



BIOLOGY

BOTANY AND ZOOLOGY FOR NEET AND AIIMS

RESPIRATION IN PLANTS

Exercise I Introduction Do Plants Breathe

1. Respiration differs from the process of combustion in the fact that

- A. All the energy stored in glucose is released at once
- B. All the energy stored in glucose is gradually released
- C. Comparatively large quantity of energy is produced

D. Only carbohydrates act as the combustion substance

Answer: B



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2. Respiratory enzymes are mostly located in

A. mitochondrial matrix

B. Perimitochondrial space

C. Cristae

D. Outer membrane

Answer: A



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3. Dark respiration occurs in

- A. light
- B. dark
- C. light & dark both
- D. none of these

Answer: C



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4. Gaseous exchange in woody plants occurs through

- A. Stomata , Hydathodes

B. Hydathodes , Cuticle

C. Lenticels , Stomata

D. Cuticle

Answer: C



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5. In an annual plant, exchange of gases takes place mainly through

A. Leaf scars

B. Lenticels

C. Stomata

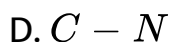
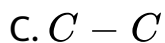
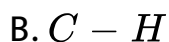
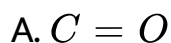
D. Woody stem

Answer: C



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6. Which bonds are broken down by oxidation in a respiratory substrate?



Answer: C



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7. Type of oxidation in respiration is by

- A. Addition of hydrogen to glucose
- B. Removal of only protons from glucose
- C. Removal of only electrons from glucose
- D. Removal of hydrogen from glucose

Answer: D



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8. Respiration is completely absent in

- A. Bacteriophage
- B. Cyanobacteria

C. Chlorella

D. Spirulina

Answer: A



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9. Old trees obtain O_2 through

A. Stomata

B. Lenticels

C. Leaf scars

D. All the above

Answer: D



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10. The mechanism of breakdown of food materials within the cells to release energy is called

- A. Cellular digestion
- B. Cellular photosynthesis
- C. Cellular respiration
- D. Cell division

Answer: C



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11. The compounds that are oxidised during the respiration process are known as

- A. Food molecules
- B. Respiratory substrates
- C. Inorganic molecules
- D. Organic compounds

Answer: B



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12. 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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13. Mitochondria are called powerhouses of the cell. Which of the following observations support this statement?

A. Mitochondria synthesize 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 plant and animal cells

Answer: A



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14. Enzymes that catalyse the substrate level phosphorylation reactions in Glycolysis belong to

- A. Oxido reductases
- B. Transferases
- C. Hydrolases

D. Ligases

Answer: B



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15. The enzyme that catalyses phosphorylation of the substrate without using ATP molecule is

- A. Glyceraldehyde 3-phosphate dehydrogenase
- B. Glucose 6-phosphotransferase
- C. Phosphofructokinase
- D. Pyruvatedikinese

Answer: A



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16. A three carbon sugar of Glycolysis is

- A. 3 Phosphoglyceric acid
- B. Pyruvic acid
- C. Glyceraldehyde 3-phosphate
- D. 1-3 disphosphoglyceric acid

Answer: C



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17. The net gain in EMP path way is

A. $2NADH + H^+$ and $4ATP$

B. $2NADH + H^+$ and $2ATP$

C. $1NADH + H^+$ and $2ATP$

D. $1NADH + H^+$ and $1ATP$

Answer: B



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18. Glycolysis occurs in

A. Matrix of mitochondria

B. Inner membrane of mitochondria

C. Cytoplasm

D. Ribosomes

Answer: C



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19. Glycolysis is

- A. Oxidative process
- B. Reductive process
- C. Physical process
- D. Anabolic process

Answer: A



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20. Enzymatic machinery required for partial breakdown of glucose into two molecules of pyruvic acid without the involvement of oxygen is present in

- A. Aerobic prokaryotes only
- B. Anaerobic prokaryotes only
- C. Anaerobic prokaryotes and eukaryotes only
- D. All aerobic and anaerobic organisms

Answer: D



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21. Two important steps of aerobic respiration namely oxidative decarboxylation and oxidative phosphorylation

occurs respectively in

- A. Cytoplasm and mitochondrial cristae
- B. Mitochondrial matrix and mitochondrial cristae
- C. Mitochondrial cristae and cytoplasm
- D. Mitochondrial matrix and cytoplasm

Answer: B



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22. In glycolysis two redox-equivalents are removed from

- A. GAP
- B. DHAP

C. PEP

D. 1, 3-Bis PGA

Answer: A



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23. The ratio of carbons found in lactic acid and ethanol respectively

A. 1 : 1

B. 3 : 1

C. 2 : 3

D. 3 : 2

Answer: D



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24. Both respiration and photosynthesis require the following

- A. Sunlight
- B. Chlorophyll
- C. Glucose
- D. Cytochromes

Answer: D



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25. Phosphorylation of glucose during glycolysis is catalyzed by

- A. Phosphoglucomutase
- B. Phosphoglucoisomerase
- C. Hexokinase
- D. Phosphorylase

Answer: C



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26. 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

Answer: C



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Exercise I Fermentation

1. Alcohol is produced during the process of

A. Photosynthesis

B. Aerobic respiration

C. Anaerobic respiration

D. None of these

Answer: C



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2. $NADH^+ H^+$ is utilized in this reaction during alcoholic fermentation

A. Conversion of Pyruvic acid to Acetaldehyde

B. Conversion of GAP to Bisphosphoglyceric acid

C. Conversion of Acetaldehyde to Ethyl alcohol

D. Conversion of Pyruvic acid to Acetyl CO-A

Answer: C



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3. The only enzyme that catalyses the reduction of substrate in the biochemical reactions of Anaerobic respiration is

