

Biology Practice Questions

Unit 3: Energy Transformation

DIRECTION: Read each question carefully and then attempt the following question adequately as much as possible individually or within your group members.

Instructions: Choose the correct answer from the given alternatives

1. Which of the following is not a main difference between anabolism and catabolism?
 - A. Anabolism involves the breakdown of complex molecules, while catabolism involves the synthesis of complex molecules
 - B. Anabolism requires an input of energy, while catabolism releases energy
 - C. Anabolism builds complex molecules, while catabolism breaks them down
 - D. Anabolism results in the formation of larger molecules, while catabolism produces smaller molecules
2. The ATP molecule is sometimes described as:
 - A. a phosphorylated nitrogenous base
 - C. a glycosated nucleotide
 - B. a phosphorylated nucleotide
 - D. glycosated nitrogenous base
3. Examples of processes requiring ATP include:
 - A. simple diffusion and active transport
 - B. active transport and facilitated diffusion
 - C. conduction of nerve impulses and osmosis
 - D. active transport and protein synthesis
4. The ATP synthase molecule produces ATP when:
 - A. electrons turn the rotor to activate sites in the catalytic knob.
 - B. hydrogen ions spin the catalytic knob.
 - C. electrons spin the catalytic knob.
 - D. hydrogen ions turn the rotor to activate sites in the catalytic knob.



5. ATP is an ideal energy transfer molecule in cells because it:
- A. releases energy in small amounts
 - B. releases energy quickly
 - C. can move freely in, but not escape from, the cell
 - D. All of the above
6. Which of the following is take place during the Krebs cycle?
- A. oxidative phosphorylation. C. substrate-level phosphorylation
 - B. electron transport D. the link reaction
7. Which one of the following **NOT** happen during anaerobic respiration?:
- A. oxidative phosphorylation undergone
 - B. substrate-level phosphorylation does take place
 - C. NAD is reduced in glycolysis
 - D. NADH is oxidized at fermentation
8. Which of the following statements about mitochondria is **NOT TRUE**?
- A. the carrier molecules of the electron transfer chain are found on the inner mitochondrial membran
 - B. the reactions of the Krebs cycle take place inside the mitochondria
 - C. all of the ATP needed by the cell is made in the mitochondria
 - D. much of the ATP needed by the cell is made in the mitochondria
9. Oxidative phosphorylation includes:
- A. the electron transport chain and chemiosmosis
 - B. the electron transport chain and the Krebs cycle
 - C. the Krebs cycle and chemiosmosis
 - D. None of these



10. In the Krebs cycle:
- A. some ATP is made by oxidative phosphorylation
 - B. the four-carbon compound oxaloacetate is regenerated
 - C. ATP is used
 - D. the six-carbon compound citrate is split into two three carbon compounds
11. When compared with aerobic respiration, fermentation of glucose by yeast:
- A. yields less ATP per molecule of glucose.
 - C. produces lactate
 - B. produces more CO₂.
 - D. None of the above
12. Which of the following statements about aerobic respiration is correct?
- A. Glycolysis takes place in the matrix of the mitochondrion.
 - B. Carrier molecules of the electron transport chain exist on the outer membrane of the mitochondrion.
 - C. A high concentration of hydrogen ions builds up in the matrix of the mitochondrion.
 - D. The Krebs cycle takes place in the matrix of the mitochondrion.
13. Which of the following occur in both aerobic respiration and fermentation in mammals:
- A. substrate-level phosphorylation.
 - C. chemiosmosis
 - B. link reaction.
 - D. decarboxylation
14. In the light-dependent reactions of photosynthesis:
- A. NADP is reduced.
 - C. ATP is produced
 - B. ADP is produced.
 - D. Light energy excites chlorophyll electrons
15. In the light-independent reactions of photosynthesis:
- A. ATP is used to convert GPA into G3P
 - B. reduced NADP is used to convert GPA into G3P
 - C. ATP is produced
 - D. carbohydrates are produced



16. Cyclic photophosphorylation produces:

- A. oxygen and ATP. B. reduced NADP and ATP. C. oxygen only D. ATP only

17. In the light-independent reactions, NADPH is used to:

- A. oxidise GPA into G3P. C. oxidise G3P into GPA
B. reduce GPA into G3P. D. reduce G3P to GPA

18. A photosynthetic unit can carry out:

- A. photolysis. B. the synthesis of ATP. C. the synthesis of NADPH. D. All of the above

19. In photorespiration:

- A. low oxygen concentrations cause Rubisco to form more GP than usual
B. low oxygen concentrations cause Rubisco to form less GP than usual
C. low carbon dioxide concentrations cause Rubisco to form less GP than usual
D. low carbon dioxide concentrations cause Rubisco to form more GP than usual

20. In the C4 pathway:

- A. PEP carboxylase catalyses the reaction of carbon dioxide with RuBP in the mesophyll cells
B. PEP carboxylase catalyses the reaction of carbon dioxide with RuBP in the bundle sheath cells
C. PEP carboxylase catalyses the reaction of carbon dioxide with PEP in the mesophyll cells
D. PEP carboxylase catalyses the reaction of carbon dioxide with PEP in the bundle sheath cells

