ASVAB General Science Practice Test (Sample)

Study Guide

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Questions

1. Newton's second law of motion is commonly referred to as what?

A. Law of action and reaction

B. Law of inertia

C. Law of acceleration

D. Law of conservation of momentum

2. Solution A has a pH of 8 and solution B has a pH of 11. Which statement is true?

A. Solution A is 1000 times more acidic than solution B

B. Solution A is an acid and solution B is a base

C. Solution B is an acid and solution A is a base

D. Solution B is 1000 times more acidic than solution A

3. What is the primary characteristic of a concave lens?

A. Thicker in the middle than on the edges

B. Thicker on the edges than in the middle

C. Has a reflective surface

D. Converges light rays

4. What instrument is used to measure wind speed?

A. Hygrometer

B. Thermometer

C. Anemometer

D. Barometer

5. What is the basic unit of mass in the metric system?

A. Pound

B. Ounce

C. Gram

D. Kilogram

6. What is the end result of the process of meiosis?

A. Two identical cells

B. Two genetically diverse cells

C. Four genetically diverse cells

D. No division occurs

7. Which group includes organisms that decompose organic material?

A. Carnivores

B. Herbivores

C. Omnivores

D. Decomposers

8. What is the role of lipase in the digestive system?

A. Breaks down proteins into amino acids

B. Changes fats to glycerol and fatty acids

C. Helps digest carbohydrates

D. Aids in the absorption of vitamins

9. You are hiking through the Grand Canyon and notice the striated pattern of the rocks. These striations are most likely to be present in what type of rock?

A. Metamorphic

B. Sedimentary

C. Igneous

D. Pumice

10. Which scientific principle relates the force, mass, and acceleration of an object?

A. Force equals mass times acceleration

B. Work equals force times distance

C. Energy equals mass times the speed of light squared

D. Impulse equals change in momentum

Answers

1. C
2. A
3. B
4. C
5. C
6. C
7. D
8. B
9. B
10. A

Explanations

1. Newton's second law of motion is commonly referred to as what?

A. Law of action and reaction

B. Law of inertia

C. Law of acceleration

D. Law of conservation of momentum

Newton's second law of motion is indeed referred to as the law of acceleration. This law states that the force acting on an object is equal to the mass of that object multiplied by its acceleration (F = ma). Essentially, this means that the acceleration of an object is directly proportional to the net force acting on it and inversely proportional to its mass. When a greater force is applied, the object accelerates more. This principle is fundamental in understanding how forces affect the motion of objects, making it a cornerstone in the study of dynamics in physics. The other choices relate to different concepts in physics: the law of action and reaction refers to Newton's third law, the law of inertia pertains to Newton's first law, and the law of conservation of momentum speaks to a principle that describes the constancy of momentum in an isolated system. Each of these concepts is important, but they represent different aspects of Newton's laws.

2. Solution A has a pH of 8 and solution B has a pH of 11. Which statement is true?

A. Solution A is 1000 times more acidic than solution B

B. Solution A is an acid and solution B is a base

C. Solution B is an acid and solution A is a base

D. Solution B is 1000 times more acidic than solution A

The correct statement regarding the pH levels of the two solutions is that solution A is 1000 times more acidic than solution B. This is based on the pH scale, which is logarithmic. Each whole number change on the pH scale represents a tenfold difference in acidity or alkalinity. In this case, solution A has a pH of 8, and solution B has a pH of 11. The difference between these two pH values is 3 (11 - 8 = 3). Since each incremental unit on the pH scale represents a tenfold change, a difference of 3 means that solution A is ten times more acidic than solution B for each unit. Therefore, because the scale is logarithmic: - From pH 8 to pH 9 is 10 times more acidic. - From pH 9 to pH 10 is another 10 times. - From pH 10 to pH 11 is yet another 10 times. Multiplying these differences gives us 10 x 10 x 10, which equals 1000. Thus, solution A, with a pH of 8, is indeed 1000 times more acidic than solution B,

3. What is the primary characteristic of a concave lens?

A. Thicker in the middle than on the edges

B. Thicker on the edges than in the middle

C. Has a reflective surface

D. Converges light rays

A concave lens is primarily characterized by being thicker at the edges than in the middle. This design causes the lens to diverge light rays that pass through it. When parallel light rays enter a concave lens, they are spread out or diverged, making it appear as if they originate from a single point called the focal point on the same side of the lens from which the light comes. This diverging property is a fundamental aspect of concave lenses and is why they are commonly used in applications such as corrective eyewear for nearsightedness, where they help the eyes to focus light properly on the retina. The other choices pertain to properties that do not align with the characteristics of a concave lens. For instance, a lens that is thicker in the middle than at the edges describes a convex lens, which converges light rather than diverging it. Similarly, a reflective surface pertains more to mirrors rather than lenses, and the convergence of light rays is associated with convex lenses rather than concave ones. Hence, the defining characteristic of a concave lens is its thickness at the edges compared to the middle.

4. What instrument is used to measure wind speed?

A. Hygrometer

B. Thermometer

C. Anemometer

D. Barometer

An anemometer is the instrument specifically designed to measure wind speed. It typically consists of cups or blades that rotate in the wind; the speed at which they turn correlates with the wind's velocity. This allows meteorologists and other professionals to gather accurate data about wind conditions, which is essential for weather forecasting, understanding climate patterns, and ensuring safety in activities like aviation and sailing. Hygrometers measure humidity in the air, thermometers measure temperature, and barometers measure atmospheric pressure, none of which relate directly to wind speed measurement. Understanding these different instruments helps clarify the specific role of each in meteorological studies.