- A. Pyruvic decarboxylase
- B. Glyceraldehyde phosphate dehydrogenase
- C. Alcohol dehydrogenase
- D. Enolase

Answer: C



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4. In Alcoholic fermentation of Glucose, the net gain of $NADH_2$ is

- A. One
- B. zero
- C. three
- D. Four

Answer: B



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5. Fermentation is

- A. Complete oxidation of carbohydrates

B. Incomplete oxidation of carbohydrates

C. Anaerobic respiration

D. None of the above

Answer: B



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6. Enzyme catalysing reduction of acetaldehyde in fermentation is

A. amylase

B. diastase

C. alcohol dehydrogenase

D. decarboxylase

Answer: C



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7. The enzymes that convert pyruvic acid into ethanol are

- A. Carboxylase
- B. Dehydrogenase
- C. Decarboxylase and dehydrogenase
- D. Oxidases and decarboxylase

Answer: C



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8. When respiratory substrate is cereal/starch sprouting potato tuber then RQ value is

- A. 0
- B. unity
- C. > 1
- D. < 1

Answer: B



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9. In anaerobic condition, producing alcohol value of RQ will be

A. 1

B. 2

C. infinity

D. 0

Answer: C



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10. How much of the energy of a glucose molecule is released in anaerobic respiration ending with fermentation?

A. Around 15%

B. 0.02

C. Less than 7%

D. 7.6 k.cal

Answer: C



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11. Source of hydrogen for the reduction of acetaldehyde into ethyl alcohol in anaerobic respiration is

A. $FADH_2$

B. $NADPH_2$

C. $NADH_2$

D. TPP

Answer: C



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12. The incomplete breakdown of sugars in anaerobic respiration results in the formation of

A. Fructose and Water

B. Glucose and CO_2

C. Alcohol and CO_2

D. Water and CO_2

Answer: C



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13. Partial oxidation and the break down of glucose to Pyruvic acid without the help of oxygen is called

- A. Fermentation
- B. Anaerobic respiration
- C. Glycolysis
- D. Combustion

Answer: C



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14. Dough kept overnight in warm weather become soft and spongy because of

- A. Absorption of carbondioxide from atmosphere
- B. Fermentation
- C. Cohesion
- D. Osmosis

Answer: B



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15. In hurdle race, which of the following is accumulated in the leg muscle?

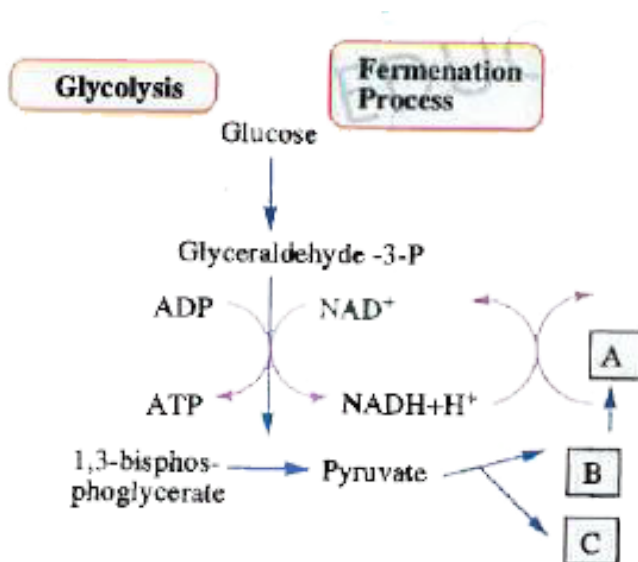
- A. ATP
- B. Glycolate
- C. Lactate

D. Ethyl alcohol

Answer: C

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16. Choose the correct combination of labelling the molecules involved in the pathway of anaerobic respiration in yeast.



A. A-Ethanol, B- CO_2 , C-Acetaldehyde

B. A- CO_2 , B-Ethanol, C-Acetaldehyde

C. A- CO_2 , B-Acetaldehyde, C-Ethanol

D. A-Ethanol, B-Acetaldehyde, C- CO_2 .

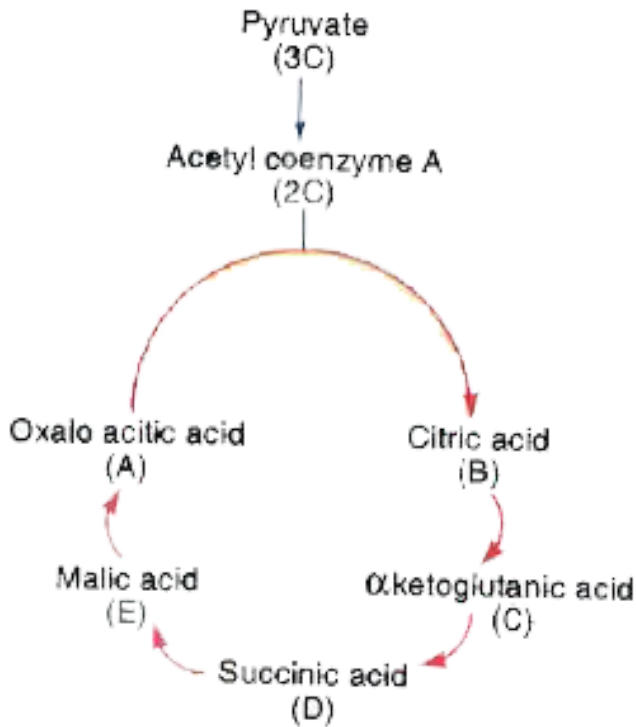
Answer: D



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17. Choose the correct combination of labeling the number of carbon compounds in the substrate molecules, involved

