

Name: _____

Biology 11
Chapter 9 worksheet

1. Potential energy is energy associated with the _____ of atoms and the amount of potential energy is based on the _____ of _____ relative to other electrons
2. List two reasons why ATP hydrolysis is exergonic
 - a. -
 - b. -
3. List and describe as precisely as you can what ATP hydrolysis accomplishes in the living cell
 - a. -
 - b. -
 - c. -
4. Describe energetic couplings
5. In your own words explain a "high energy phosphate bond". Using this information why is it logical that PEP can transfer a phosphate group and make ATP from ADP

6. As you know breaking all chemical bonds requires energy. How then is it possible to “get” energy out of the hydrolysis of ATP. Draw an energy diagram to help explain.

7. Calculate ΔG_p for a *E. coli* cell using this equation
 $\Delta G_p = \Delta G^\circ + RT \ln \frac{[\text{ADP}][\text{Pi}]}{[\text{ATP}]}$. ATP = 7.9mM, ADP = 1.04mM and Pi = 7.9mM

8. ATP has such “high energy bonds” that it will hydrolyze in water
a. true
b. false

9. Why is it important that ATP can only be broken down in the presence of an enzyme?

10. Define

a. Oxidation (List what is primarily oxidized in metabolism)

b. Reduction (List what is primarily reduced in metabolism)

11. Why is a C – O bond more stable and have less energy than a C – H bond

12. List the four main steps for metabolism. Under each step write all of the products

a. –

b. –

c. –

d. –

13. Glycolysis is an ancient and aerobic pathway which predates photosynthesis

a. true

b. false

14. Glycolysis is a metabolic pathway which is highly conserved in most organism

a. true

b. false

15. Draw out the steps of glycolysis **include all of the enzymes and place an * by any enzyme which is not reversible. Circle the enzyme which is the major regulation step**