21. C4 photosynthesis is more efficient than C3 photosynthesis in conditions of:

- A. high light intensity and high carbon dioxide concentrations
B. low light intensity and high carbon dioxide concentrations
C. high light intensity and low carbon dioxide concentrations
D. low light intensity and low carbon dioxide concentration



22. The chloroplasts in the bundle sheath cells of C4 plants are an adaptation to this pathway because:
- A. they contain no Calvin cycle enzymes. C. they contain no thylakoids
 - B. they have a large surface area. D. they produce large amounts of oxygen
23. Which of the following statements about C4 and CAM photosynthesis is true?
- A. In CAM photosynthesis, the C4 stage and the Calvin cycle are separated in time.
 - B. In CAM photosynthesis, the C4 stage and the Calvin cycle are separated in space.
 - C. In C4 photosynthesis, the C4 stage and the Calvin cycle are separated in time.
 - D. In C4 photosynthesis, the C4 stage and the Calvin cycle both occur in the same cell.
24. The process by which plants convert sunlight into chemical energy is called:
- A.. Cellular respiration. B. Photosynthesis. C. Glycolysis. D. Fermentation
25. Which molecule stores the energy captured during photosynthesis?
- A. ATP. B. DNA. C. Glucos. D. Water
26. The breakdown of glucose in the absence of oxygen is called:
- A. Aerobic respiration. B. Anaerobic respiration. C. Photosynthesis. D. Calvin cycle
27. Which organelle is the primary site of cellular respiration?
- A. Chloroplas. B. Mitochondrion. C. Nucleus. D. Ribosome
28. The first stage of cellular respiration is:
- A. Krebs cycle. B. Electron transport chain. C. Glycolysis D. Calvin cycle
29. Which molecule is the final electron acceptor in the electron transport chain
- A. Oxygen. B. Carbon dioxide. C. Water. D. Glucose
30. How much ATP is typically produced from one molecule of glucose during aerobic respiration?
- A. 2. B. 4. C. 36-38. D. 100



31. Which of the following is **NOT** a type of energy transformation?
- A. Light energy to chemical energy C. Chemical energy to mechanical energy
B. Heat energy to light energy D. Potential energy to kinetic energy
32. The process by which organisms use chemical energy to build complex molecules is called:
- A. Catabolism B. Anabolism C. Metabolism D. Homeostasis
33. Which of the following is an example of an endergonic reaction?
- A. Cellular respiration B. Photosynthesis C. Hydrolysis D. Glycolysis
34. ATP is often referred to as the "energy currency" of cells because:
- A. It is the only source of energy for cells
B. It can be easily used to power cellular processes
C. It is stored in large quantities in cells
D. It is produced only during photosynthesis
35. Which of the following is **NOT** a stage of photosynthesis?
- A. Light-dependent reactions C. Calvin cycle
B. Glycolysis D. Electron transport chain
36. Which pigment is primarily responsible for absorbing light energy in photosynthesis?
- A. Chlorophyll B. Carotenoid C. Xanthophyll D. Anthocyanin
37. The light-dependent reactions of photosynthesis take place in the:
- A. Stroma B. Thylakoid membrane C. Cytoplasm D. Mitochondria
38. The Calvin cycle is also known as the:
- A. Dark reactions B. Light reactions C. Electron transport chain D. Krebs cycle
39. Which of the following is NOT a product of the Calvin cycle?
- A. Glucose B. Oxygen C. ADP D. NADPH



40. The transfer of energy from one organism to another in a food chain is typically:
- A. 100% efficient B. 50% efficient C. 10-20% efficient D. Less than 10% efficient
41. Organisms that produce their own food are called:
- A. Heterotrophs B. Autotrophs C. Decomposers D. Consumers
42. The process by which organic matter is broken down into simpler substances is called:
- A. Photosynthesis B. Respiration C. Decomposition D. Combustion
43. What is the primary function of photosynthesis?
- A. To produce heat C. To convert light energy into chemical energy
B. To produce oxygen for animals D. To break down glucose for energy
44. What are the primary reactants of photosynthesis?
- A. Glucose and oxygen C. Carbon dioxide and water
B. ATP and NADPH D. Starch and water
45. What are the primary products of photosynthesis?
- A. Glucose and oxygen C. Carbon dioxide and water
B. ATP and NADPH D. Starch and water
46. What are the two main stages of photosynthesis?
- A. Glycolysis and fermentation C. Krebs cycle and electron transport chain
B. Transcription and translation D. Light-dependent reactions and Calvin cycle
47. Where do the light-dependent reactions of photosynthesis occur?
- A. Stroma B. Thylakoid membrane C. Cytoplasm D. Mitochondria
48. What is the primary function of the light-dependent reactions?
- A. To produce glucose C. To produce ATP and NADPH
B. To fix carbon dioxide D. To break down water



49. What is the primary function of the Calvin cycle?
- A. To produce glucose
 - B. To fix carbon dioxide
 - C. To produce ATP and NADPH
 - D. To break down water
50. What is the role of ATP and NADPH in the Calvin cycle?
- A. To provide energy and reducing power for carbon fixation
 - B. To store energy from sunlight
 - C. To transport electrons
 - D. To break down glucose
51. How do stomata help in photosynthesis?
- A. They absorb sunlight
 - B. They store glucose
 - C. They transport water to the leaves
 - D. They allow for gas exchange (CO₂ in, O₂ out)
52. What factors can affect the rate of photosynthesis?
- A. Light intensity
 - B. Temperature
 - C. Carbon dioxide concentration
 - D. All of the above
53. What is photorespiration?
- A. A process that increases the efficiency of photosynthesis
 - B. A process that decreases the efficiency of photosynthesis
 - C. The process of light absorption by chlorophyll
 - D. The process of water loss from leaves
54. How do C₄ plants adapt to hot, dry environments?
- A. They open their stomata only at night
 - B. They have specialized leaf structures to reduce water loss
 - C. They use a different carbon fixation pathway
 - D. They store water in their stems



