AP Biology Chapter 7 Quiz 2 (4-6)

Name _____ date _____

1. ____ In the complete reactions of aerobic respiration, the energy for the majority of ATP synthesis is provided by
A) transfer of electrons from organic molecules to acetyl CoA.
B) high-energy phosphate bonds from organic molecule intermediates in the citric acid cycle.
C) splitting water to produce oxygen.
D) a proton gradient across a membrane.

2. ____ The primary role of oxygen in cellular respiration is to
A) donate high energy electrons to the electron transport chain.
B) serve as an acceptor for released carbon, forming CO_2.
C) serve as an acceptor for electrons and hydrogen, forming water.
D) combine with acetyl CoA, forming pyruvate.

3. ____ What is the source of the oxygen used to form water in the complete reactions of cellular respiration?
A) carbon dioxide (CO_2)
B) glucose ($C_6H_{12}O_6$)
C) pyruvate ($C_3H_3O_3^-$)
D) molecular oxygen (O_2)

4. ____ In chemiosmosis, what is the most direct source of energy that is used to convert ADP + Ⓟ_i to ATP?
A) energy released as electrons flow through the electron transport system
B) energy released from substrate-level phosphorylation
C) energy released from dehydration synthesis reactions
D) energy released from movement of protons down their electrochemical gradient through ATP synthase

5. ____ The energy used to pump hydrogen ions from the mitochondrial matrix across the inner membrane and into the intermembrane space is derived from
A) ATP hydrolysis.
B) redox reactions in the electron transport chain.
C) decreasing the pH in the mitochondrial matrix.
D) splitting water to form oxygen and protons.

6. ____ The direct energy source that drives ATP synthesis during respiratory oxidative phosphorylation in eukaryotic cells is
A) oxidation of glucose to CO_2 and water.
B) the thermodynamically favorable flow of electrons from NADH to the mitochondrial electron transport carriers.
C) the final transfer of electrons to oxygen.
D) the proton-motive force across the inner mitochondrial membrane.

7. ____ Which of the following produces the most ATP when glucose ($C_6H_{12}O_6$) is completely oxidized to carbon dioxide (CO_2) and water?
A) glycolysis
B) fermentation
C) oxidation of pyruvate to acetyl CoA
D) citric acid cycle
E) oxidative phosphorylation (chemiosmosis)

8. ____ The synthesis of ATP by oxidative phosphorylation, using the energy released by movement of protons across the membrane down their electrochemical gradient, is an example of
A) active transport.
B) an endergonic reaction coupled to an exergonic reaction.
C) a redox reaction.
D) allosteric regulation.

9. ____ If a cell is able to synthesize 30 ATP molecules for each molecule of glucose completely oxidized to carbon dioxide and water, approximately how many ATP molecules can the cell synthesize for each molecule of pyruvate completely oxidized to carbon dioxide and water?
A) 60
B) 6
C) 14
D) 28

10. ____ In liver cells, the inner mitochondrial membranes are about five times the area of the outer mitochondrial membranes. What purpose must this serve?
A) It increases the surface area for glycolysis.
B) It increases the surface area for the citric acid cycle.
C) It increases the surface area for oxidative phosphorylation.
D) It increases the surface area for substrate-level phosphorylation.

11. ____ Brown fat cells produce a protein called thermogenin in their mitochondrial inner membrane. Thermogenin is a channel for facilitated transport of protons across the membrane. What will occur in the brown fat cells when they produce thermogenin?
A) ATP synthesis and heat generation will both increase.
B) ATP synthesis will increase, and heat generation will decrease.
C) ATP synthesis will decrease, and heat generation will increase.
D) ATP synthesis and heat generation will both decrease.

12. ____ Yeast cells with defective mitochondria are incapable of cellular respiration. These cells will be able to grow by catabolizing which of the following carbon sources for energy?
A) glucose
B) proteins
C) fatty acids
D) pyruvate

13. ____ Which catabolic processes may have been used by cells on ancient Earth before free oxygen became available?
A) only glycolysis and fermentation
B) only glycolysis and the citric acid cycle
C) only glycolysis and pyruvate oxidation
D) only oxidative phosphorylation, using an electron acceptor other than oxygen
E) glycolysis, pyruvate oxidation, the citric acid cycle, and oxidative phosphorylation, using an electron acceptor other than oxygen

14. ____ Which of the following occur(s) in the cytosol of a eukaryotic cell?
A) glycolysis and fermentation
B) fermentation and chemiosmosis
C) oxidation of pyruvate to acetyl CoA
D) citric acid cycle

15. ____ Which of the following occur(s) in mitochondria?
A) glycolysis and fermentation
B) fermentation and chemiosmosis
C) glycolysis and oxidation of pyruvate to acetyl CoA
D) oxidation of pyruvate to acetyl CoA and the citric acid cycle
E) fermentation and oxidative phosphorylation

16. ____ Which metabolic pathway is common to both cellular respiration and fermentation?
A) the oxidation of pyruvate to acetyl CoA
B) the citric acid cycle
C) oxidative phosphorylation
D) glycolysis
E) chemiosmosis

17. ____ The ATP made during fermentation is generated by which of the following?
A) the electron transport chain
B) substrate-level phosphorylation
C) chemiosmosis
D) oxidative phosphorylation
E) aerobic respiration

18. ____ Yeast cells grown anaerobically can obtain energy by fermentation, which results in the production of
A) ATP, NADH, and pyruvate.
B) ATP and lactate.
C) ATP, CO_2, and lactate.
D) ATP, CO_2, and ethanol.
E) ATP, CO_2, and acetyl CoA.

19. ____ One primary function of both alcohol fermentation and lactic acid fermentation is to
A) reduce NAD^+ to NADH.
B) reduce FAD^+ to $FADH_2$.
C) oxidize NADH to NAD^+.
D) reduce $FADH_2$ to FAD^+.

20. ____ Which statement best supports the hypothesis that glycolysis is an ancient metabolic pathway that originated before the last universal common ancestor of life on Earth?
A) Glycolysis is widespread and is found in the domains Bacteria, Archaea, and Eukarya.
B) Glycolysis neither uses nor requires O_2.
C) Glycolysis is found in all eukaryotic cells.
D) The enzymes of glycolysis are found in the cytosol rather than in a membrane-enclosed organelle.
E) Ancient prokaryotic cells existed long before oxygen was present in Earth's atmosphere.