SAMPLE QUESTIONS

1. The energy of motion is _________ energy.
   (a) kinetic
   (b) conserved
   (c) created
   (d) potential
   (e) stored

2. A rock on the top of a mountain contains _________ energy.
   (a) motion
   (b) potential
   (c) no
   (d) kinetic
   (e) conserved

3. Which of the following is a measure of disorder?
   (a) entropy
   (b) kinetic energy
   (c) potential energy
   (d) respiration
   (e) conservation of energy

4. Humans convert approximately _________ of the energy stored in food to useful work.
   (a) 20%
   (b) 40%
   (c) 60%
   (d) 80%
   (e) 99.9%

5. You have a 2-liter bottle of liquid water at 0°C. About how many Calories are needed to heat up the water to 100°C?
   (a) 2 Calories
   (b) 100 Calories
   (c) 200 Calories
   (d) 2,000 Calories
   (e) 10,000 Calories

6. Energy is transferred from ATP to other molecules by transferring a(n) _________.
   (a) adenosine
   (b) spring
   (c) heat unit
   (d) photon
   (e) phosphate group

7. Usually, enzymes are _________.
   (a) fats
   (b) steroids
(c) monosaccharides
(d) phospholipids
(e) proteins

8. Enzymes increase the rate of a reaction by __________.
   (a) increasing the temperature of the substrates
   (b) contributing electrons to the reaction
   (c) contributing water to the reaction
   (d) decreasing activation energy
   (e) changing the pH of the substrates

9. An enzyme's function is dependent on its __________.
   (a) pH
   (b) temperature
   (c) shape
   (d) size
   (e) weight

10. The region of an enzyme to which a substrate binds is called the __________ site.
    (a) active
    (b) substrate
    (c) enzymatic
    (d) conformational
    (e) denatured

11. Which one of the following is true?
    (a) An enzyme's function depends on its three-dimensional shape.
    (b) Enzymes work generally on a broad range of substrates.
    (c) Enzymes are used up in chemical reactions.
    (d) Enzymes emerge changed from the reactions they catalyze.
    (e) An enzyme binds to its substrate at the enzyme's substrate site.

12. Which one of the following is most similar to the mechanism of an enzyme inhibitor?
    (a) keeping someone from parking by parking in their designated spot
    (b) driving the wrong way on a one-way street
    (c) forgetting to put a cap back on a pen
    (d) combining new ingredients in a new recipe
    (e) changing the tires on a car

13. Diffusion __________.
    (a) is the result of the potential energy of atoms
    (b) is driven by an input of cellular energy
    (c) requires an input of cellular energy
    (d) occurs when particles spread from areas where they are less concentrated to areas where they are more concentrated
    (e) proceeds until equilibrium is reached

14. Osmosis can be defined as __________.
    (a) the diffusion of water
    (b) the diffusion of non-polar molecules
    (c) active transport
15. When two solutions that differ in solute concentration are placed on either side of a selectively permeable membrane, and osmosis is allowed to take place, the water will __________.
   (a) exhibit a net movement to the side with lower water concentration
   (b) exhibit a net movement to the side with higher water concentration
   (c) exhibit a net movement to the side with lower solute concentration
   (d) exhibit an equal movement in both directions across the membrane
   (e) not cross the membrane

16. Some protozoans have special organelles called contractile vacuoles that continually eliminate excess water from the cell. The presence of these organelles tells you that the environment __________.
   (a) is isotonic to the protozoan
   (b) is hypotonic to the protozoan
   (c) is hypertonic to the protozoan
   (d) contains a higher concentration of solutes than the protozoan
   (e) none of the above

17. In a hypotonic solution, a plant cell will __________.
   (a) undergo plasmolysis
   (b) pump out excess water
   (c) become flaccid
   (d) burst
   (e) become turgid

18. Active transport __________.
   (a) uses ATP as an energy source
   (b) can move solutes against their concentration gradient
   (c) requires the cell to expend energy
   (d) can involve the transport of ions
   (e) all of the above

19. Certain cells that line the stomach synthesize a digestive enzyme and secrete it into the stomach. This enzyme is a protein. Which of the following processes could be responsible for its secretion?
   (a) endocytosis
   (b) exocytosis
   (c) diffusion
   (d) pinocytosis
   (e) passive transport

20. Relaying a message from a receptor protein to a molecule that performs a specific function within a cell is called __________.
   (a) signal transduction
   (b) inhibition
   (c) competition
   (d) self-recognition
   (e) selective permeability

21. The figure below shows that __________.
   (a) ADP can perform cellular work when it binds to an additional phosphate group
(b) ATP can perform cellular work when it releases a phosphate group
(c) ATP can be converted to ADP by adding a phosphate group
(d) energy is released from ATP during the process of cellular respiration
(e) ADP is a smooth molecule

22. Examine the following figure. Imagine that cell signaling using a signal transduction pathway is like a person answering the door after hearing the doorbell ring. Which structure in this figure is like the button for the doorbell?

(a) epinephrine
(b) the receptor protein
(c) proteins of the signal transduction pathway
(d) the hydrolysis of glycogen
(e) the plasma membrane
Read the following scenario to answer the following questions.

Cellular respiration converts the energy of fuel molecules to a form of energy that a cell can use to perform work. In an average day, most adult humans need to consume about 2,000 Calories to maintain their health. However, the exact amount of dietary Calories a person needs depends upon many factors, including the person’s age, physical activity, size, and health. Foods that we consume vary greatly in their nutritional content and quality. A large hard-boiled egg, for example, has about 75 dietary Calories and contains about 70% of our recommended daily intake of cholesterol.

23. If a person eats one hard-boiled egg and digests the egg fully, cellular respiration will convert most of this energy into __________.
   (a) ATP
   (b) heat
   (c) carbon dioxide
   (d) water
   (e) sugars