55. How do CAM plants adapt to hot, dry environments?
- A. They open their stomata only at night
 - B. They have specialized leaf structures to reduce water loss
 - C. They use a different carbon fixation pathway
 - D. They store water in their stems
56. What is the importance of photosynthesis for the Earth's atmosphere?
- A. It removes carbon dioxide from the atmosphere
 - B. It adds carbon dioxide to the atmosphere
 - C. It has no significant impact on the atmosphere
 - D. It breaks down oxygen in the atmosphere
57. How does photosynthesis contribute to the food chain?
- A. Plants are the primary producers, providing energy for other organisms
 - B. Plants are the primary consumers, eating other organisms
 - C. Plants are decomposers, breaking down dead organisms
 - D. Plants have no role in the food chain
58. What is the relationship between photosynthesis and cellular respiration?
- A. They are opposite processes: photosynthesis produces glucose, while cellular respiration breaks it down
 - B. They are the same process
 - C. Photosynthesis is a part of cellular respiration
 - D. There is no relationship between them
59. How can human activities impact photosynthesis?
- A. Deforestation can reduce the amount of photosynthesis
 - B. Pollution can damage plant leaves, reducing photosynthesis
 - C. Climate change can alter temperature and precipitation patterns, affecting photosynthesis



D. All of the above

60. What is the role of accessory pigments in photosynthesis?

- A. To absorb light energy of different wavelengths than chlorophyll
- B. To store energy from sunlight
- C. To transport electron
- D. To break down glucose

61. What is the role of enzymes in photosynthesis?

- A. To speed up the chemical reactions
- B. To absorb light energy
- B. To transport electrons
- D. To store glucose

62. What is the role of water in photosynthesis?

- A. To provide electrons for the light-dependent reactions
- B. To store energy from sunlight
- C. To transport electrons
- D. To break down glucose

63. What is the role of carbon dioxide in photosynthesis?

- A. To provide carbon for the synthesis of glucose
- C.. To store energy from sunlight
- B. To transport electrons
- D. To break down glucose

64. How does light intensity affect the rate of photosynthesis?

- A. As light intensity increases, the rate of photosynthesis generally increases.
- B. As light intensity increases, the rate of photosynthesis generally decreases.
- C. Light intensity has no effect on the rate of photosynthesis.
- D. The relationship between light intensity and photosynthesis is complex and varies depending on other factors.



65. How does carbon dioxide concentration affect the rate of photosynthesis?
- A. As carbon dioxide concentration increases, the rate of photosynthesis generally increases.
 - B. As carbon dioxide concentration increases, the rate of photosynthesis generally decreases.
 - C. Carbon dioxide concentration has no effect on the rate of photosynthesis.
 - D. The relationship between carbon dioxide concentration and photosynthesis is complex and varies depending on other factors.
66. How does temperature affect the rate of photosynthesis?
- A. As temperature increases, the rate of photosynthesis generally increases
 - B. As temperature increases, the rate of photosynthesis generally decreases
 - C. Temperature has no effect on the rate of photosynthesis
 - D. The relationship between temperature and photosynthesis is complex and varies depending on other factors
67. What is the role of rubisco in photosynthesis?
- A. To absorb light energy
 - C. To transport electron
 - B. To fix carbon dioxide
 - D. To store glucose
68. What is the role of NADP^+ in photosynthesis?
- A. To accept electrons and hydrogen ions, forming NADPH
 - B. To donate electrons and hydrogen ions, forming NADP^+
 - C. To store energy from sunlight
 - D. To break down glucose
69. What is the role of ATP synthase in photosynthesis?
- A. To produce ATP from ADP and inorganic phosphate
 - C. To absorb light energy
 - B. To transport electrons
 - D. To store glucose



70. What is the role of the electron transport chain in photosynthesis?
- A. To fix carbon dioxide.
 - B. To store energy from sunlight.
 - C. To transport electrons from water to NADP^+
 - D. To break down glucose
71. What is the role of chlorophyll in the light-dependent reactions?
- A. To transport electrons
 - B. To store energy from sunlight
 - C. To absorb light energy and transfer it to electrons
 - D. To break down glucose
72. What is the role of oxygen in photosynthesis?
- A. It is a reactant in photosynthesis
 - B. It is a product of photosynthesis
 - C. It is not involved in photosynthesis
 - D. It is a byproduct of the light-dependent reactions
73. The synthesis of one molecule of glucose during Calvin cycle requires
- A. 6 molecules of ATP and 12 molecules of NADPH_2
 - B. 12 molecules each of ATP and NADPH_2
 - C. 12 molecules of ATP and 18 molecules of NADPH_2
 - D. 18 molecules of ATP and 12 molecules of NADPH_2
74. Which one of the following is not true about the light reactions of photosynthesis?
- A. NADPH is not produced in cyclic electrons transport in light reactions.
 - B. The flow of electrons from water to NADP in non-cyclic electron transport produces one ATP.
 - C. Reactions of the two photosystems are needed for the reduction of NADPH .
 - D. P680 and P700 are the reaction Centre's of PS I and PS II respectively.



