<sub>2</sub>  
 (4) H<sub>2</sub>O and energy

CR0015

10. Common immediate source of energy in cellular activity is :-  
 (1) glucose (2) aldohexose  
 (3) ATP (4) NAD

CR0017

11. The net gain of ATP molecules by glycolysis is -  
 (1) Zero (2) Two (3) Four (4) Eight

CR0019

12. Respiratory enzymes are localised in :-  
 (1) Ribosomes (2) Chloroplast  
 (3) Mitochondria (4) Chromoplast

CR0023

13. The organism in which Kreb's cycle does not occur in mitochondria is :-  
 (1) Yeast (2) *E.coli*  
 (3) *Ulothrix* (4) Plants

CR0025

- 14.** The first preferred respiratory substrate is :-  
 (1) Glucose (2) Fats  
 (3) Proteins (4) Polypeptides  
**CR0027**
- 15.** Respiration occurs in :-  
 (1) All living cells both in day and night  
 (2) Non green cells only in day  
 (3) Non green cells in both day and night  
 (4) All living cells in day only  
**CR0028**
- 16.** Respiration may take place –  
 (1) In the presence of  $O_2$   
 (2) In the absence of  $O_2$   
 (3) In the presence or absence of  $O_2$   
 (4) Only in the presence of  $CO_2$   
**CR0034**
- 17.** The common phase between aerobic & anaerobic respiration is :-  
 (1) TCA cycle  
 (2) Krebs's cycle  
 (3) Glycolysis  
 (4) Photo respiration  
**CR0035**
- 18.** The enzyme which converts glucose to glucose-6-phosphate -  
 (1) Phosphorylase  
 (2) Gluco-phosphorylase  
 (3) Hexokinase  
 (4) Phosphoglucomutase  
**CR0036**
- 19.** Product formed by the activity of malic dehydrogenase is :-  
 (1) Fumaric acid  
 (2) Malic acid  
 (3) Oxaloacetic acid  
 (4) Succinic acid  
**CR0043**
- 20.** Which of the following is 5-carbon compound of Krebs's cycle ?  
 (1) Citric acid  
 (2) Fumaric acid  
 (3) Oxalosuccinic acid  
 (4)  $\alpha$  - Ketoglutaric acid  
**CR0044**
- 21.** SLP net gain of ATP from one molecule of glucose during glycolysis or EMP pathway–  
 (1) 2 ATP (2) 6 ATP  
 (3) 36 ATP (4) 38 ATP  
**CR0063**
- 22.** Which enzyme breaks the fructose-1, 6-bisphosphate ?  
 (1) Hexokinase  
 (2) Phosphatase  
 (3) Aldolase  
 (4) Phosphofructokinase  
**CR0065**
- 23.** Acceptor of acetyl Co-A in Krebs-cycle is :-  
 (1) Malic acid  
 (2) Fumaric acid  
 (3)  $\alpha$ -ketoglutaric acid  
 (4) Oxalo acetic acid  
**CR0066**
- 24.** In which one of the following do the two names refer to one and the same thing ?  
 (1) Krebs cycle and Calvin cycle  
 (2) Tricarboxylic acid cycle and citric acid cycle  
 (3) Citric acid cycle and Calvin cycle  
 (4) Tricarboxylic acid cycle and urea cycle  
**CR0072**
- AEROBIC RESPIRATION (ETS) TO REPIRATORY QUOTIENT**
- 25.** Which component of ETS is mobile carrier ?  
 (1) UQ (CO-Q) (2) Cyt-a  
 (3) Cyt-b (4) Cyt-f  
**CR0002**

