- 1. Opponents of evolutionary theory often contend that the study of evolution is not a real science because there is no experimental evidence that supports the theory. As you now know, ample experimental evidence exists that supports the idea of evolution. Please describe an experiment that we have discussed (including the set-up and results), and how the experiment supports the idea of evolution.
- 2. The metabolic processes conducted by Earth's early organisms were likely mediated only by a limited number of enzymes. Explain what impact a small library of enzymes would have on the (i) efficiency and (ii) specificity of early bioprocesses.
- 3. What was the main criticism against the likelihood of autotrophy on early Earth?
- 4. Early organisms were simple, but they used some fairly complex pathways to metabolize nutrient sources. How can the *retrograde evolution hypothesis* explain the evolution of today's complex metabolic pathways?
- 5. What was the evolutionary significance of the development of enzymes? (2 points)
- 6. In terms of the availability of raw materials and energy, describe two characteristics of the early Earth/solar system that supported the development of life. (2 points)
- 7. The Early earth (3.5 billion years ago) contained
 - a) a reducing atmosphere
 - b) homogeneous distribution of nutrients
 - c) a high diversity of organisms
 - d) controllable energy sources
 - e) aerobic organisms
- 8. Primitive, enclosed, membrane-like structures that formed following the agitation of water containing an overlying layer of lipids were called
 - a) vesicles
 - b) stromatolites
 - c) ribozymes
 - d) proteinoids
- 9. Condensation reactions
 - a) result in the loss of water from the resulting compound
 - b) are polymerization reactions
 - c) are key in the formation of nucleic acids, proteins, sugars and lipids
 - d) could be driven by heat
 - e) all of the above
- 10. What bridged the gap between chemical evolution and biological evolution?
 - a) selection
 - b) the central dogma
 - c) cyclic photosynthesis
 - d) retrograde evolution
 - e) glycolysis