75. Why is photorespiration more of a problem for a plant when their stomata are closed?

- A. Oxygen levels increase from photosynthesis and compete with carbon dioxide for rubisco's active site.
- B. Carbon dioxide levels increase from photosynthesis and compete with oxygen for rubisco's active site.
- C. Water is lost when the stomata are open and is not available to accept electrons from Photosystem I.
- D. Oxygen cannot enter the leaf blocking normal respiration so the plants switch to photorespiration.

76. Which one of the following is **CORRECT** when the carbohydrate is synthesized in the lightindependent reactions?

- A. One turns of the cycle would give an output of two molecules of G3P – enough to make one molecule of glucose.
- B. Six turns of the cycle would give an output of two molecules of ATP – enough to make one molecule of glucose.
- C. Six turns of the cycle would give an output of two molecules of G3P – enough to make one molecule of glucose.
- D. Twelve turns of the cycle would give an output of six molecules of ATP – enough to make three molecules of glucose.

77. The correct sequence of cell organelles during photo respiration in C3 plant is

- A. Chloroplast – Peroxisome – Mitochondria
- B. Chloroplast – Rough endoplasmic reticulum – Mitochondria
- C. Chloroplast – Golgi bodies – Mitochondria
- D. Chloroplast – Mitochondria – Peroxisome

78. During photorespiration the conversion of phosphoglycolate to glycolate takes place in this cell organelle

- A. Peroxisome B. Glyoxysome C. Mitochondria D. Chloroplast



79. Which of the following statements regarding the C₄ pathway is false?
- A. The C₄ acid OAA is formed in the mesophyll cells.
 - B. The bundle sheath cells contain the enzyme PEP Case.
 - C. The primary CO₂ acceptor is Phosphoenol pyruvate.
 - D. The enzyme responsible for CO₂ fixation is PEP Case.
80. A green plant is kept in a brightly lighted area for 48 hours. What will most likely occur if the light intensity is then reduced slightly during the next 48 hours?
- A. The rate at which nitrogen is used by the plant will increase.
 - B. Photosynthesis will stop completely.
 - C. The rate at which oxygen is released from the plant will decrease.
 - D. Glucose production inside each plant cell will increase.
81. The enzyme ATP synthase is part of the process required to synthesize ATP from ADP and inorganic phosphate in the mitochondria. Which of the following conditions would stimulate the synthesis of ATP?
- A. A slowdown of glycolytic activity
 - B. Elevated oxygen levels
 - C. A buildup of the proton gradient
 - D. Decreased substrate-level phosphorylation in the cytoplasm
82. C₄ photosynthesis is more efficient than C₃ photosynthesis in conditions of:
- A. High light intensity and high carbon dioxide concentrations
 - B. Low light intensity and high carbon dioxide concentrations
 - C. High light intensity and low carbon dioxide concentrations
 - D. Low light intensity and low carbon dioxide concentrations



83. The leaves of C₃ plants in the tropics close their stomata to minimize water loss. as a result, concentration of carbon dioxide in the leaves falls When the C₃ plants faces such problem Ribulose biphosphate react with oxygen to produce.
- A. Triose phosphate and sugar in the mitochondria
 - B. Oxaloacetate and water in the peroxisome
 - C. Hydrogen peroxide and CO₂ in the mitochondria
 - D. Glycerate phosphate and phosphoglycolate in the chloroplast
84. Photosynthesis in C₄ plants is relatively less limited by atmospheric CO₂ levels because
- A. Effective pumping of CO₂ into bundle sheath cells.
 - B. Rubisco in C₄ plants has higher affinity for CO₂.
 - C. Four carbon acids are the primary initial CO₂ fixation products.
 - D. The primary fixation of CO₂ is mediated via PEP carboxylase.
85. Plants that follow CAM photosynthetic pathways carry out the two stages of photosynthesis at different times. Which of the following products are formed during the night?
- A. ATP and NADPH
 - B. ATP and sugar
 - C. CO₂ and sugar
 - D. oxaloacetate and malate
86. In CAM plants CO₂ required for photosynthesis enters the plant body during
- A. Daytime when the stomata closed
 - B. Daytime when the stomata are open
 - C. Night when the stomata are closed
 - D. Night when the stomata are open
87. The two enzymes responsible for primary carboxylation in C₃ and C₄ pathway respectively are
- A. RUBP carboxylase and RUBP oxygenase
 - B. RUBP carboxylase and PEP carboxylase
 - C. PEP carboxylase and RUBP carboxylase
 - D. Rubisco and PEP carboxylase