26. R.Q. is less than one at the time of respiration of—  
 (1) Starch (2) Sugarcane  
 (3) Glucose (4) Ground nut  
**CR0003**
27. Conversion of pyruvic acid into ethyl alcohol is mediated by —  
 (1) Phosphatase  
 (2) Dehydrogenase  
 (3) Decarboxylase & dehydrogenase  
 (4) Catalase  
**CR0006**
28. Which of the following is link between carbohydrate and fat metabolism ?  
 (1)  $\text{CO}_2$  (2) Acetyl Co-A  
 (3) Pyruvic acid (4) Citric acid  
**CR0008**
29. In the electron transport chain during terminal oxidation, the cytochrome, which donates electrons to  $\text{O}_2$  is ?  
 (1) Cytochrome-b  
 (2) Cytochrome-C  
 (3) Cytochrome- $\text{a}_3$   
 (4) Cytochrome-f  
**CR0013**
30. The incomplete breakdown of sugars in anaerobic respiration results in the formation of :—  
 (1) Fructose and water  
 (2) Glucose and  $\text{CO}_2$   
 (3) Alcohol and  $\text{CO}_2$   
 (4) Water and  $\text{CO}_2$   
**CR0016**
31. Cytochromes are concerned with :—  
 (1) Protein synthesis  
 (2) Cellular digestion  
 (3) Cell division  
 (4) Cell-respiration  
**CR0020**
32. In respiration pyruvic acid is :—  
 (1) Formed only when oxygen is available  
 (2) One of the products of Krebs cycle  
 (3) Broken down into Acetyl Co-A and  $\text{CO}_2$   
 (4) Oxidised into Alcohol  
**CR0021**
33. Number of ATP molecules formed during aerobic respiration in break down of one glucose molecule via malate aspartate shuttle, is :—  
 (1) 38 (2) 18 (3) 28 (4) 4  
**CR0024**
34. What causes R.Q. to vary ?  
 (1) Respiratory Substrate  
 (2) Light &  $\text{O}_2$   
 (3) Respiratory Product  
 (4) Temperature  
**CR0026**
35. When the evolution of  $\text{CO}_2$  is more than the intake of  $\text{O}_2$ , the respired substrate should be :—  
 (1) Fatty acid (2) organic acid  
 (3) Glucose (4) Polysaccharides  
**CR0033**
36. Which of the following ETS complex is inhibited by cyanide ?  
 (1) Complex II (2) Complex V  
 (3) Complex IV (4) Complex III  
**CR0038**
37. How many molecules of ATP are produced per molecule of  $\text{FADH}_2$  oxidised ?  
 (1) One (2) Two (3) Three (4) four  
**CR0039**
38. How many ATP molecules produced from the complete oxidation of a molecule of acetyl Co-A ?  
 (1) 38 ATP (2) 15 ATP  
 (3) 12 ATP (4) 4 ATP  
**CR0041**

**39.** How many ATP equivalents are produced by the oxidation of succinate into fumarate?

- (1) 1 ATP (2) 2 ATP  
(3) 3 ATP (4) 4 ATP

**CR0042**

**40.** How many net ATP generates in aerobic respiration via glycerol phosphate shuttle in eukaryotes ?

- (1) 38 ATP (2) 36 ATP  
(3) 40 ATP (4) 80 ATP

**CR0060**

**41.** During protoplasmic respiration, the R.Q. [Respiratory Quotient] will be :-

- (1) between 1 and 2  
(2) between 2 and 3  
(3) between 0 and 1  
(4) between 3 and 4

**CR0221**

**42.** Anaerobic respiration takes place in :-

- (1) Ribosome (2) Mitochondria  
(3) Cytoplasm (4) Vacuole

**CR0068**

**43.** During the formation of bread, it becomes porous due to release of CO<sub>2</sub> by the action of :-

- (1) Yeast (2) Bacteria  
(3) Virus (4) Protozoans

**CR0069**

**44.** 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) Accumulation of Cl ions

**CR0077**

**45.** Curd formation is the result of :-

- (1) aerobic respiration  
(2) glycolysis only  
(3) lactic acid fermentation  
(4) alcoholic fermentation