5. What is the basic unit of mass in the metric system?

A. Pound

B. Ounce

C. Gram

D. Kilogram

The basic unit of mass in the metric system is the gram. It serves as the foundation for measuring mass in this system, which is based on powers of ten, making it straightforward to convert between units. For example, one kilogram equals one thousand grams, highlighting the relationship between these measurements. The metric system is widely used in scientific contexts because of its consistency and ease of use. While the kilogram is also an important and commonly used unit of mass in the metric system, particularly in everyday applications and industry, the gram specifically represents the base unit from which larger and smaller units of mass are derived. Thus, understanding the gram as the basic unit is crucial when studying or working within the metric framework.

6. What is the end result of the process of meiosis?

A. Two identical cells

B. Two genetically diverse cells

C. Four genetically diverse cells

D. No division occurs

The end result of meiosis is the formation of four genetically diverse cells. This process reduces the chromosome number by half, resulting in gametes (sperm and eggs in animals) that each carry only one set of chromosomes. During meiosis, a single diploid cell undergoes two rounds of division, known as meiosis I and meiosis II. In meiosis I, homologous chromosomes are separated into different cells, which contributes to genetic diversity through processes such as crossing over, where maternal and paternal chromosomes exchange segments of DNA. This results in a mix of genetic material in the resulting cells. Then, during meiosis II, the sister chromatids of each chromosome are separated, leading to a total of four unique haploid cells, each with a different combination of genes. This genetic variation is essential for evolution and adaptability in populations, making the correct choice one that highlights the diversity produced by meiosis.

7. Which group includes organisms that decompose organic material?

A. Carnivores

B. Herbivores

C. Omnivores

D. Decomposers

The correct answer is Decomposers because this group of organisms plays a critical role in ecosystems by breaking down dead organic material and recycling nutrients back into the environment. Decomposers, which include fungi, bacteria, and certain insects, utilize dead plants and animals as their food source, breaking down complex organic compounds into simpler substances. This process not only helps in nutrient cycling but also maintains the health of ecosystems by ensuring that organic waste is processed efficiently. In contrast, carnivores, herbivores, and omnivores are different categories of consumers that obtain their energy from living organisms. Carnivores eat other animals, herbivores consume plants, and omnivores eat both plants and animals. While they are all essential for the food web, they do not perform the decomposition process that is vital for nutrient recycling. Therefore, Decomposers are the only group specifically identified for their role in decomposition.

8. What is the role of lipase in the digestive system?

A. Breaks down proteins into amino acids

B. Changes fats to glycerol and fatty acids

C. Helps digest carbohydrates

D. Aids in the absorption of vitamins

Lipase plays a crucial role in the digestive system by breaking down fats into simpler components, specifically glycerol and fatty acids. This process is essential because fats, which are too large to be absorbed by the intestines in their whole form, need to be digested into smaller molecules first. Lipase, which is produced by the pancreas and secreted into the small intestine, effectively catalyzes the hydrolysis of triglycerides— the main constituents of body fat in humans and other animals— into free fatty acids and glycerol. This breakdown is vital for the absorption of dietary fats, which are not only a significant source of energy but also necessary for the absorption of fat-soluble vitamins (A, D, E, and K). The other options refer to different processes and do not align with the primary function of lipase. For example, the digestion of proteins into amino acids is primarily the function of proteases, while carbohydrates are broken down by enzymes known as carbohydrases. Both these enzymatic actions occur separately from the role of lipase.

9. You are hiking through the Grand Canyon and notice the striated pattern of the rocks. These striations are most likely to be present in what type of rock?

A. Metamorphic

B. Sedimentary

C. Igneous

D. Pumice

The striated patterns observed in rocks are typically associated with sedimentary rocks, which are formed through the accumulation of mineral and organic particles over time. In the case of sedimentary rocks, these striations can result from various factors, including the layering of sediments, variations in particle size, and changes in composition due to environmental conditions during deposition. Sedimentary rocks are often deposited in layers or strata, reflecting different periods of deposition where materials may have been transported and laid down in varying conditions. The striations you notice could be indicative of the natural processes that influenced the arrangement and layering of the sediment, such as the movement of water or wind. While metamorphic rocks can also exhibit striations due to the reorientation of minerals under heat and pressure, the context of the Grand Canyon, which showcases a rich stratigraphy of sedimentary layers, makes sedimentary rocks the most likely candidate. Igneous rocks, formed from the solidification of magma or lava, and pumice, a type of igneous rock characterized by its light, porous structure, do not typically display the same striated patterns found in sedimentary formations. Hence, the presence of striations in the rocks encountered during your hike indicates that they are most

10. Which scientific principle relates the force, mass, and acceleration of an object?

A. Force equals mass times acceleration

B. Work equals force times distance

C. Energy equals mass times the speed of light squared

D. Impulse equals change in momentum

The scientific principle that relates force, mass, and acceleration is defined by Newton's second law of motion, which states that the force acting on an object is equal to the mass of that object multiplied by its acceleration. This relationship is often summarized by the equation: $$ F = m \times a $$ where $ F $ represents force, $ m $ represents mass, and $ a $ represents acceleration. This principle emphasizes that a larger mass will require a greater force to achieve the same acceleration as a smaller mass. Additionally, it highlights the direct proportionality between the force applied and the resulting acceleration of the mass. The other options, while significant in their own right, pertain to different principles in physics. For example, the work-energy principle relates to the relationship between work done and energy transferred, while Einstein's famous equation relates energy to mass and the speed of light, and impulse concerns the change in momentum of an object due to a force applied over a time interval. However, none of these directly describe the relationship between force, mass, and acceleration as effectively as Newton's second law does.