Photosynthesis: Light Dependent Reactions (20 Marks)

Name: _____ Date: _____

1. What is ATP and what is its purpose in cellular functions? (1)

2. Explain why yellow and red-coloured pigments are visible in autumn leaves but not in summer leaves. (1)

3. Explain the meaning of the word photosynthesis. What is being synthesized and why? (2)

4. What is the purpose of the light dependent reactions of photosynthesis? In other words, what are the products? (1)

5. What happens when chlorophyll absorbs a photon of light? (1)

6. When water is broken up during photosynthesis, where do its individual atoms (H^+ and O) ultimately end up? (2)

7. Photosystem I uses electrons to make NADPH from $NADP^+$ and a hydrogen ion (H^+). Where do these electrons come from? (1)

8. Where are photosystems I and II of the first phase of photosynthesis located specifically? (1)

9. Define the terms oxidation and reduction. How do these terms apply to photosynthesis? Which molecules are oxidized and which are reduced? (3)

10. Chemiosmosis is a process for synthesizing ATP using the energy of a concentration gradient and the ATP synthase enzyme found in the thylakoid membrane. What is the concentration gradient that is created? Explain. (2)

11. What does photosystem II do? (1)
    a. Uses solar energy to make ATP
    b. Uses solar energy to pump hydrogen into the thylakoid
    c. Uses solar energy to release an electron
    d. Uses solar energy to break up water molecules

12. What does photosystem I do? (1)
    a. Facilitates the creation of NADPH
    b. Facilitates the creation of ATP
    c. Facilitates the creation of water
    d. Facilitates the pumping of hydrogen into the thylakoid

13. What does the electron transport chain do? (1)
    a. Breaks up water into oxygen molecules and hydrogen ions
    b. Pumps hydrogen ions into the thylakoid
    c. Adds hydrogen to NADP to form NADPH
    d. Creates ATP

14. What does ATP synthase do? (1)
    a. Facilitates the movement of H^+ into the thylakoid producing ATP in the process
    b. Facilitates the movement of H^+ out of the thylakoid producing ATP in the process
    c. Transfers electrons from photosystem I to photosystem II
    d. Transfers electrons from photosystem II to photosystem I

15. Which molecule is used to create an electrochemical gradient in the light dependent reactions of photosynthesis? (1)
    a. Oxygen
    b. Hydrogen
    c. ATP
    d. ADP