**CR0200**

**EXERCISE-I (Conceptual Questions)**

**ANSWER KEY**

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	3	2	4	4	2	1	4	3	1	3	2	3	2	1	1
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	3	3	3	3	4	1	3	4	2	1	4	3	2	3	3
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	4	3	1	1	2	3	2	3	2	2	3	3	1	1	3

## EXERCISE-II (Previous Year Questions)

## AIPMT/NEET

## AIPMT 2007

1. The overall goal of glycolysis, Krebs cycle and the electron transport system is the formation of:-

- (1) Nucleic acids
- (2) ATP in small stepwise units
- (3) ATP in one large oxidation reaction
- (4) Sugars

CR0085

2. All enzymes of TCA cycle are located in the mitochondrial matrix except one which is located in inner mitochondrial membrane in eukaryotes and in cytosol in prokaryotes. This enzyme is:-

- (1) Succinate dehydrogenase
- (2) Lactate dehydrogenase
- (3) Isocitrate dehydrogenase
- (4) Malate dehydrogenase

CR0086

3. Which one of the following mammalian cells are not capable of metabolising glucose to carbon-dioxide aerobically ?

- (1) Red blood cells
- (2) White blood cells
- (3) Unstriated muscle cells
- (4) Liver cells

CR0087

## AIPMT 2008

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

- (1) A proton gradient forms across the inner membrane
- (2) There is a change in the permeability of the inner mitochondrial membrane toward adenosine diphosphate (ADP)

- (3) High energy bonds are formed in mitochondrial proteins
- (4) ADP is pumped out of the matrix into the intermembrane space

CR0089

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

- (1) Aerobic respiration
- (2) Glycolysis
- (3) Fermentation
- (4) Photorespiration

CR0090

## AIPMT 2009

6. Aerobic respiratory pathway is appropriately termed :-

- (1) Parabolic
- (2) Amphibolic
- (3) Anabolic
- (4) Catabolic

CR0092

## AIPMT-Pre 2010

7. The energy-releasing metabolic process in which substrate is oxidised without an external electron acceptor is called :

- (1) Glycolysis
- (2) Fermentation
- (3) Aerobic respiration
- (4) Photorespiration

CR0093

## AIPMT-Mains 2011

8. In mitochondria, protons accumulate in the :

- (1) Matrix
- (2) Outer membrane
- (3) Inner membrane
- (4) Intermembrane space

CR0097

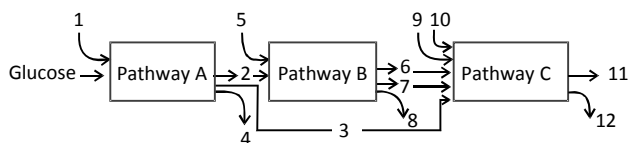
## NEET-UG 2013

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

- (1) Acetyl CoA
- (2) Glucose-6-phosphate
- (3) Fructose 1,6-bisphosphate
- (4) Pyruvic acid

CR0100

10. The three boxes in this diagram represent the three major biosynthetic pathways in aerobic respiration. Arrows represent net reactants or products.



Arrow numbered 4, 8 and 12 can all be :

- (1)  $\text{FAD}^+$  or  $\text{FADH}_2$
- (2)  $\text{NADH}$
- (3)  $\text{ATP}$
- (4)  $\text{H}_2\text{O}$

CR0102

**AIPMT 2014**

11. In which one of the following processes  $\text{CO}_2$  is **not** released ?
- (1) Aerobic respiration in plants
  - (2) Aerobic respiration in animals
  - (3) Alcoholic fermentation
  - (4) Lactate fermentation

CR0103

**AIPMT 2015**

12. Cytochromes are found in :-
- (1) Outer wall of mitochondria
  - (2) Cristae of mitochondria
  - (3) Lysosomes
  - (4) Matrix of mitochondria

