December 2003
Relevant Sample Questions for final exam from previous year exam.

*True or False (write ‘true’ or ‘false’)*

2._________ Higher food quality and higher body temperature both act to decrease food transit time in the vertebrate digestive system.

4._________ The most common byproduct of all chemical reactions is heat.

6._________ To digest cellulose, vertebrates require symbiotic gut microbes.

8._________ The Reynold’s Number is roughly proportional to mass in small animals.

11._________ Fats contain less metabolizable energy per gram than carbohydrates.

12._________ The mass-specific rate of metabolism decreases in larger species of vertebrates.

*Really Short Answer (maybe a few words or a sentence; 45 points total; 3 points each)*

2. How is glucose reabsorbed in the proximal tubule of the nephron?

5. Why do infrequently feeding snakes exhibit a high degree of gut plasticity?

6. What is the main energy-consuming activity that contributes to basal metabolic rate (BMR)?

11. Distinguish between regional and temporal heterothermy.

*Short Answer*

9. How does the structure and function of the small intestine, including the duodenum, aid in digestion and absorption of nutrients from the chyme passed through the pyloric sphincter from the stomach?

10. Given the following data, what is the $Q_{10}$ for the metabolic rate of Mr. Ectothermic Vertebrate (show your work)?

<table>
<thead>
<tr>
<th>Ambient Temp. (C)</th>
<th>$O_2$ consumption (ml/g/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>150</td>
</tr>
<tr>
<td>7</td>
<td>225</td>
</tr>
<tr>
<td>11</td>
<td>300</td>
</tr>
<tr>
<td>13</td>
<td>375</td>
</tr>
<tr>
<td>15</td>
<td>500</td>
</tr>
</tbody>
</table>

12. How are metabolism, entropy, and heat all linked?
Long Essay Answer (18 pts; ∼a few well-organized paragraphs).
1. If you were a guest lecturer in front of a classroom of over-achieving high school students and were asked to describe physiological differences between endotherms and ectotherms, what would you say? So that the high school students pass their exam, be sure to discuss physiology in the context of respiration, circulation, metabolism, temperature regulation, H₂O balance, behavior, ecological role, etc.