88. Action spectrum is
- A. A graph showing amount of light absorbed
 - B. A graph showing rate of photosynthesis
 - C. . A graph showing absorption of light
 - D. A graph showing amount of CO₂ released
89. What is the primary function of cellular respiration?
- A. To produce heat.
 - C. To convert light energy into chemical energy
 - B. To produce oxygen for animals
 - D. To break down glucose for energy
90. Where does cellular respiration occur in eukaryotic cells?
- A. Mitochondria
 - B. Ribosomes
 - C. Chloroplasts
 - D. Nucleus
91. What is the overall equation for cellular respiration?
- A. $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + ATP$
 - B. $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$
 - B. $C_6H_{12}O_6 \rightarrow 2C_3H_6O_3 + 2ATP$
 - D. $C_6H_{12}O_6 + 2ATP \rightarrow 2C_3H_6O_3 + 4ATP$
92. What are the four main stages of cellular respiration?
- A. Glycolysis, Link reaction, Krebs cycle, electron transport chain
 - B. Photosynthesis, Calvin cycle, electron transport chain
 - C. Glycolysis, fermentation, Calvin cycle, Link reaction
 - D. Krebs cycle, Link reaction, Calvin cycle, electron transport chain
93. Which stages of cellular respiration is correctly paired with its sites?
- A. . Glycolysis – cristae
 - C. Krebs cycle – matrix
 - B. Pyruvate oxidation – cytoplasm
 - D. Oxidative phosphorylation – outer membrane
94. What is the net yield of ATP from glycolysis?
- A. 2 ATP
 - B. 4 ATP
 - C. 36 ATP
 - D. 38 ATP



95. Suppose three moles of glucose is burned aerobically. How many moles of ATP can be produced by substrate level phosphorylation in Krebs cycle?
- A. 4 B. 8 C. 6 D. 12
96. What are the end products of glycolysis?
- A. 2Pyruvate, 2ATP, and 2NADH C. Glucose, 2ATP, and 2NADH
B. 2Pyruvate, 4ATP, and 2FADH₂ D. Glucose, 4ATP, and 2FADH₂
97. What happens to pyruvate after glycolysis under aerobic conditions?
- A. It is converted to lactate C. It is used to synthesize glucose
B. It is converted to ethanol D. It enters the mitochondria for further oxidation
98. Where does the Krebs cycle occur?
- A. Fluid matrix B. Inner membrane C. Outer membrane D. Inter membrane
99. What are the products of the Krebs cycle?
- A. ATP, 3NADH, FADH₂, and 2CO₂ C. 2ATP, 6NADH, 2FADH₂, and 4CO₂
B. 2ATP, 2NADH, FADH₂, and 2CO₂ D. ATP, NADPH, FADH₂, and CO₂
100. What is the role of oxygen in cellular respiration?
- A. To donate electrons to the electron transport chain
B. To accept electrons at the end of the electron transport chain
C. To provide energy for ATP synthesis
D. To break down glucose
101. How is ATP produced in the electron transport chain?
- A. Substrate-level phosphorylation C. Oxidative phosphorylation
B. Photophosphorylation D. None of the above



102. What is the role of NADH and FADH₂ in cellular respiration?
- A. To transport electrons to the electron transport chain
 - B. To store energy from sunlight
 - C. To break down glucose
 - D. To provide energy for ATP synthesis
103. What is the final electron acceptor in the electron transport chain?
- A. Oxygen B. Carbon dioxide C. Water D. Glucose
104. What is the fate of acetyl-CoA produced during beta-oxidation of fatty acids?
- A. It enters glycolysis B. It forms triglycerides
 - B. It is excreted as waste D. It enters the Krebs cycle
105. In pyruvate oxidation, what is the final product formed after the oxidation and decarboxylation of pyruvate?
- A. Pyruvate B. Lactate C. Acetyl-CoA D. Ethanol
106. Which stage of aerobic respiration does not directly generate ATP?
- A. Pyruvate oxidation B. Glycolysis C. Krebs cycle D. Oxidative phosphorylation
107. What is fermentation?
- A. An aerobic process that produces ATP
 - B. An anaerobic process that produces ATP
 - C. A process that converts light energy into chemical energy
 - D. A process that breaks down foods.
108. What are the two main types of fermentation?
- A. Lactic acid fermentation and alcohol fermentation
 - B. Aerobic respiration and anaerobic respiration
 - C. Glycolysis and Krebs cycle
 - D. Photosynthesis and cellular respiration



109. What is lactic acid fermentation?
- A. A process that produces lactic acid as a byproduct
 - B. A process that produces alcohol as a byproduct
 - C. A process that occurs in plants
 - D. A process that occurs in mitochondria
110. Which of the following statements is true about lactic acid fermentation?
- A. The starting material for lactic acid fermentation is lactose.
 - B. It is an aerobic process that occurs in the presence of oxygen.
 - C. The final product of lactic acid fermentation is carbon dioxide.
 - D. Lactic acid fermentation regenerates NAD^+ from NADH
111. During alcoholic fermentation, CO_2 is released
- A. When pyruvate is oxidized.
 - B. Ethanol is oxidized.
 - C. Acetaldehyde is reduced.
 - D. Pyruvate is decarboxylated.
112. What is alcohol fermentation?
- A. A process that produces lactic acid as a byproduct
 - B. A process that produces alcohol as a byproduct
 - C. A process that occurs in plants
 - D. A process that occurs in mitochondria
113. Why do we get tired and fatigued during heavy exercise such as long-distance running? It is due to
- A. Accumulation of lactic acid.
 - B. Accumulation of CO_2
 - C. Shortage of glucose
 - D. High rate of aerobic respiration