CR0201

**NEET-II 2016**

13. Which of the following biomolecules is common to respiration-mediated breakdown of fats, carbohydrates and proteins ?
- (1) Pyruvic acid
  - (2) Acetyl CoA
  - (3) Glucose-6-phosphate
  - (4) Fructose 1,6-bisphosphate

CR0105

**NEET(UG) 2017**

14. Which statement is wrong for Krebs' cycle ?
- (1) There is one point in the cycle where  $\text{FAD}^+$  is reduced to  $\text{FADH}_2$
  - (2) During conversion of succinyl CoA to succinic acid, a molecule of GTP is synthesised
  - (3) The cycle starts with condensation of acetyl group (acetyl CoA) with pyruvic acid to yield citric acid
  - (4) There are three points in the cycle where  $\text{NAD}^+$  is reduced to  $\text{NADH} + \text{H}^+$

CR0110

**NEET(UG) 2018**

15. What is the role of  $\text{NAD}^+$  in cellular respiration ?
- (1) It functions as an enzyme
  - (2) It functions as an electron carrier
  - (3) It is a nucleotide source for ATP synthesis
  - (4) It is the final electron acceptor for anaerobic respiration

CR0116

16. Which of these statements is **incorrect** ?
- (1) Enzymes of TCA cycle are present in mitochondrial matrix.
  - (2) Glycolysis occurs in cytosol.
  - (3) Glycolysis operates as long as it is supplied with  $\text{NAD}^+$  that can pick up hydrogen atoms.
  - (4) Oxidative phosphorylation takes place in outer mitochondrial membrane.

CR0117

**NEET(UG) 2019**

17. Respiratory Quotient (RQ) value of tripalmitin is :
- (1) 0.9
  - (2) 0.7
  - (3) 0.07
  - (4) 0.09

CR0195



18. Conversion of glucose to glucose-6-phosphate, the first irreversible reaction of glycolysis, is catalyzed by :

(1) Aldolase  
(2) Hexokinase  
(3) Enolase  
(4) Phosphofructokinase

CR0196

## NEET(UG) 2019 (Odisha)

19. Where is respiratory electron transport system (ETS) located in plants ?

(1) Mitochondrial matrix  
(2) Outer mitochondrial membrane  
(3) Inner mitochondrial membrane  
(4) Intermembrane space

CR0199

## NEET(UG) 2020

20. The number of substrate level phosphorylations in one turn of citric acid cycle is :

(1) Three (2) Zero (3) One (4) Two

CR0202

## NEET(UG) 2020 (COVID-19)

21. Pyruvate dehydrogenase activity during aerobic respiration requires :-

(1) Calcium (2) Iron  
(3) Cobalt (4) Magnesium

CR0203

## NEET(UG) 2021

22. Which of the following statements is incorrect ?

(1) During aerobic respiration, role of oxygen is limited to the terminal stage.  
(2) In ETC (Electron Transport Chain), one molecule of  $\text{NADH} + \text{H}^+$  gives rise to 2 ATP molecules, and one  $\text{FADH}_2$  gives rise to 3 ATP molecules.  
(3) ATP is synthesized through complex V.  
(4) Oxidation-reduction reactions produce proton gradient in respiration.

CR0204

## NEET(UG) 2021 (Paper-2)

23. In glycolysis, ATP is synthesised during the conversion of

(1) Glucose to glucose 6-phosphate  
(2) Fructose 6-phosphate to fructose 1,6-bisphosphate  
(3) 1,3-bisphosphoglyceric acid to 3-phosphoglyceric acid  
(4) Both (2) and (3)

