

NAME: _____

Time Started: _____

BIO 112: Organisms, Evolution, and Ecosystems

Dr. Chris Paradise

Review 2

Spring 2008

Instructions: This review is worth 150 points (15% of your course grade) and will be due by 5:00 pm on Tuesday, 4/1/2008. No exceptions; late reviews will result in at least a 5% deduction. **You may not consult** any references or any other person while working on this review. Your signature at the bottom of the last page signifies that the work is yours alone and is pledged under the Honor Code. When you break the seal on the envelope you will have **three hours to complete the review**. Print legibly; I can only grade what I can read. For each question or part to a question, limit your answers to the space below each question, unless otherwise specified. Any part of your answer outside of the space provided **will not be graded**. **You may type** your answers separately, but use the same amount of space provided below each question. Each question is worth 15 points.

1. Answer the following questions regarding the regulation of body temperature in mammals (15 points).
 - a. What are two areas where temperature is sensed and where is this information sent?

 - b. What is one physiological response exhibited by mammals when they are too hot?

 - c. What is one behavioral response exhibited by mammals when they are too cold?

2. Discuss the physiological and/or behavioral ecology of one of the following animals. Be sure to identify specific physiological or behavioral mechanisms that have evolved in the context of the chosen animal's environment.

Dromedary camel

OR

Ruby-throated hummingbird

3. Answer the following two questions about Fick's Law of Diffusion.
 - a. How does Fick's Law of Diffusion help us assess animal adaptations for gas exchange?

 - b. Provide one detailed application of Fick's Law to help understand adaptations in one specific type of animal.

4. Give an example of how the respiratory system and circulatory system are integrated in vertebrates. Further, explain how other systems are involved in control and regulation of this integration.

5. Describe the role of insulin in carbohydrate and fat metabolism. Be sure to indicate the different physiological systems involved throughout the course of insulin release and action. Be specific.

6. Answer these questions regarding the mechanisms involved in digestive and excretory systems.
 - a. What is the role of perfusion in each system?

 - b. Explain the role of one hormone in the digestive system.

 - c. Briefly describe countercurrent exchange in the nephron.

7. How does atherosclerosis develop and what are the consequences of atherosclerosis? Once someone develops atherosclerosis, how are different physiological systems affected, and what are the associated risk factors?

8. Relate the two articles by Nesse and Williams (Evolution and the Origin of Disease) and Duncan (The Covert Plague). Specifically, apply one or more principles of Darwinian Medicine discussed in the first article to the medical issues discussed in the second article.

9. Describe feedbacks (negative, positive, or both, as appropriate) from the nervous and endocrine systems that are important in homeostasis of the following variables. For each variable, provide specific details regarding the mechanisms involved in at least one negative feedback.
 - a. Blood pressure

 - b. Water re-absorption in the kidney

10. Explain the advantage(s) of autoregulatory control over nervous or endocrine control in the circulatory system. Use two examples to illustrate the advantages of autoregulatory control: during nutrient absorption (post-meal) and during strenuous exercise.