in the citric acid cycle



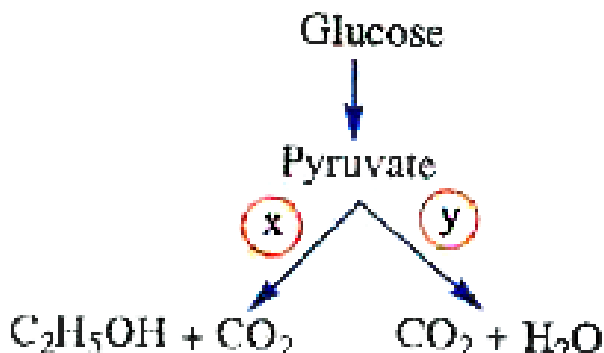
- A. (A) 4C, (B) 6C, (C) 5C, (D) 4C, (E) 4C
- B. (A) 6C, (B) 5C, (C) 4C, (D) 3C, (E) 2C
- C. (A) 2C, (B) 3C, (C) 4C, (D) 5C, (E) 6C
- D. (A) 4C, (B) 6C, (C) 4C, (D) 4C, (E) 4C

Answer: A



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18. Name the type of respiration labeled x in the given diagram



- A. Aerobic
- B. Anaerobic
- C. Krebs cycle
- D. None of these

Answer: B



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Exercise I Aerobic Respiration Ets Bs Amphibolic

1. The incomplete breakdown of sugars in anaerobic respiration results in the formation of

- A. Water and carbon dioxide
- B. Alcohol and carbon dioxide
- C. Fructose and water
- D. Glucose and carbon dioxide

Answer: A



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2. Which of the following reactions takes place in the matrix of the cell Organelle, that is referred to as 'Power house of the cell'

- A. Hydration of Fumaric acid
- B. Oxidation of Glycolic acid
- C. Dehydrogenation of Glyceraldehyde 3-phosphate
- D. Decarboxylation of Malic acid

Answer: D



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3. Catalytic action of a multienzyme complex, involving six different co-factors, is needed for the formation of

- A. Acetyl phosphate
- B. Acetyl Co. A
- C. Pyruvic acid
- D. α -Ketoglutaric acid

Answer: B



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4. Though mitochondria are absent in the cells, Tricarboxylic acid cycle occurs in

- A. Yeast cells
- B. Azotobacter
- C. Clostridium

D. Azolla

Answer: B



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5. How many oxygen atoms are required for Respiratory electron transport, for the oxidation of one molecule of 3 Phosphoglyceric acid

A. 14

B. 5

C. 10

D. 4

Answer: B



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6. The dicarboxylic acid required for the formation of first Tricarboxylic acid of Krebs cycle

A. a Ketoglutaric acid

B. Oxalosuccinic acid

C. Malic acid

D. Oxaloacetic acid

Answer: D



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7. Product of first biological oxidation in Krebs cycle is

- A. Isocitric acid
- B. Oxalosuccinic acid
- C. α -Ketoglutaric acid
- D. Succinic acid

Answer: B



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8. When one molecule of Glucose is completely oxidized in aerobic respiration, how many molecules of carbon dioxide are released in tricarboxylic acid cycle?

- A. one
- B. Six

C. Three

D. Four

Answer: D



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9. Calculate the number of ATP produced for one Glyceraldehyde 3-phosphate molecule by the end of aerobic respiration through Electron transport only

A. 20

B. 16

C. 15

D. 19

Answer: D



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10. The substrate for final decarboxylation reaction of aerobic respiration is

- A. Oxalosuccinic acid
- B. Succinyl Co. A
- C. Pyruvic acid
- D. α -Ketoglutaric acid

Answer: D



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11. Number of ATP generated in ETS on oxidation of reduced Co-enzymes produced in cytosol for one glucose molecule is

- A. 4 ATP
- B. 36 ATP
- C. 32 ATP
- D. 6 ATP

Answer: A



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12. Number of ATP molecules formed through oxidative decarboxylation reactions when one Glucose molecule is oxidized in aerobic respiration

A. 11

B. 19

C. 15

D. 12

Answer: D



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13. The correct sequence of electron carriers (Cytochromes) in Respiratory electron transport system is

A. a , a_3 , b , c and c_1

B. b , c , c_1 , a and a_3

C. b , c_1 , c , a and a_3

D. a_3 , a , c , c_1 and b

Answer: C



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14. ATP is a

A. Purine

B. Nucleotide

C. Nucleoside

D. Nucleosome

Answer: B



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15. Non-mitochondrial aerobic respiration occurs in

- A. Viruses
- B. Bacteria
- C. Cyanobacteria
- D. 2 and 3

Answer: D



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16. The ATP output of aerobic respiration is more than that of anaerobic respiration per one glucose molecule by

A. 18 times

B. 2 times

C. 4 times

D. 8 times

Answer: A



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17. The number of oxidations, substrate level phosphorylations respectively in HDP pathway are

A. 1, 1

B. 2, 1

C. 1, 2

D. 2, 2

Answer: C



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18. Pick out the correct statement from following

A. In glycolysis, hydration is followed by dephosphorylation

B. In link reaction, $2CO_2$ are removed from each pyruvic acid

C. One turn of Krebs cycle requires $3NAD^+$ and 1 FAD

D. In Krebs cycle, dehydration is immediately followed by oxidation

Answer: C



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19. The substrates of 1st oxidation and 4th oxidation of Krebs cycle are formed respectively by