CR0222

## NEET(UG) 2022

24. What is the net gain of ATP when each molecule of glucose is converted to two molecules of pyruvic acid ?

(1) Six (2) Two  
(3) Eight (4) Four

CR0223

25. What amount of energy is released from glucose during lactic acid fermentation?

(1) More than 18%  
(2) About 10%  
(3) Less than 7%  
(4) Approximately 15%

CR0224

## NEET(UG) 2022 (OVERSEAS)

26. Match List - I with List - II

## List - I

## List - II

(a) ETS complex-I	(i) Cyt $\text{bc}_1$
(b) ETS complex-II	(ii) Cyt a, $\text{a}_3$ and 2 copper centres
(c) ETS complex-III	(iii) NADH dehydrogenase
(d) ETS complex-IV	(iv) Ubiquinone and FADH dehydrogenase

Choose the **correct answer** from the options given below:

(1) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)  
(2) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)  
(3) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)  
(4) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

CR0225



27. Identify the cytochrome which acts as a mobile carrier for the transfer of electrons between complex III and IV?

- (1) Cytochrome-a<sub>3</sub>
- (2) Cytochrome-b, c<sub>1</sub>
- (3) Cytochrome-c
- (4) Cytochrome-a

CR0226

29. The 5-C compound formed during TCA cycle is:

- (1)  $\alpha$ -ketoglutaric acid
- (2) Oxalosuccinic acid
- (3) Succinic acid
- (4) Fumaric acid

CR0228

**Re-NEET(UG) 2022**

28. The number of time(s) decarboxylation of isocitrate occurs during single TCA cycle is :

- (1) One
- (2) Two
- (3) Three
- (4) Four

CR0227

**EXERCISE-II (Previous Year Questions)**

**ANSWER KEY**

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	2	1	1	1	3	2	2	4	1	3	4	2	2	3	2
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
Ans.	4	2	2	3	3	4	2	3	2	3	3	3	2	1	

## EXERCISE-III

## Master Your Understanding

## EXERCISE-III(A) NCERT BASED QUESTIONS

1. Glycolysis is present in :-  
 (1) Plants and animals only.  
 (2) Plants, animals and fungi only.  
 (3) Animals only.  
 (4) All living organisms.  
**CR0165**
2. The RQ for proteins is :  
 (1) 1 (2) 0.7  
 (3) 0.9 (4) 0  
**CR0127**
3. Glycerol would enter the respiratory pathway only after being converted to –  
 (1) Fatty acid (2) Acetyl CoA  
 (3) PGAL (4) Pyruvic acid  
**CR0128**
4. Final Decarboxylation in Krebs cycle occur between–  
 (1) Citric acid and  $\alpha$ -ketoglutaric acid  
 (2)  $\alpha$ -ketoglutaric acid and succinic acid  
 (3) Succinic acid and malic acid  
 (4) Malic acid and oxalo acetic acid  
**CR0129**
5. Pyruvate, which is formed by the glycolytic catabolism of carbohydrates in the cytosol, after it enters mitochondrial matrix, undergoes :-  
 (1) Oxidative carboxylation  
 (2) Oxidative decarboxylation  
 (3) Reductive carboxylation  
 (4) Carboxylation  
**CR0130**
6. The products formed from glycolysis are :-  
 (1) Pyruvate,  $\text{CO}_2$ , ATP  
 (2) Pyruvate, ATP,  $\text{NADH}+\text{H}^+$   
 (3) Acetyl CoA, ATP,  $\text{NADH}+\text{H}^+$   
 (4) Acetyl CoA, ATP,  $\text{H}_2\text{O}$   
**CR0167**
7. During conversion of succinyl Co-A to succinic acid a molecule of GTP is formed, this process is known as :-  
 (1) Oxidative phosphorylation  
 (2) Substrate level phosphorylation  
 (3) Photophosphorylation  
 (4) Terminal oxidation  
**CR0133**
8. In Glycolysis, glucose form two molecules of pyruvic acid, this is called :-  
 (1) Complete oxidation  
 (2) Partial oxidation  
 (3) Photooxidation  
 (4) Terminal oxidation  
**CR0134**
9. How many ATP molecules are directly synthesised in glycolysis?  
 (1) 6ATP (2) 4ATP (3) 36ATP (4) 8ATP  
**CR0135**
10. When carbohydrates are used as substrate & anaerobically oxidised; the value of RQ will be :-  
 (1) 1 (2) 0  
 (3)  $\infty$  (4) less than 1  
**CR0137**
11. Which act as final hydrogen acceptor in ETS ?  
 (1) Oxygen (2)  $\text{NAD}^+$   
 (3) FAD (4)  $\text{NADP}^+$   
**CR0138**
12. Number of ATP produced when 1 molecule of pyruvic acid is used as respiratory substrate?  
 (1) 15 (2) 12 (3) 3 (4) 36  
**CR0139**

