

**URI CMB 190**  
**Issues in Biotechnology**  
**Lesson 4: Study Guide**

Name \_\_\_\_\_ Date \_\_\_\_\_

1. A Pipetman is:

- (A) the new biomedical device made by tissue engineering and now used to treat the damaged blood vessels of heart attack victims
- (B) a radical group of bioengineered superheroes in the Hollywood movie GATTACCA
- (C) a molecular biology tool used in the lab to measure small volumes of liquid common in biotechnology
- (D) a new type of bio-engineered crop plants that are drought tolerant
- (E) a new surgical tool used in to extract cancer cells

2. An ultracentrifuge consists of a rotor that spins tubes containing materials and is:

- (A) a component on a new type of microscope to allow cell components to be easily visualized
- (B) the laboratory tool developed by Robert Hooke in the 1660s that he used to discover cells
- (C) a tool used by cell biologists for separating and comparing cell components based on size and density
- (D) a component on the recent Rover Mars mission used to look for life on other planets
- (E) used only to enrich uranium for nuclear warheads

3. Cloning a gene:

- (A) is a method that has been banned in Europe but widely used in the US
- (B) is a method used to copy a specific segment of DNA
- (C) is a method used to reproduce an entire new organism from a donor cell
- (D) is a science fiction idea that has not yet been accomplished or proven
- (E) is a good idea in theory, but has not yet been accomplished

4. The atomic number of carbon is 6. Its nucleus must contain:

- (A) 6 neutrons and 6 protons
- (B) 3 protons and 3 neutrons
- (C) 6 neutrons and no electrons
- (D) 6 protons and no electrons
- (E) 6 protons and 6 electrons

5. A covalent bond is formed when:

- (A) two non-polar molecules associate with each other in a polar environment
- (B) a positively charged particle is attracted to a negatively charged particle
- (C) one atom gives up electrons to another atom
- (D) two atoms share electrons
- (E) two polar molecules associate with each other in a non-polar environment

6. Enzymes are usually:

- (A) proteins
- (B) carbohydrates
- (C) helpful bacteria
- (D) only available in health food stores
- (E) none of these answers are correct

7. Changing one amino acid within a protein could change what about that protein?

- (A) the primary structure of the protein
- (B) the overall shape of the protein
- (C) the function of the protein itself
- (D) the sequence of amino acids specified in the DNA sequence called a gene
- (E) all of the above

8. A shortage of phosphorus would make it difficult for an organism to manufacture:

- (A) DNA
- (B) proteins
- (C) cellulose
- (D) fats
- (E) none of these answers are correct

9. Which of the following is not a chemical reaction?

- (A) sugar and oxygen combine to form carbon dioxide and water
- (B) sodium metal and chlorine gas unite to form sodium chloride
- (C) hydrogen gas combines with oxygen to form water
- (D) ice melts to form liquid water
- (E) none of these answers are correct

10. The chemical units of information in DNA are:

- (A) ATGC
- (B) UAGC
- (C) DAMN
- (D) RNAI
- (E) XYZQ

11. In DNA replication an (A) adenine always pairs with:

- (A) cytosine (C)
- (B) thymidine (T)
- (C) guanine (G)
- (D) tyrosine
- (E) monosodium glutamate

12. Observation of and wonder at the workings of nature are what initiate “why” and “how” type questions. Science is a system of:

- (A) relying on one’s best intuition, inspiration and perspiration to solve problems
- (B) advertising as a devious enterprise conceived by entrepreneurial western capitalists to make money from the ideas of inventive and often eccentric minds
- (C) making theories that fit certain beliefs about why and how things happen
- (D) hypothesis making about the mysteries of life
- (E) hypothesis making and testing to discern and validate observable facts

13. Water can absorb and store a large amount of heat while increasing only a few degrees in temperature. Why?

- (A) the heat must first be used to break the hydrogen bonds rather than raise the temperature
- (B) the heat must first be used to break the ionic bonds rather than raise the temperature
- (C) the heat must first be used to break the covalent bonds rather than raise the temperature
- (D) an increase in temperature causes an increase in adhesion of the water
- (E) an increase in temperature causes an increase in cohesion of the water

14. Water is split during photosynthesis in plants to yield what compounds?

- (A) methane gas and carbon dioxide
- (B) oxygen and water
- (C) hydrogen and oxygen
- (D) sugars and proteins
- (E) RNA and DNA