114. How does temperature affect the rate of cellular respiration?
- A. As temperature increases, the rate of cellular respiration generally increases
 - B. As temperature increases, the rate of cellular respiration generally decreases
 - C. Temperature has no effect on the rate of cellular respiration
 - D. The relationship between temperature and cellular respiration is complex and varies depending on other factors
115. How does oxygen availability affect the rate of cellular respiration?
- A. As oxygen availability increases, the rate of cellular respiration generally increases
 - B. As oxygen availability increases, the rate of cellular respiration generally decreases
 - C. Oxygen availability has no effect on the rate of cellular respiration
 - D. The relationship between oxygen availability and cellular respiration is complex and varies depending on other factors
116. How does cellular respiration contribute to the energy needs of organisms?
- A. It provides ATP, the primary energy currency of cells
 - B. It provides building blocks for the synthesis of new molecules
 - C. It helps to maintain homeostasis
 - D. All of the above
117. What is the role of ATP in cellular respiration?
- A. To store energy released during cellular respiration
 - B. To provide energy for cellular work
 - C. To transport electrons
 - D. To break down glucose
118. What is the role of NAD^+ in cellular respiration?
- A. To accept electrons and hydrogen ions, forming NADH
 - B. To donate electrons and hydrogen ions, forming NAD^+
 - C. To store energy from sunlight
 - D. To break down glucose



119. What is the role of the citric acid cycle (Krebs cycle)?
- A. To further oxidize pyruvate and generate NADH and FADH₂
 - B. To produce ATP directly
 - C. To fix carbon dioxide
 - D. To break down glucose
120. What is the role of the electron transport chain?
- A. To transport electrons from NADH and FADH₂ to oxygen
 - B. To produce ATP through oxidative phosphorylation
 - C. To break down glucose
 - D. To fix carbon dioxide
121. What is the role of chemiosmosis in ATP synthesis?
- A. The movement of protons across a membrane drives the synthesis of ATP
 - B. The direct transfer of a phosphate group to ADP
 - C. The breakdown of glucose
 - D. The absorption of light energy
122. What is the role of ATP synthase in cellular respiration?
- A. To synthesize ATP from ADP and inorganic phosphate
 - B. To transport electrons
 - C. To break down glucose
 - D. To fix carbon dioxide
123. How does cyanide affect cellular respiration?
- A. It blocks the electron transport chain
 - B. It prevents the breakdown of glucose
 - C. It inhibits glycolysis
 - D. It has no effect on cellular respiration
124. What is the primary source of energy for cellular processes?
- A. Glucose
 - B. ATP
 - C. NADPH
 - D. FADH₂
125. In cellular respiration, which stage produces the majority of ATP?
- A. Glycolysis
 - B. Krebs cycle
 - C. Electron transport chain
 - D. Link reaction



126. What is the role of mitochondria in energy transformation?
- A. Photosynthesis B. Energy storage C. ATP production D. Protein synthesis
127. Which molecule is a byproduct of photosynthesis?
- A. Carbon dioxide B. Oxygen C. Glucose D. Water
128. Which one of the following determines the cause and effect of lactate production during physical exercise? The demand for
- A. More energy causes muscle cells to ferment respiratory substrates leading to muscle fatigue
- B. Lower pH in muscle tissues leads to fermentation of respiratory substrates to muscle fatigue
- C. A substrate that can easily release energy leads to production of lactate which results in muscle fatigue
- D. An easily absorbable molecule leads to the production of lactate that results in muscle fatigue
129. Which plants are best adapted to cool wet conditions?
- A. C4 Plants B. C3 Plants C. CAM Plants D. Sorghum
130. How do CAM plants minimize photorespiration?
- A. Stomata are only opened at night storing carbon dioxide in malate.
- B. During the day the carbon dioxide is released for photosynthesis.
- C. C4 and C3 pathway take place in different cells.
- D. C4 pathway take place at day and C4 pathway at night.
131. Which is the correct order for the stages of the Calvin cycle
- A. Carboxylation → Regeneration → Reductio
- B. Regeneration → Carboxylation → Reduction
- C. C. Reduction → Carboxylation → Regeneration
- D. D. Carboxylation → Reduction → Regeneration
132. The Calvin cycle requires each of the following inputs except:
- A. CO₂ B. O₂ C. ATP D. NADPH



133. Cells can produce some amount of ATP without using ATP-synthase by
- A. Oxidative phosphorylation
 - B. Substrate level phosphorylation
 - C. chemiosmosis
 - D. Electron transport chain.
134. In which step of aerobic respiration reduced NAD & FADH₂ lose their hydrogens & become oxidized?
- A. Glycolysis
 - B. Link reaction
 - C. Krebs's cycle
 - D. Oxidative phosphorylation
135. Which one of the following compounds contain more energy than all the rest per a molecule
- A. Pyruvic acid
 - B. ATP
 - C. NADH
 - D. FADH₂
136. Which one of the following is true about photorespiration?
- A. It is a common process occurs in C₄ plants in high temperature condition.
 - B. It involves reaction of ribulose biphosphate with oxygen instead of CO₂.
 - C. It occurs as a result of CO₂ shortage in light independent reaction.
 - D. It is the process that produces a GPA and Phophoglycolate from a CO₂.
137. Muscle Cramps during exercise are caused as a result of occurring in our body
- A. glycolysis
 - B. alcohol fermentation
 - C. lactic acid fermentation
 - D. Krebs's cycle
138. Light dependent reaction produces all except
- A. Oxygen
 - B. NADPH
 - C. Sugar
 - D. ATP
139. Which of the following is the main difference between cyclic and noncyclic photophosphorylation?
- A. In noncyclic photophosphorylation the electron is circulated within the photosystem, whereas in cyclic photophorylation the electronnot circulated.
 - B. Noncyclic photophosphorylation mainly takes place in all green plants and cyanobacteria, whereas cyclic photophorylation mainly in photosynthetic eubacteria.
 - C. Noncyclic photophosphorylation produces only ATP at the end of pathways, whereas cyclic photophorylation produces ATP, NADPH, H and O₂.
 - D. Noncyclic photophosphorylation use only Photosystems I, whereas cyclic photophorylation use both Photosystems I and II.