- 13.** Which of the following is the energy yielding step of glycolysis?  
 (1) Glucose  $\rightarrow$  Glucose-6-phosphate  
 (2) BPGA  $\rightarrow$  PGA  
 (3) Fructose 1, 6 biphosphate  $\rightarrow$  PGAL  
 (4) Phosphoglycerate  $\rightarrow$  phosphoenolpyruvate  
**CR0140**
- 14.** The passing on of the electrons removed as part of the hydrogen atoms to molecular oxygen with synthesis of ATP, the site of this process located—  
 (1) in the matrix of the mitochondria  
 (2) in the cytoplasm  
 (3) in the intermembrane space of mitochondria  
 (4) on the inner membrane of the mitochondria  
**CR0141**
- 15.** In TCA cycle, isomerisation of citrate is followed by how many decarboxylation(s) to form succinic acid?  
 (1) Two (2) Three  
 (3) One (4) Four  
**CR0142**
- 16.** In glycolysis there is no :-  
 (1) oxidation  
 (2) decarboxylation  
 (3) dehydrogenation  
 (4) splitting of C-C bonds  
**CR0146**
- 17.** Which of the following is not an intermediate of Krebs cycle ?  
 (1) OAA  
 (2)  $\alpha$ -ketoglutarate  
 (3) Malate  
 (4) PGAL  
**CR0168**
- 18.** What is the product of two decarboxylations and two oxidation of isocitric acid ?  
 (1)  $\alpha$ -ketoglutaric acid  
 (2) Succinyl Co A  
 (3) Succinic acid  
 (4) Fumaric acid  
**CR0148**
- 19.** The respiratory quotient depends upon the:-  
 (1) Type of respiratory substrate used during respiration  
 (2) Amount of respiratory substrate used during respiration  
 (3) Duration of respiration  
 (4) Type of coenzymes used during respiration  
**CR0171**
- 20.** In mitochondrial ETS, cytochrome 'C' acts as a mobile carrier for transfer of electrons between :-  
 (1) Complex III and IV  
 (2) Complex I and II  
 (3) Complex II and III  
 (4) Complex IV and V  
**CR0173**
- 21.** The energy released by oxidation of respiratory substrates :  
 (A) Comes out in a single step to increase the possibility of maximum ATP production  
 (B) is not used directly  
 (C) is used directly in the energy requiring processes of the organisms  
 (D) is trapped as chemical energy in the energy currency of the cell  
 (1) C and D are incorrect  
 (2) B and D are correct  
 (3) A and B are correct  
 (4) A and D are incorrect  
**CR0205**