- A. Dehydration and hydration
- B. Hydration and dehydration
- C. Decarboxylation and cleavage
- D. Hydration and hydration

Answer: D



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20. The 5C-intermediate of Krebs cycle that serves as substrate for transamination is

- A. α -Ketoglutaric acid
- B. Succinyl Co. A
- C. Oxalo acetic acid
- D. Oxalo succinic acid

Answer: A



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21. Aerobic respiration is more advantageous because it

- A. Does not require sunlight

B. Produces oxygen as a waste product

C. Does not require molecular oxygen and hydrogen

D. Release more energy from an equal amount of nutrients

Answer: A



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22. Hydrogen joins oxygen at the end of

A. Glycolysis

B. Electron transport system

C. Krebs cycle

D. All of these

Answer: B



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23. Main source of ATP in a cell is by oxidative phosphorylation is

- A. Glycolysis
- B. ETS
- C. Krebs cycle
- D. Pyruvate oxidation

Answer: B



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24. Krebs cycle produces

A. ATP

B. UTP

C. CTP

D. TTP

Answer: A



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25. Oxidative phosphorylation occurs during electron transfer in

A. Chloroplasts

B. Mitochondria

C. Ribosomes

D. Glyoxisomes

Answer: B



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26. Which of the following is phosphorylating unit?

A. Microsome

B. Peroxisome

C. Oxysome

D. Lomasome

Answer: C



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27. In cellular respiration, oxygen is used as the final receptor of

A. Nitrogen

B. Iron

C. Carbon

D. Hydrogen

Answer: D



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28. In respiration, pyruvic acid is

- A. Broken down into a two-carbon fragment and carbon dioxide
- B. A result of protein breakdown
- C. Formed only when oxygen is available
- D. One of the product of Krebs cycle

Answer: A



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29. Chemiosmotic hypothesis is based on

- A. Membrane potential

B. Proton gradient

C. Accumulation of K^+ ions

D. Accumulation of Na^+ ions

Answer: B



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30. One molecule of glucose requires 2 ATP to get phosphorylated to form Fructose 1-6 Biphosphate in glycolysis. How many ATP are used in the same process if the substrate is fructose?

A. 1

B. 2

C. 4

D. 3

Answer: A



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31. Total number of ATP produced when one molecule of G3P, participates in aerobic respiration is

A. 6

B. 10

C. 2

D. 8

Answer: D



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32. In which of the following steps NADH can be produced?

- A. Glucose \rightarrow fructose
- B. Citric acid \rightarrow isocitric acid
- C. Pyruvic acid \rightarrow Acetyl $CO\sim A$
- D. OAA \rightarrow citric acid

Answer: C



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33. Amphibolic cycle that occurs only in aerobic condition is

- A. EMP pathway
- B. Glycolysis
- C. Krebs cycle
- D. E-D pathway

Answer: C



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34. During respiration, pyruvic acid is

- A. transported from cytosol to mitochondria
- B. produced in Krebs cycle

C. formed if fat is used

D. produced only in aerobic condition

Answer: A



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35. In how many steps is CO_2 produced in aerobic respiration

A. 1

B. 2

C. 3

D. 6

Answer: C



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36. Instant source of energy/most common respiratory substrate is

- A. glucose
- B. fructose
- C. sucrose
- D. all

Answer: A



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37. In Krebs cycle the first product is citric acid which is a 6-carbon compound. It is formed by a condensing irreversible reaction between

- A. OAA and puruvic acid
- B. OAA and Acetyl CO-A
- C. Pyruvic acid and Acetyl CO-A
- D. OAA and citrate synthetase

Answer: B



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38. Largest amount of reduced coenzymes is produced in respiration during

- A. glycolysis
- B. Krebs cycle
- C. Anaerobic respiration
- D. fermentation by yeast

Answer: B



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39. The importance of glycolysis is that

- A. It degrades glucose to generate ATP
- B. It provides building material for the synthesis of cellular components
- C. both correct

D. It occurs in mitochondria

Answer: C



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40. Conversion of α -ketoglutaric acid into succinyl co-A is a step of

A. EMP pathway

B. TCA cycle

C. HMP pathway

D. ED pathway

Answer: B



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41. When $FADH_2 / FMNH_2$ is oxidised through ETS

- A. Produces 2 ATP
- B. Consumes $1/2 O_2$
- C. Both 1 and 2
- D. Uses one water molecule

Answer: C



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42. One molecule of pyruvic acid produces ____ molecules of CO_2 in mitochondrion

A. 3

B. 2

C. 4

D. 6

Answer: A



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43. Mineral elements in ATP are

A. N, P

B. N, Mg, Fe

C. N, S

D. Mg, S

Answer: A



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44. In ETS, electrons moves from

A. NADH to O_2

B. FADH to O_2

C. H_2O to O_2

D. 1 and 2

Answer: D



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45. Upon oxidation of 1 molecule of pyruvic acid in mitochondrial respiration the molecules of ATP generated are

A. 38

B. 30

C. 8

D. 15

Answer: D



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46. More energy is stored in per unit weight of

A. carbohydrate

B. fat

C. protein

D. glucose

Answer: B



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47. How much energy is released in anaerobic respiration by the incomplete oxidation of 1 molecule of glucose?

A. 52 Kcal

B. 56 Kcal

C. 15 Kcal

D. 16 Kcal

Answer: B



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48. Which is not a protein in ETC?

