

## Section III – Science

**1. Electricity is a general term encompassing a variety of phenomena resulting from the presence and flow of electric charge. Which of the following statements about electricity is/are true?**

- a. Electrically charged matter is influenced by, and produces, electromagnetic fields.
- b. Electric current is a movement or flow of electrically charged particles.
- c. Electric potential is a fundamental interaction between the magnetic field and the presence and motion of an electric charge.
- d. An influence produced by an electric charge on other charges in its vicinity is an electric field.

**2. Which of the following is/are not included in Ohm's Law?**

- a. Ohm's Law defines the relationships between (P) power, (E) voltage, (I) current, and (R) resistance.
- b. One ohm is the resistance value through which one volt will maintain a current of one ampere.
- c. Using Ohm's Law, voltage is determined using  $V = IR$ , with I equaling current and R equaling resistance.

d. An ohm ( $\Omega$ ) is a unit of electrical voltage.

**3. The property of a conductor that restricts its internal flow of electrons is:**

- a. Friction
- b. Power
- c. Current
- d. Resistance

**4. In physics, \_\_\_\_\_ is the force that opposes the relative motion of two bodies in contact.**

- a. Resistance
- b. Abrasiveness
- c. Friction
- d. Antagonism

**5. What is the difference, of any, between kinetic energy and potential energy?**

- a. Kinetic energy is the energy of a body that results from heat while potential energy is the energy possessed by an object that is chilled
- b. Kinetic energy is the energy of a body that results from motion while potential energy is the energy possessed by an object by virtue of its position or state, e.g., as in a compressed spring.
- c. There is no difference between kinetic and potential energy; all energy is the same.
- d. Potential energy is the energy of a body that results from motion while kinetic energy is the energy possessed by an object by virtue of its position or state, e.g., as in a compressed spring.

**6. What are considered the four fundamental forces of nature?**

- a. Gravity, electromagnetic force, weak nuclear force, and strong nuclear force
- b. Gravity, electromagnetic force, negative nuclear force, and positive nuclear force
- c. Polarity, electromagnetic force, weak nuclear force, and strong nuclear force
- d. Gravity, chemical magnetic force, weak nuclear force, and strong nuclear force

**7. Starting with the weakest, arrange the fundamental forces of nature in order of strength.**

- a. Gravity, Weak Nuclear Force, Electromagnetic Force, Strong Nuclear Force
- b. Weak Nuclear Force, Gravity, Electromagnetic Force, Strong Nuclear Force
- c. Strong Nuclear Force, Weak Nuclear Force, Electromagnetic Force, Gravity
- d. Gravity, Strong Nuclear Force, Weak Nuclear Force, Electromagnetic Force

**8. What is the difference between Strong Nuclear Force and Weak Nuclear Force?**

- a. The Strong Nuclear Force is an attractive force that binds protons and neutrons and maintains the structure of the nucleus, and the Weak Nuclear Force is responsible for the

radioactive beta decay and other subatomic reactions.

b. The Strong Nuclear Force is responsible for the radioactive beta decay and other subatomic reactions, and the Weak Nuclear Force is an attractive force that binds protons and neutrons and maintains the structure of the nucleus.

c. The Weak Nuclear Force is feeble and the Strong Nuclear Force is robust.

d. The Strong Nuclear Force is a negative force that releases protons and neutrons and threatens the structure of the nucleus, and the Weak Nuclear Force is an attractive force that binds protons and neutrons and maintains the structure of the nucleus.

**9. The Law of Conservation of Mass states that:**

a. No detectable gain but, depending on the substances used, some loss can occur in chemical reactions.

b. No detectable gain or loss occurs in chemical reactions.

c. No detectable loss but some gain occurs in chemical reactions.

d. Depending on the substances used, substantial gain or loss can occur in chemical reactions.

**10. What is the difference, if any, between convection and heat radiation?**

a. Thermal radiation is the transfer of heat from one place to another by the movement of fluids; convection is electromagnetic radiation emitted from all matter due to its possessing thermal energy.

b. Convection is the transfer of heat from one place to another by the movement of fluids; thermal radiation is nuclear energy emitted from all matter due to its possessing thermal energy.

c. Convection is the transfer of heat from one place to another by the movement of fluids; thermal radiation is electromagnetic radiation emitted from all matter due to its possessing thermal energy.

d. Convection is the transfer of heat from one place to another by the movement of fluids; thermal radiation is the barely detectable light emitted from all matter due to its possessing thermal energy.