- 22.** How many ATP molecules and during which steps, are directly synthesised in EMP pathway from one glucose molecule?  
 (1) 4 ATP, 2 in each PEP to pyruvic acid and BiPGA to PGA  
 (2) 8 ATP, 4 in each PEP to pyruvic acid and BiPGA to PGA  
 (3) 2 ATP, 1 in each Glucose to Glucose-6-P and Fructose-6-P to Fructose 1, 6 BiPGA  
 (4) 4 ATP, 2 in each Glucose to Glucose-6-P and Fructose-6-P to Fructose 1, 6 BiPGA  
**CR0206**
- 23.** Which of the following enzyme(s) is/are involved in the conversion of pyruvic acid into  $\text{CO}_2$  and ethanol?  
 (1) Pyruvic acid dehydrogenase  
 (2) Alcohol decarboxylase  
 (3) Both (1) and (2)  
 (4) Pyruvic acid decarboxylase  
**CR0207**
- 24.** The complete oxidation of one molecule of pyruvate by the stepwise removal of all the hydrogen atoms:  
 (1) leaving six molecules of  $\text{CO}_2$   
 (2) leaving two molecules of  $\text{CO}_2$   
 (3) leaving four molecules of  $\text{CO}_2$   
 (4) leaving three molecules of  $\text{CO}_2$   
**CR0208**
- 25.** In aerobic respiration, the ultimate or final electron acceptor is :  
 (1) Atomic oxygen  
 (2) Molecular oxygen  
 (3) Cytochrome  $a_3$   
 (4) Water  
**CR0209**
- 26.** Fermentation differs from aerobic respiration :  
 (1) in having partial breakdown of glucose  
 (2) in producing less ATP per glucose  
 (3) in having slow oxidation of  $\text{NADH}_2$  to  $\text{NAD}^+$   
 (4) All of the above  
**CR0210**
- 27.** Complete oxidation of which of the following respiratory substrate evolve less volume of  $\text{CO}_2$  as compare to volume of  $\text{O}_2$  consumed ?  
 (1) Fats  
 (2) Proteins  
 (3) Carbohydrates  
 (4) Both (1) and (2)  
**CR0211**
- 28.** What is the significance of respiration ?  
 (1) Production of cellular energy currency  
 (2) Provides carbon skeleton as precursor for synthesis of various chemicals  
 (3) loss of weight  
 (4) Both (1) and (2)  
**CR0212**
- 29.** Plants donot present great demands for gaseous exchange in leaf because :  
 (1) They are autotrophic  
 (2) Photosynthesis and respiration work mutually  
 (3) In plants there is less need of energy  
 (4) Plants are regulators  
**CR0213**
- 30.** Select out the correct sequence of glycolytic steps:  
 (1) PGAL  $\rightarrow$  3-PGA  $\rightarrow$  1,3-BiPGA  $\rightarrow$  PEP  
 (2) PGAL  $\rightarrow$  1,3-BiPGA  $\rightarrow$  PEP  $\rightarrow$  3-PGA  
 (3) PGAL  $\rightarrow$  1,3-BiPGA  $\rightarrow$  3-PGA  $\rightarrow$  PEP  
 (4) PGAL  $\rightarrow$  PEP  $\rightarrow$  1,3-BiPGA  $\rightarrow$  2-PGA  
**CR0214**
- 31.** During respiration of Yeast which of the following enzyme is not used in oxygen stressed conditions ?  
 (1) Enolase  
 (2) Pyruvic acid decarboxylase  
 (3) Alcohol dehydrogenase  
 (4) Aconitase  
**CR0215**

