

Name _____ Date _____ Period _____

HONORS BIOLOGY – PROBLEM SET

CHAPTER 5a: THE WORKING CELL

1. An artificial cell consisting of a solution enclosed in a selectively permeable membrane has just been immersed in a beaker containing a different solution. The membrane is permeable to water and to monosaccharides but not to disaccharides. [4 points]

CELL CONTENTS: 0.08 M sucrose, 0.02 M glucose, water

ENVIRONMENT: 0.02 M sucrose, 0.01 M glucose, 0.04 M fructose, water

- Which solute(s) will exhibit a net diffusion into the cell?
 - Which solute(s) will exhibit a net diffusion out of the cell?
 - Which solution (cell or the environment) is hypertonic to the other?
 - In which direction will there be a net osmotic movement of water?
2. Enzymes work best at an OPTIMAL pH and temperature. Answer these four questions regarding enzymes from the DIGESTIVE system. Refer to pages 434 and 436 for help on parts A and B. [3 points]
- Name at least one enzyme that works best in a neutral pH. Explain its function.
 - Name at least one enzyme that works best in an acidic pH. Explain its function.
 - What is the optimal temperature for enzymes in the human body?
 - Why is a prolonged fever of greater than 105°F so dangerous? Explain.
3. If a hospital patient needs to receive intravenous fluids, he or she is injected with 0.9% salt solution. Explain what would happen to that person's red blood cells if he or she were injected with 0% salt solution (pure water). [1 point]
4. An enzyme called alpha-amantin stops the ability of an animal to produce RNA by competitively inhibiting an enzyme called RNA polymerase. It is found in the "death cap" and "destroying angel" mushrooms. Draw and label a diagram showing a normal enzyme-substrate relationship. Then draw and label a diagram showing how alpha-amantin works. [2 points]