140. Which one of the following sequences is showing the electron pathway of cyclic photophorylation?
- A. PSII $\rightarrow$ Pq $\rightarrow$ Cyt $\rightarrow$ Pc $\rightarrow$ PSI $\rightarrow$ Fd $\rightarrow$ NADP reductase
 - B. PS I $\rightarrow$ Fd $\rightarrow$ Pq $\rightarrow$ Cyt $\rightarrow$ Pc $\rightarrow$ PSI
 - C. PSI $\rightarrow$ Pq $\rightarrow$ Cyt $\rightarrow$ Pc $\rightarrow$ PSII $\rightarrow$ Fd $\rightarrow$ NADP reductase
 - D. PS II $\rightarrow$ Fd $\rightarrow$ Pq $\rightarrow$ Cyt $\rightarrow$ Pc $\rightarrow$ PSI
141. Which chemicals are the products of respiration as well as the raw materials of photosynthesis?
- A. Carbon dioxide. ATP and oxygen
 - C. Carbon dioxide and water
 - B. Glucose and oxygen
 - D. Glucose. ATP and oxygen
142. Which stage of aerobic respiration produces ATP, NADH, FADH₂, ATP and CO₂?
- A. Glycolysis
 - B. Link reaction
 - C. Krebs cycle
 - D. Oxidative phosphorylation
143. Among the following, one occurs in both photosynthesis and respiration?
- A. Glycolysis
 - B. Chemiosmosis
 - C. Krebs cycle
 - D. Calvin cycle
144. Plants like cacti, succulents and pineapple only open their stomata for CO₂ uptake at night are known as:
- A. C₃ plants
 - B. C₄ plants
 - C. CAM plants
 - D. All of them
145. In what way are the photosynthetic adaptations of C₄ and CAM plants similar?
- A. Both undergone C₄ and Calvin cycle
 - B. In both cases primary CO₂ acceptor molecule is RuBP.
 - C. In both cases RuBP carboxylase is primary CO₂ fixer enzyme.
 - D. Both are adapted to growing in Temperate zone.
146. EXCEPT one all are the products of the Calvin Cycle.
- A. Oxygen.
 - B. G3P
 - C. ADP
 - D. NADP⁺
147. What is the purpose of cyclic electron flow?
- A. Produce more ATP
 - C. Produce more NADPH
 - B. Hydrogen ion
 - D. GPA



148. During photosynthesis which of the followings acts as a reservoir for hydrogen ions?
A. Thylakoid membrane B. Stroma C. Thylakoid space D. Inter membrane
149. In a CAM plant the concentration of organic acid
A. Increases during the day C. Decreases or increases during the day
B. Increases during night D. Decreases during any time
150. PGA as the first CO₂ fixation product was discovered in photosynthesis of
A. Algae B. Bryophytes C. Gymnosperms D. Angiosperms
151. The metabolic pathway which produces carbohydrate is
A. Calvin cycle B. Glycolysis C. Cyclic pathway D. Noncyclic pathway
152. In leaves of C₄ plants malic acid synthesis during CO₂ fixation occurs in:
A. Guard cells B. Epidermal cells C. Mesophyll cells D. Bundle sheath
153. In C₃ plants the first stable product of photosynthesis during the dark reaction is
A. Phosphoglyceraldehyde C. 3-phosphoglyceric acid
C. Oxaloacetic acid D. Malic acid
154. All of the following statements are refers the similarities of photosynthesis and respiration EXCEPT:
A. Both are anabolic process C. Both are redox reactions
B. Both can produces ATP D. Both are the form of energy transformation.
155. The first step in the light dependent reaction photosynthesis is
A. Photolysis B. Formation of ATP C. Formation of NADPH D. Formation of G3P
156. In sugarcane plant. ¹⁴C₂O₂ is fixed in malic acid in which the enzyme that fixes CO₂ is:
A. Ribulose biphosphate carboxylase C. Phosphoenolpyruvic acid carboxylase
B. Ribulose biphosphate oxygenase D. Rubisco
157. During light phase of photosynthesis _____ is oxidized and _____ is reduced.
A. CO₂ and Water C. Water and CO₂
B. Water and NADP D. NADPH₂ and CO₂