- 32.** How much amount of energy present in glucose, get released during lactic acid and alcohol fermentation?  
 (1) 7 percent  
 (2) less than seven percent  
 (3) more than seven percent  
 (4) always 2 percent  
**CR0216**
- 33.** TCA cycle starts with condensation of acetyl group with :  
 (1) OAA (2) Water  
 (3) NAD (4) both (1) and (2)  
**CR0217**
- 34.** During TCA which of the following intermediate is a result of two successive decarboxylations ?  
 (1) Oxalosuccinic acid  
 (2)  $\alpha$ -ketoglutaric acid  
 (3) Succinyl Co-A  
 (4) Cis aconitic acid  
**CR0218**
- 35.** Which of the following ETC complex is directly involved in reduction of oxygen ?  
 (1) complex-I  
 (2) complex-II  
 (3) complex-III  
 (4) complex-IV  
**CR0219**
- 36.** When proteins are respiratory substrates the ratio of  $\text{CO}_2/\text{O}_2$  would be about :  
 (1) 1.0 (2) 0.7  
 (3) 0.9 (4) 1.3  
**CR0220**
- EXERCISE-III(B) ANALYTICAL QUESTIONS**
- 37.** At how many steps  $\text{CO}_2$  is released in aerobic respiration?  
 (1) One or two  
 (2) Three  
 (3) Five  
 (4) Twelve  
**CR0152**
- 38.** Green plants kept in light produce ATP from the glucose, this process is :  
 (1) Photophosphorylation  
 (2) Hill reaction  
 (3) Oxidative phosphorylation  
 (4)  $\beta$ -oxidation  
**CR0154**
- 39.**  $\text{FADH}_2$  produced in Kreb's-cycle from –  
 (1) Isocitrate (2)  $\alpha$ -ketoglutarate  
 (3) succinate (4) malate  
**CR0156**
- 40.** Aerobic respiration is how many times useful than anaerobic respiration ?  
 (1) 2 (2) 8 (3) 19 (4) 38  
**CR0158**
- 41.** RQ is less than one for :-  
 (1) Proteins and organic acids  
 (2) Fatty acids and organic acids  
 (3) Fatty acids and proteins  
 (4) Organic acids and carbohydrates  
**CR0170**
- 42.** The step in which  $\text{NADH}+\text{H}^+$  is not produced is:-  
 (1) Succinyl-CoA  $\rightarrow$  Succinate  
 (2) Pyruvate  $\rightarrow$  Acetyl-CoA  
 (3)  $\alpha$ -ketoglutarate  $\rightarrow$  Succinyl-CoA  
 (4) Malate  $\rightarrow$  OAA  
**CR0162**
- 43.** Which intermediate of Krebs cycle is used as a substrate for amino acid biosynthesis ?  
 (1) Citric acid (2)  $\alpha$ -ketoglutarate  
 (3) Succinyl-CoA (4) Isocitric acid  
**CR0163**
- 44.** Which of the following is a common feature between glycolysis and Krebs cycles?  
 (1) Release of  $\text{CO}_2$ .  
 (2) Formation of  $\text{FADH}_2$ .  
 (3) Site of the processes.  
 (4) Dehydrogenation.  
**CR0164**

45. In lactic acid fermentation, the final electron acceptor is –  
 (1) Acetaldehyde (2) Ethyl alcohol  
 (3) NADH + H<sup>+</sup> (4) Pyruvic acid  
**CR0126**
46. How many molecules of CO<sub>2</sub> are released in Krebs cycle per glucose molecule ?  
 (1) Two (2) Three  
 (3) Four (4) Six  
**CR0166**
47. After entry of pyruvic acid in mitochondrial matrix, which of the following does not take place?  
 (1) oxidation  
 (2) decarboxylation  
 (3) oxidative decarboxylation  
 (4) ATP mediated phosphorylation  
**CR0147**
48. What is incorrect about anaerobic respiration?  
 (1) Partial breakdown of glucose  
 (2) Net gain of 2ATP  
 (3) Rapid oxidation of NADH + H<sup>+</sup> to NAD<sup>+</sup>  
 (4) Reduction of pyruvic acid  
**CR0149**
49. How many NADH+H<sup>+</sup> are formed in per turn of Krebs cycle ?  
 (1) Two (2) Three  
 (3) Four (4) Five  
**CR0169**
50. During alcoholic fermentation by yeast two molecules of glucose produce -  
 (1) 3 molecules of ethanol + 3 molecules of CO<sub>2</sub>  
 (2) 6 molecules of ethanol + 6 molecules of CO<sub>2</sub>  
 (3) 2 molecules of ethanol + 2 molecules of CO<sub>2</sub>  
 (4) 4 molecules of ethanol + 4 molecules of CO<sub>2</sub>  
**CR0172**

## EXERCISE-III

## ANSWER KEY

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