**Bioenergetics**

Name Date

**ATP**

1. ATP’s main function is:

1. Storing energy
2. promoting hydrolysis
3. dehydration synthesis
4. providing strength to connective tissue

2. Which of the following is not true of ATP?

1. It is a high energy substance.
2. It is formed by the synthesis of ADP and a phosphate.
3. It releases energy when split.
4. It cannot be recycled after it is broken down.

3. ADP is an abbreviation for:

1. adenosine double phosphate
2. aniline diphosphate
3. adenosine diphosphate
4. Andy’s dark peppermint

4. The preferred energy fuel of the body is:

1. fructose
2. glucose
3. amino acids
4. fatty acids

**Photosynthesis**

5. The wavelengths of light effective in driving photosynthesis are those in what part of the visible spectrum?

1. mostly blue-violet; some red
2. yellow
3. green
4. red

7. Enzymes for both photochemical (light reactions) and carbon-fixation (Calvin cycle) are found within organelles known as

1. lysosomes
2. ribosomes
3. Golgi apparatus
4. chloroplasts

8. The summary word equation shown below represents a set of reactions occurring in photosynthesis.

These reactions are known as

1. fermentation reactions c) Calvin cycle
2. dark reactions d) light dependent reactions

9. The light dependent reactions of photosynthesis take place within the

1. plasma membrane of the cell.
2. membranes of the mitochondria.
3. membranes of the thylakoids.
4. membranes surrounding the chloroplast.

10. The “first step” in photosynthesis is the

1. formation of ATP.
2. energizing of an electron of chlorophyll by a photon of light.
3. splitting of water into H and O components.
4. addition of CO2 to a five-carbon sugar.

11. The products of the light dependent reactions necessary to drive the light independent reactions are

1. ATP, O2
2. ATP, NADPH
3. NADP+, CO2
4. ATP, CO2

12. The light dependent reactions of photosynthesis

1. provide CO2 for the Calvin cycle.
2. produce carbohydrates.
3. provide the energy required for the Calvin cycle.
4. use O2 in the production of ATP.

13. What is the source of the electrons that add to NADP+ during photosynthesis?

1. water
2. light
3. ATP
4. glucose

14. The oxygen in our atmosphere is a product of

1. the splitting of CO2 during photosynthesis.
2. the splitting of water during photosynthesis
3. the splitting of ATP into ADP and a phosphate
4. the combination of ADP and a phosphate into ATP.

15. The proteins of the electron transport chain of photosynthesis are

1. built into the thylakoid membrane.
2. built into the outer membrane of the chloroplast.
3. located in the interior of the thylakoid.
4. located in the stroma.

16. The chlorophyll found in photosystem II has is electrons replaced by electrons from

1. photosystem I
2. water
3. NADPH
4. other pigments

17. Which of the following is mismatched with its location?

1. light reactions – grana
2. electron transport chain – thylakoid membrane
3. Calvin cycle – stroma
4. ATPsynthase – membrane surrounding chloroplast
5. splitting of water – thylakoid space

18. What are the final electron acceptors for the electron transport chains in the light reactions of photosynthesis and in cellular respiration?

1. O2 in both
2. CO2 in both
3. H2O in the light reactions and O2 in cellular respiration
4. NADP+ in the light reactions and NAD+ or FAD in respiration
5. NADP+ in the light reactions and O2 in respiration

**Cellular Respiration and Fermentation**

T / F 19. The breakdown of glucose into two pyruvic acid molecules occurs during glycolysis

20. The series of biochemical reactions in the cell which results in the breakdown of glucose and the production of two ATP molecules is called

1. cellular respiration
2. glycolysis
3. fermentation
4. photosynthesis

21. Glycolysis takes place in the

1. chloroplast.
2. cytoplasm.
3. mitochondria.
4. nucleus.
5. ribosomes.

22. What is the **net gain** in ATP molecules produced during the reactions of glycolysis under anaerobic conditions?

1. 2
2. 4
3. 6
4. 8

23. In the process of glycolysis

1. glucose is broken down.
2. there is a net gain of 2 ATP’s for the cell.
3. 2 lactic acid molecules are formed.
4. 4 ATP’s are used, but 6 ATP’s are produced.
5. both a and b

24. The products of glycolysis are

1. 2 ATP, 2 CO2, 2 ethanol.
2. 2 ATP, 2 NAD+, 2 acetate.
3. 2 ATP, 2 NADH, 2 pyruvate.
4. 38 ATP, 6 CO2, 6 H2O.

Match the following with the phrase that describes them. The number after each phrase indicates the number of correct answers.

**Glycolysis Fermentation Krebs cycle Electron Transport Chain (ETC)**

25. Produces ethyl alcohol

26. Occurs anaerobically (2)

27. Requires oxygen (2)

28. Ends with the formation pf pyruvate

29. Ends with carbon dioxide (2)

30. Occurs outside the mitochondria (2)

31. Aerobic respiration

1. happens in the presence of oxygen.
2. results in 36 molecules of ATP for the breakdown of one glucose molecule.
3. results in 6 molecules of carbon dioxide which eventually leave the body in the exhalation from the lungs.
4. All of the above are true of aerobic respiration.

32. If the two pyruvates from glycolysis continue to the next step of aerobic respiration, how many ATP molecules are synthesized in said step?

1. 1
2. 2
3. 4
4. 12

33. During which stage of cellular respiration is the most ATP generated?

1. glycolysis
2. Calvin cycle
3. Krebs cycle
4. Electron transport chain

34. Anaerobic respiration

1. starts with glycolysis.
2. produces 2 molecules of lactic acid.
3. produces 2 ATP’s.
4. creates an oxygen debt.
5. all of the above

35. An important function of fermentation is to

1. regenerate NAD+.
2. produce alcohol as a nutrient source.
3. produce NADH.
4. synthesize glucose.

36. How much O2 is required in the fermentation of one molecule of glucose?

1. none
2. 1 molecule
3. 2 molecules
4. 6 molecules