A. Ubiquinone

B. Cytochrome

C. Cytochrome oxidase

D. None of these

Answer: A



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49. Net number of water molecules produced per molecule of glucose during aerobic respiration is

- A. 6
- B. 10
- C. 8
- D. 12

Answer: C



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50. Flow of electrons in ETS is

A. Cytochrome \rightarrow UQ

B. UQ \rightarrow Cytochrome

C. Cytochrome \rightarrow FMN

D. Cytochrome $\rightarrow F_0F_1$

Answer: B



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51. Fructose 1, 6-Bisphosphate splits into DHAP and GAP.

These two are

A. Four carbon sugars

B. Three carbon sugars

C. Five carbon sugars

D. hexoses

Answer: B



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52. Which step is called Gateway Step/Link reaction in aerobic respiration?

- A. Glycolysis
- B. Formation of acetyl CO-A
- C. Citric acid formation
- D. ETS Terminal oxidation

Answer: B



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53. In Krebs cycle

- A. Acetyl coenzyme A undergoes 4 oxidations and 2 decarboxylations
- B. Pyruvic acid undergoes 4 oxidations and 2 decarboxylations
- C. TCA undergoes 4 oxidations and 4 de-carboxylations
- D. OAA undergoes 4 oxidations and two decarboxylations

Answer: B



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54. Correct sequence of events in Krebs cycle is

A. Acetyl CoA \rightarrow citrate \rightarrow pyruvate α -ketoglutarate
 \rightarrow succinate \rightarrow malate \rightarrow fumarate \rightarrow OAA

B. Acetyl CoA \rightarrow citric acid \rightarrow α - ketoglutaric acid \rightarrow
succinic acid \rightarrow fumaric acid \rightarrow malic acid \rightarrow OAA

C. Acetyl CoA \rightarrow citric acid \rightarrow malic acid α -
ketoglutaric acid α -succinic acid \rightarrow OAA

D. All are wrong

Answer: B



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55. Which of the following aerobic respiratory substrates have the same yield of ATP

A. Glucose, Glucose 6P, Fructose 6P

B. 3PGA, 2PGA, PEP

C. Pyruvic acid, Acetyl Co.A, Citric acid

D. Isocitric acid, Oxalosuccinic acid, α -Ketoglutaric acid

Answer: B



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56. Krebs cycle is involved during the oxidation of

A. Proteins and fats only

- B. Carbohydrates and fats only
- C. Carbohydrates only
- D. Carbohydrates, fats and proteins

Answer: D



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57. The substrate for final decarboxylation reaction of aerobic respiration is

- A. α ketoglutaric dehydrogenase
- B. Succinic dehydrogenase
- C. Succinic thiokinase
- D. Citric synthetase

Answer: C



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58. Total number of ATP produced when one molecule of G3P, participates in aerobic respiration is

A. 18

B. 14

C. 17

D. 16

Answer: B



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59. Energy formed at F_1 particle is obtained from

- A. H^+ accumulated in the outer space
- B. H^+ moving through the F_0
- C. H^+ moving out through different complexes
- D. H^+ formed due to oxidation of $NADH + H^+$

Answer: B



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60. Cyt. a and a_3 are the components of

- A. Complex IV
- B. Complex II

C. Complex III

D. Complex I

Answer: A



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61. A competitive inhibitor of succinic dehydrogenase is

A. Malonate

B. Oxaloacetate

C. α -ketoglutarate

D. Malate

Answer: A

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62. Smallest rotatory biomachine found in aerobes is

- A. $F_0 - F_1$ particle
- B. Complex - I
- C. Complex - II
- D. UQ

Answer: A

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63. 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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64. Electron transport system (ETS) is located in mitochondrial

A. outer membrane

B. inter membrane space

C. inner membrane

D. matrix

Answer: C



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65. The end product of oxidative phosphorylation is

A. NADH

B. Oxygen

C. ADP

D. $ATP + H_2O$

Answer: D



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66. 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 CoA

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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Exercise I Respiratory Quotient

1. During starvation, RQ value will be

- A. 0
- B. less than unity
- C. more than unity
- D. unity

Answer: B



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2. RQ is measured by

- A. Auxanometer
- B. Ganong's potometer
- C. Ganong's Respirometer
- D. Drawin's Porometer

Answer: C



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3. Number of CO_2 molecules liberated if one molecules of tripalmitin is a respiratory substrate

- A. 51
- B. 20
- C. 49

D. 72.5

Answer: A



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4. Higher respiratory quotient is in which among the following?

A. Fats

B. Protein

C. Carbohydrates

D. Organic acids

Answer: D



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5. R.Q. Value is an infinity during

- A. Aerobic respiration of carbohydrates as substrate
- B. Aerobic respiration of proteins as substrate
- C. Aerobic respiration of fats as substrate
- D. Anaerobic respiration of carbohydrates as substrate

Answer: D



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6. RQ value in succulent xerophytes (Bryophyllum) is

- A. One
- B. More than one
- C. Less than One
- D. Zero

Answer: D



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7. The respiratory quotient during cellular respiration would depend on the

- A. Nature of enzymes involved
- B. Nature of the substrate
- C. Amount of carbondioxide released

D. Amount of oxygen utilized

Answer: B



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8. Ratio of CO_2 produced in aerobic and anaerobic respiration is

A. 3:1

B. 2:1

C. 4:1

D. 1:1

Answer: A



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9. Respiration and photosynthesis both have one thing in common

- A. ATP
- B. Chlorophyll
- C. Glucose
- D. Cytochrome

Answer: D



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10. Chemoautotrophic bacteria resemble the photosynthetic bacteria in

