Cellular Respiration and Photosynthesis Test

1. When bonds are made energy is __________, when bonds are broken energy is __________.
   A. stored / released
   B. used / not used
   C. released / stored
   D. created / destroyed

2. Aerobic respiration produces _______ ATP, while each type of anaerobic respiration or fermentation produces _______ ATP.
   A. 2 / 38
   B. 38 / 2
   C. 32 / 2
   D. 34 / 2

3. This type of reaction takes place in a muscle lacking O₂ and may cause soreness:
   A. Lactic acid fermentation
   B. alcoholic fermentation
   C. anaerobic respiration
   D. all but B

4. Which process is the most efficient way to convert glucose into ATP?
   A. lactic acid fermentation
   B. alcoholic fermentation
   C. anaerobic respiration
   D. aerobic respiration

5. How many carbon atoms does ONE molecule of glucose have?
   A. 3
   B. 6
   C. 2
   D. 36

6. What is the main purpose of the Krebs Cycle in Cell Respiration?
   A. To build sugar molecules
   B. Complete the breakdown of sugar molecules
   C. To capture sunlight
   D. To fuel the dark reactions

7. The energy most directly available for use by living cells is stored in molecules of:
   A. Carbohydrates
   B. Lipids
   C. Fats
   D. ATP

8. How many molecules of ATP are produced for every ONE molecule of glucose?
   A. 5
   B. 63
   C. 33
   D. 36

9. Two organisms that can carry out anaerobic respiration are:
   A. Yeast and plants
   B. Trees and worms
   C. Yeast and humans
   D. Goulies and goblins

10. What product is always produced from either anaerobic or aerobic respiration?
    A. O₂
    B. CO₂
    C. ATP
    D. both A and C are produced
Use the following diagram to answer the next two questions:

\[ \text{ATP} \rightarrow \text{ADP} + \text{P} \]

11. Which is true about ATP being converted into ADP?
   A. Energy is required
   B. Energy is released
   C. Bonds are broken
   D. Phosphates are removed
   E. All but A

Match the statement to the related reaction:

   A. Aerobic Respiration
   B. Anaerobic Respiration
   C. Photosynthesis
   D. None of these

12. \[ \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} + 38\text{ATP} \]
13. Makes a total of 2 ATP for the cell to do work
14. \[ \text{CO}_2 + \text{H}_2\text{O} + \text{lactic acid} + 2\text{ATP} \]
15. Only happens in the presence of oxygen
16. Makes Sugar
17. Makes 38 ATP for the cell to do work
18. Only happens in the chloroplasts
19. \[ 6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \]
20. Is the most efficient way for cells to convert food into energy
21. Converting the sun’s energy into Sugar

\[ \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} + 38\text{ATP} \]

22. The above reaction shows:
   A. Photosynthesis
   B. Anaerobic respiration
   C. Aerobic Respiration
   D. Lactic acid Fermentation

23. The primary role of photosynthesis is to make what molecule?
   A. Sugar
   B. \( \text{O}_2 \)
   C. ATP
   D. \( \text{CO}_2 \)

24. The pigment in plants that makes them green is called what?
   A. Chloroplasts
   B. Xanthophyll
B. Carotenoids  
D. Chlorophyll

25. How is the oxygen that we breathe produced in plants?
   A. Water splitting in the light reactions  
   C. Carbon Dioxide production
   B. As a product of the KREB Cycle  
   D. none of these is correct

26. What is the main purpose of the Calvin Cycle in Photosynthesis?
   A. To build sugar molecules
   B. Complete the breakdown of sugar molecules
   C. To capture sunlight
   D. To fuel the dark reactions

27. Where does the CO₂ in photosynthesis come from?
   A. Water  
   C. Air
   B. Soil  
   D. Cliff Calvin cycle

28. Energy captured in the light reactions is stored in what molecule in the dark reactions?
   A. Glucose  
   C. Hydrogen
   B. CO₂  
   D. ATP

29. Which colors of the visible light spectrum does chlorophyll absorb?
   A. Red & blue  
   C. Violet
   B. Only green  
   D. Only red

30. Where do the light independent reactions take place?
   A. In the cytoplasm
   B. In the mitochondria of the cell.
   C. In the stroma of the chloroplast.
   D. Within and across the thylakoid membranes of the chloroplast.

31. What reactant is needed in the light-independent reactions?
   A. Oxygen
   B. Sunlight
   C. Water
   D. Carbon dioxide

32. Which of the following is not a function of photosynthesis?
   A. It provides material for plant growth and development
   B. It releases energy by breaking down glucose
   C. It helps regulate Earth’s environment
   D. It makes glucose, which stores energy for future use by plants and animals

33. Autotrophs differ from heterotrophs because they
   A. Utilize oxygen to burn food
   B. Do not require oxygen to live
   C. Make carbon dioxide as a product of using food
   D. Make their own food from carbon dioxide and water
34. Which of the following is not produced in the light reactions of photosynthesis?
   A. NADPH  
   B. Sugars  
   C. Hydrogen ions  
   D. ATP

35. Which statement describes how photosynthesis and cellular respiration are interrelated?
   A. Oxygen is produced during cellular respiration and stored during photosynthesis.
   B. Carbon dioxide and water released by cellular respiration are used in photosynthesis.
   C. Photosynthesis releases the energy that is stored during the process of cellular respiration.
   D. Glucose is used during cellular respiration to produce food that is broken down during photosynthesis.

36. The role of chlorophyll in photosynthesis is to
   A. Pass electrons to the stroma  
   B. Split water molecules  
   C. Absorb light energy  
   D. All of the above

37. Photosynthesis : oxygen ::
   A. Respiration : darkness  
   B. Light reactions : dark reactions  
   C. Respiration : carbon dioxide  
   D. Oxygen : carbon dioxide
38. The thylakoid membranes of a plant cell are the sites where
   A. Light energy is packaged into photons
   B. The light reactions occur
   C. Carbohydrates are formed
   D. ATP is used to produce NADPH

39. In a typical plant, all of the following factors are necessary for photosynthesis EXCEPT
   A. Chlorophyll
   B. Light
   C. Oxygen
   D. Water

40. The principal chemical compound that living things use to store energy is
   A. DNA
   B. ATP
   C. Water
   D. Carbon dioxide

Short answer-
Answer the following questions on your own sheet of paper:

41. Describe the energy transformations that happen in Phineas from when he eats his food to when he moves his muscles in flight. Use labeled diagrams and description. (4 points)

42. How are plants and animals connected. Connect plants and animals on a cellular level. (2 points)

43. Write the equation for cellular respiration and photosynthesis: (2 points)

44. What is an autotroph? Give an example. What is a heterotroph? Give an example. (3 points)