Due at the start of lecture on Monday, 8 February 2010

Chapter 1: Biological Building Blocks --

1) Provide a clear and concise explanation as to why the helium and neon are two of the top four most abundant elements in the Universe, yet doesn't make the top ten for elements composing the human body (see Table 1.1 on page 4 of Gilmour & Sephton).

2) A common classification of metabolic systems for biological organisms is to divide the possibilities into four categories: photoautotroph, chemoautotroph, photoheterotroph, and chemoheterotroph.
a) For each of the four categories, cite specific facts gleaned from the Internet and any other resources to provide examples of life forms that make use of that form of metabolism.
b) Cite specific facts gleaned from the Internet and any other resources to clearly and concisely explain i) what is the principle source of the carbon for each of the four categories; and ii) what is the principle energy source for each of the four categories.

3) Suppose a form of life began in which genetic words consisted of 2 DNA bases in a row.
a) How many amino acids could be coded by such instructions?
b) In what way might this for of life have been more successful or less successful than the actual life we find on Earth?
c) Cite specific facts gleaned from the Internet and any other resources to clearly and concisely explain the evidence to support the hypothesis that our current genetic code arose from a two-base code.

4) Imagine a protein which consists of the following chain of five amino acids:
tyrosine – alanine – alanine – methionine – phenylanine.
Two potential RNA code sequences for this protein are UAU – GCC – GCG – AUG – UUC and UAC – GCU – GCA – AUG – UUU. List the complementary DNA sequences of letters that make up these RNA strands.

5) Provide a clear yet concise justification as to what indicators in the structure of a eukaryotic cell hint at an origin that involved multiple prokaryotic cells.