- A. Oxidising inorganic compounds for synthesizing ATP
- B. causing photolysis of H_2O to get H
- C. synthesizing carbohydrate through Calvin cycle
- D. synthesize assimilatory power

Answer: C



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11. Increased rate of respiration during ripening of fruits is known as

- A. Climacteric respiration
- B. Salt respiration
- C. Anionic respiration
- D. Photo respiration

Answer: A



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12. The tissue of highest respiratory activity is

- A. Meristems
- B. Ground tissue
- C. Phloem
- D. Mechanical tissue

Answer: A



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13. Assume that one molecule of glucose entered in aerobic respiration. Glycolysis, link reaction, Krebs cycle and ETS sequentially occurred. But intermediate compounds of Krebs cycle that is α -ketoglutaric acid is withdrawn for the formation of glutamic acid. Then how many net ATPs are obtained in this aerobic respiration?

A. 18

B. 12

C. 4

D. 20

Answer: A



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14. The final e^- acceptors of alcoholic fermentation and aerobic respiration respectively are

- A. Pyruvic acid and Oxygen
- B. Acetylene Co. A and Oxygen
- C. Acetaldehyde and Cyt- a_3
- D. Acetaldehyde and Oxygen

Answer: D



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15. The rate of respiration is measured by

- A. Respirometer
- B. Ganongs potometer
- C. Auxanometer
- D. Spectro photometer

Answer: A



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16. In plants respiration is greater in

- A. Root apices
- B. Shoot apices

C. Vegetative and floral buds

D. All the above parts

Answer: D



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

A. ATP in small stepwise units

B. ATP in one large oxidation reaction

C. Sugars

D. Nucleic acids

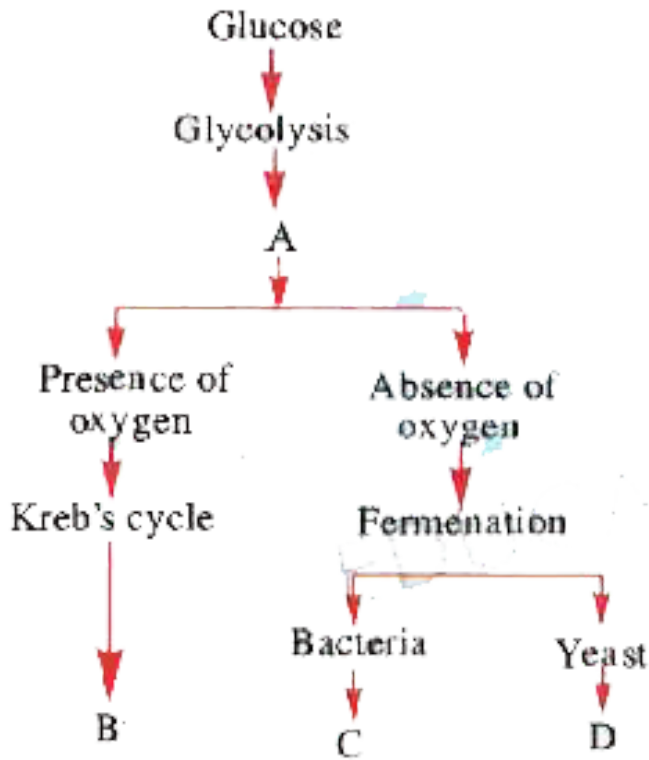
Answer: A



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18. The following is a simplified scheme showing the fate of glucose during aerobic and anaerobic respiration. Identify the end products that are formed at stages indicated as A, B, C and D. Identify the correct option from those given

below.



A. A-Carbon dioxide and water, B-Pyruvic acid, C-Ethyl alcohol and carbon dioxide, D-Lactic acid

B. A-Pyruvic acid. B-Carbon dioxide and water, C-Lactic acid, D-Ethyl alcohol and carbon dioxide

C. A-Pyruvic acid, B- Carbon dioxide and water, C-Ethyl alcohol and carbon dioxide, D-Lactic acid

D. A-Pyruvic acid, B-Ethyl alcohol and carbon dioxide, C-Lactic acid, D-Carbon dioxide and water

Answer: B



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Exercise II

1. Choose the incorrect option for why plants can get along without respiratory organs as plants, unlike animals, have no specialized organs for gaseous exchange.

- A. Respiration rate is faster than animals in roots, stems and leaves
- B. O_2 released during photosynthesis is utilized for respiration
- C. Loose packing of parenchyma cells in leaves, stems and roots facilitates respiration
- D. There is very little transport of gases from one plant part to another.

Answer: A



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2. In floating respiration substrate used is/are

- A. Carbohydrates only
- B. Fat and carbohydrate
- C. Fat and Protein
- D. Carbohydrate and protein

Answer: B



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3. Facultative anaerobes

- A. Cannot use oxygen for growth and are even harmed by it
- B. Cannot use oxygen for growth, but tolerate the presence of it

C. Are aerobes which can grow without oxygen

D. Die when given aerobic condition

Answer: C



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4. Maximum energy can be obtained from oxidation of which respiratory substrate

A. Fat

B. proteins

C. Carbohydrates

D. Organic acid

Answer: A



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5. Concentration of alcohol in a sugar solution inoculated with yeast after which yeast gets killed is

- A. 0.13
- B. 0.25
- C. 0.3
- D. 0.2

Answer: A



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6. Cramps are formed during vigorous exercise, it is due to production of ____ in muscles.