158. Photosynthesis cannot continue for long if during light reaction only cyclic photophosphorylation takes place. This is because
- A. Only ATP are formed but not $\text{NADPH}^+ + \text{H}^+$
 - B. No Oxygen molecules produces
 - C. No bot ATP and NADPH are produces molecules
 - D. No photolysis
159. The oxygen molecule in glucose formed during photosynthesis comes from
- A. Water
 - B. CO_2
 - C. Atmosphere
 - D. Resppiration
160. What is the difference between potosytem I and Photosystems II?
- A. Potosytem I is responsible to Splits water and generates ATP while Photosystems II to Produces NADPH.
 - B. In Potosytem I the electron acceptor is Plastoquinone (PQ) while in Photosystems II the electron acceptor is Ferredoxin (Fd)
 - C. Potosytem I has P680 a reaction centers while Photosystems II has P700.
 - D. Potosytem I can functioned in the absence of Photosystem II.
161. How many turns of Calvin's cycle requires Inorder to produce one glucose molecule?
- A. 1
 - B. 3
 - C. 6
 - D. 12
162. During Electron Transport Chain, in the mitochondrion protons pumps from the _____ to the _____.
- A. Matrix; intermembrane space
 - C. Matrix; inner membrane
 - Inter membrane space; Matrix
 - D. Inner membrane to Matrix
163. During Electron Transport Chain, in the chloroplast protons pumps from the _____ to the _____.
- A. Stroma; intermembrane space
 - C. Stroma; Thylakoid space
 - B. Inter membrane space; Stroma
 - D. Thylakoid membrane; Thylakoid space



164. Which two reactions occur during photophosphorylation?
- A. ATP is hydrolyzed and NADP is reduced.
 - B. ATP is hydrolyzed and NADPH is oxidized.
 - C. ATP is synthesized and NADP is reduced.
 - D. ATP is synthesized and NADPH is oxidized
165. The ATP made during glycolysis is generated by
- A. Substrate-level phosphorylation
 - C. Oxidative phosphorylation
 - B. Photophosphorylation
 - D. Chemiosmosis
166. How many molecules of carbon dioxide (CO₂) would be produced by six turns of the citric acid cycle?
- A. 2
 - B. 4
 - C. 6
 - D. 12
167. Based on the cycle of photosynthesis and cellular respiration, one can say that the ultimate original source of energy for all living things on Earth is
- A. glucose
 - B. the sun
 - C. water
 - D. carbon dioxide
168. The process whereby plants capture energy and make complex molecules is known as
- A. Catabolism.
 - B. Photosynthesis.
 - C. Respiration.
 - D. Transpiration
169. The major atmospheric byproduct of photosynthesis is
- A. Nitrogen.
 - B. Carbon dioxide.
 - C. Oxygen.
 - D. Water vapour
170. Which stage of aerobic respiration does not directly generate ATP?
- A. Pyruvate oxidation
 - B. Glycolysis
 - C. Oxidative phosphorylation
 - D. Krebs cycle
171. In pyruvate oxidation, what is the final product formed after the oxidation and decarboxylation of pyruvate?
- A. Pyruvate
 - B. Lactate
 - C. Acetyl-CoA
 - D. Ethanol
172. Which of the following statements is WRONG about lactic acid fermentation?
- A. The starting material for lactic acid fermentation is pyruvate.
 - B. It is an aerobic process that occurs in the presence of oxygen.
 - C. The final product of lactic acid fermentation is lactic acid.
 - D. Lactic acid fermentation regenerates NAD⁺ from NADH.



173. All of the following features are common for both mitochondria and chloroplasts EXCEPT:
- A. Both are energy transducer organelles.
 - B. Both can produce ATP.
 - C. Both have membraneous structure that consists of ETC and ATP synthase.
 - D. Both are responsible to transfer light energy to chemical energy.
174. All of the following processes require ATP EXCEPT:
- A. Muscle contraction
 - B. Protein synthesis
 - C. Osmosis
 - D. Nerve impulse conduction
175. Which of the following statements is NOT TRUE about substrate level phosphorylation?
- A. It does not require ATP synthase to produce ATP.
 - B. It is the common way of ATP production for all living organisms.
 - C. It obtains phosphate group directly from substrate to make ATP.
 - D. It is an oxygen dependent process.
176. Among the following, which one of the following are NOT photosynthetic organisms?
- A. Plants
 - B. Algae
 - C. Cyanobacteria
 - D. Protozoan
177. Which one of the following statements is NOT TRUE about reaction centre?
- A. It is the part of photosystem where light-dependent reactions begin.
 - B. It contains only chlorophyll a.
 - C. It absorbs light energy.
 - D. It transfers excited electrons to primary electron acceptors.
178. In the tropical regions, where is higher temperature, which one of the following is most likely to take place in the C3 plants? Rubisco binds with:
- A. CO_2 to produce 2PGA.
 - B. CO_2 to produce 2G3P
 - C. O_2 to produce 2PGA
 - D. O_2 to produce PGA and phosphoglycolate.
179. Among the following respiratory substrates, which one can provide more energy than the others?
- A. Glucose
 - B. Starch
 - C. Lipid
 - D. Proteins



180. Why plants leaves look like green colour?

- A. It absorbs the green parts of light spectrum.
- B. It reflects the green parts of light spectrum.
- C. It absorbs the blue and red parts of light spectrum.
- D. It reflects the blue and red parts of light spectrum.**

-----**THE END**-----

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