**11. In \_\_\_\_\_ cells, the cell cycle is the cycle of events involving cell division, including \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.**

a. Prokaryotic, meiosis, cytokinesis, and interphase

b. Eukaryotic, meiosis, cytokinesis, and interphase

c. Eukaryotic, mitosis, kinematisis, and interphase

d. Eukaryotic, mitosis, cytokinesis, and interphase

**12. Which, if any, of the following statements about prokaryotic cells is false?**

a. Prokaryotic cells include such organisms as E. coli and Streptococcus.

b. Prokaryotic cells lack internal membranes and organelles.

c. Prokaryotic cells break down food using cellular respiration and fermentation.

d. All of these statements are true.

**13. \_\_\_\_\_ is a nucleic acid that carries the genetic information in the cell and is capable of self-replication.**

- a. RNA
- b. Triglyceride
- c. DNA
- d. DAR

**14. The complementary bases found in DNA are \_\_\_\_\_ and \_\_\_\_\_ or \_\_\_\_\_ and \_\_\_\_\_.**

- a. Adenine and thymine or cytosine and guanine
- b. Cytosine and thymine or adenine and guanine
- c. Adenine and cytosine or thymine and guanine
- d. None of the above

**15. A/an \_\_\_\_\_ is the basic structural unit of nucleic acids (DNA or RNA); their sequence determines individual hereditary characteristics.**

- a. Gene
- b. Nucleotide
- c. Phosphate
- d. Nitrogen base

**16. \_\_\_\_\_ is a \_\_\_\_\_ that plays an important role in the creation of new \_\_\_\_\_.**

- a. Deoxyribonucleic acid (DNA) is a chain of nucleotides that plays an important role in the creation of new proteins.
- b. Ribonucleic acid (RNA) is a chain of nucleotides that plays an important role in the creation of new proteins.
- c. Ribonucleic acid (RNA) is a cluster of enzymes that plays an important role in the creation of new proteins.
- d. Ribonucleic acid (RNA) is a chain of nucleotides that plays an important role in the creation of new genes.

**17. Which, if any, of the following statements are false?**

- a. A mutation is a permanent change in the DNA sequence of a gene.
- b. Mutations in a gene's DNA sequence can alter the amino acid sequence of the protein encoded by the gene.
- c. Mutations in DNA sequences usually occur spontaneously.
- d. Mutations in DNA sequences are caused by exposure to environmental agents such as sunshine.

**18. \_\_\_\_\_ reactions occur in every cell and use \_\_\_\_\_ to convert glucose to energy; \_\_\_\_\_ organisms such as many bacteria can release energy without the use of \_\_\_\_\_.**

- a. Aerobic reactions occur in every cell and use oxygen to convert glucose to energy; anaerobic organisms such as many bacteria can release energy without the use of oxygen.
- b. Anaerobic reactions occur in every cell and use oxygen to convert glucose to energy; aerobic organisms such as many bacteria can release energy without the use of oxygen.
- c. Aerobic reactions occur in every cell and use exercise to convert glucose to energy; anaerobic organisms such as many bacteria can release energy without the use of exercise.
- d. Analogic reactions occur in every cell and use oxygen to convert glucose to energy; anaerobic organisms such as many bacteria can release energy without the use of oxygen.

**19. \_\_\_\_\_ are a collection of similar cells that group together to perform a specialized function.**

- a. Epithelia
- b. Organs
- c. Systems
- d. Tissues

**20. \_\_\_\_\_ tissue serves as membranes lining organs and helping to keep the body's organs separate, in place and protected; an example is the outer layer of the skin.**

- a. Epithelial
- b. Connective
- c. Nerve
- d. Protein

**21. Tissue that adds support and structure to the body and frequently contains fibrous strands of collagen is \_\_\_\_\_ tissue.**

- a. Epithelial
- b. Muscle
- c. Nerve
- d. Connective

**22. \_\_\_\_\_ tissue is a specialized tissue that can contract and contains the specialized proteins actin and myosin that slide past one another and allow movement.**

- a. Epithelial
- b. Muscle
- c. Nerve
- d. Connective

**23. \_\_\_\_\_ tissue contains two types of cells: neurons and glial cells and has the ability to generate and conduct electrical signals in the body.**

- a. Nerve
- b. Connective
- c. Epithelial