A. Acetyl coenzyme A

B. Ethyl alcohol

C. Lactic acid

D. Acetic acid

Answer: C



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7. Identify the product marked by i) & ii) in the following pathway

3-Phosphoglyceric acid

(ii)



(i)



NAD⁺

NADH+H⁺

Pyruvate

- A. i) 2-phosphoglycerate (ii) Acetyl CoA
- B. i) Phosphoenol pyruvate ii) Ethyl alcohol
- C. i) Phosphoenol pyruvate ii) Citric acid
- D. i) Phosphoenol pyruvate ii) Acetyl CoA

Answer: B



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8. Pasteurization is a process, which means heating of drinks. It is carried out, at the temperature and for how much duration?

- A. $70^{\circ}C$ and 60 minutes
- B. $80^{\circ}C$ and 30 minutes
- C. $120^{\circ}C$ and 60 minutes
- D. $60 - 70^{\circ}$ and 30 minutes

Answer: D



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9. Identify the enzymes 1 and 2 in the given reaction and select the correct option



A. Ethanol dehydrogenase

Pyruvate decarboxylase

B. Ethanol decarboxylase

Pyruvate dehydrogenase

C. Pyruvate decarboxylase

Ethanol dehydrogenase

D. Pyruvate dehydrogenase

Ethanol dehydrogenase

Answer: C



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10. Select the wrong statement with respect to glycolysis

- A. It occurs outside mitochondria
- B. It is an anaerobic phase
- C. Glucose undergoes partial oxidation to form 2 molecules of pyruvic acid
- D. Glucose is phosphorylated to glucose-6-phosphate by isomerase enzyme

Answer: D



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11. Which of the following steps during glycolysis is associated with utilization of ATP?

A. Glucose \rightarrow Glucose -6-phosphate

B. Fructose-6-phosphate \rightarrow fructose- 1,6-biphosphate

C. PEP \rightarrow Pyruvic acid

D. Both 1 and 2

Answer: D



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12. Which of the following conversions involve ATP synthesis during glycolysis?

A. Glucose \rightarrow Glucose -6-phosphate

B. Fructose-6-phosphate \rightarrow Fructose- 1,6-biphosphate

C. 1,3-bisphosphoglyceric acid (BPGA) → 3-

phosphoglyceric acid (PGA)

D. All of these

Answer: C



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13. Fate of pyruvic acid during aerobic respiration is

- A. Lactic acid fermentation
- B. Acloholic fermentation
- C. oxidative decarboxylation
- D. Oxidative phosphorylation

Answer: C

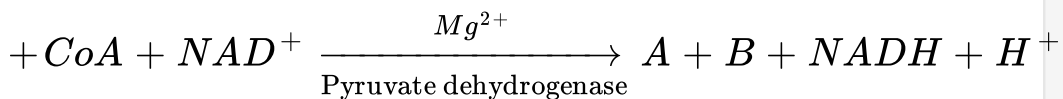


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14. Identify A and B in the given reaction.

Pyruvic

acid



- A. $\begin{matrix} A & B \\ PEP & CO_2 \end{matrix}$
- B. $\begin{matrix} A & B \\ \text{Acetyl CoA} & CO_2 \end{matrix}$
- C. $\begin{matrix} A & B \\ CO_2 & H_2O \end{matrix}$
- D. $\begin{matrix} A & B \\ \text{Acetyl CoA} & H_2O \end{matrix}$

Answer: B



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15. Substrate level phosphorylation occurs during which step of Krebs's cycle?

A. Succinyl - CoA \rightarrow Succinic acid

B. Isocitric acid \rightarrow Oxalosuccinic acid

C. Oxalosuccinic acid \rightarrow α -Ketoglutaric acid

D. Malic acid \rightarrow OAA

Answer: A



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16. The first 5-C dicarboxylic acid in Krebs's cycle which is used in nitrogen metabolism is

- A. OAA
- B. citric acid
- C. α - Ketoglutaric acid
- D. acetyl coenzyme A

Answer: C



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17. Krebs' cycle is also called metabolic sink as it is a common pathway for

- A. Carbohydrates, fats and proteins (amino acids)
- B. Carbohydrates and fats only
- C. Carbohydrates and organic acids only

D. Proteins and fats only

Answer: A



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18. Seeds respire in

A. Presence of O_2

B. presence of CO_2

C. absence of O_2

D. both 1 and 3

Answer: D



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19. Phosphorylation of glucose during glycolysis is catalyzed by

- A. Phosphoglucomutase
- B. Phosphoglucoisomerase
- C. Hexokinase
- D. Phosphorylase

Answer: C



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20. Electron transport system (ETS) is located in mitochondrial

- A. outer membrane
- B. inter membrane space
- C. inner membrane
- D. matrix

Answer: C



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21. The end product of oxidative phosphorylation is

- A. NADH
- B. Oxygen
- C. ADP
- D. $ATP + H_2O$

Answer: D



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22. Which of the following statements regarding metabolic pathways is incorrect?

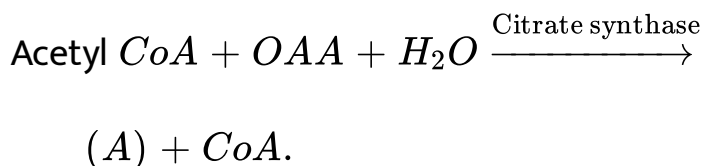
- A. Many of the steps of glycolysis can run in reverse
- B. Starch, sucrose or glycogen must be hydrolysed before it can enter the glycolysis
- C. After fats are digested, glycerol enters glycolysis by forming DHAP
- D. After fat digestion, fatty acids can no longer participate in cellular respiration

Answer: D



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23. Consider the first reaction of TCA cycle.



What is true about compound A?

- A. First product of TCA cycle
- B. Tricarboxylic acid and six carbon compound
- C. It undergoes recorganization in the presence of enzyme aconitase to form cis-aconitate
- D. All of these

Answer: D



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24. As per chemiosmotic coupling hypothesis, in mitochondria, protons accumulate in the

- A. outer membrane
- B. inner membrane
- C. intermembrane space
- D. matrix

Answer: C



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25. Which of these are respiratory poisons or inhibitors of ETC?

- A. Cyanides
- B. Antimycin A
- C. Carbon monoxide
- D. All of these

Answer: D



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26. How many ATP molecules will be generated in plant system during complete oxidation of 40 molecules of glucose?

- A. 180
- B. 360
- C. 1440
- D. 3040

Answer: C



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27. 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 Krebs' cycle is malic acid

C. One glucose molecule yields a net gain of 36ATP

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

Answer: B



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Exercise iii

1. Which statement is wrong for Kreb's cycle?

A. There are three points in the cycle where NAD^+ is reduced to $NADH + H^+$

- B. There is one point in the cycle where FAD^+ is reduced to $FADH_2$
- C. During conversion of succinyl CoA to succinic acid, a molecule of GTP is synthesized
- D. The cycle starts with condensation of acetyl group acetyl CoA^0 with pyruvic acid to yield citric acid

Answer: D



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

- A. a proton gradient forms across the inner mitochondrial membrane
- B. there is a change in the permeability of the inner mitochondrial membrane towards adenosine diphosphate (ADP)
- C. high energy bonds are formed in mitochondrial proteins
- D. ADP is pumped out of the matrix into the intermembrane space

Answer: A



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3. In which one of the following processes CO_2 is not released?

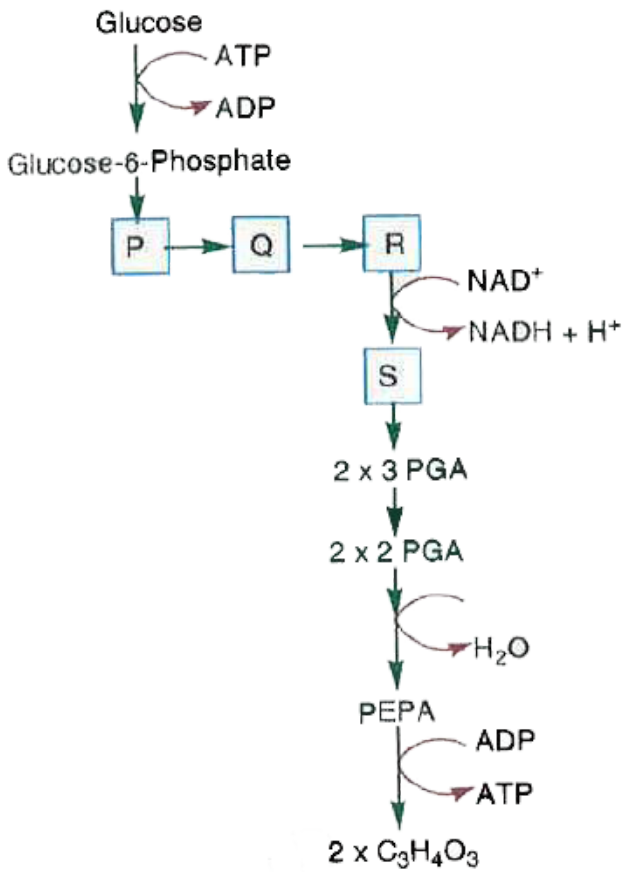
- A. Aerobic respiration in plants
- B. Aerobic respiration in animals
- C. Alcoholic fermentation
- D. Lactate fermentation

Answer: D



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4. Refer the figure and answer the question.



Choose the correct names of P, Q, R and S.

- | | | | | |
|----|-----------|----------|-------------|----------|
| | <i>P</i> | <i>Q</i> | <i>R</i> | <i>S</i> |
| A. | 1,3 diPGA | 3PGA | Fr. 1,6 diP | Fr.6P |
| B. | 3PGA | 1.3diPGA | Fr.1,6 diP | Fr.6P |

- C. $\begin{matrix} P & Q & R & S \\ \text{Fr.1,6 diP} & \text{Fr. 6P} & \text{3PGA} & \text{1,3 diPGA} \end{matrix}$
- D. $\begin{matrix} P & Q & R & S \\ \text{Fr6P} & \text{Fr.1.6 diP} & \text{3PGA} & \text{1,3 diPGA} \end{matrix}$

Answer: D



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5. The energy -relasing metabolic process in which substrate is oxidized without an external electron acceptor, is called

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

Answer: B



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6. A competitive inhibitor of succinic dehydrogenase is

- A. Malonate
- B. Oxaloacetate
- C. α - ketoglutarate
- D. Malate

Answer: A



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7. Which one of the following pairs is wrongly matched ?

A. Methanogens - Gobar gas

B. Yeast - Ethanol

C. Streptomyces - Antibiotic

D. Coliforms - Vinegar

Answer: D



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

A. ATP in small stepwise units

B. ATP in one large oxidation reaction

C. Sugars

D. Nucleic acids

Answer: A



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9. All enzymes of TCA cycle are located in the mitochondria matrix except one, which is located in inner mitochondrial membranes in eukaryotes and in cytosol in prokaryotes. This enzyme is

A. Lactate dehydrogenase

B. Isocitrate dehydrogenase

C. Malate dehydrogenase

D. Succinate dehydrogenase

Answer: D



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