

ABSA 4th Class Power Engineer Certificate of Competency - Part A Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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SAMPLE

Questions

- 1. One watt is equivalent to which of the following?**
 - A. 1 joule**
 - B. 1 joule/second**
 - C. 1 newton-metre**
 - D. 1 newton/second**
- 2. What does the angle measure in a vector represent?**
 - A. The speed of the object**
 - B. The direction of the resultant**
 - C. The distance covered**
 - D. The acceleration of the vector**
- 3. What is the key view when projecting views of an object?**
 - A. Right side view**
 - B. Left side view**
 - C. Bottom view**
 - D. Front view**
- 4. How many liters are there in a cubic meter?**
 - A. 100**
 - B. 1,000**
 - C. 10,000**
 - D. 100,000**
- 5. A cylinder with a diameter of 5 m and a height of 8 m is half full of liquid. What volume does the liquid occupy?**
 - A. 157.1 cubic cm**
 - B. 78.5 cubic cm**
 - C. 39.3 cubic cm**
 - D. 19.6 cubic cm**
- 6. What is the formula for calculating kinetic energy?**
 - A. $KE = \frac{1}{2} mv^2$**
 - B. $KE = mgh$**
 - C. $KE = Fd$**
 - D. $KE = pV$**

- 7. Six kg is a measure of an object's:**
- A. Weight**
 - B. Volume**
 - C. Mass**
 - D. Length**
- 8. Which process is NOT considered a physical change?**
- A. Melting ice**
 - B. Boiling water**
 - C. Burning wood**
 - D. Breaking glass**
- 9. What is the base unit for speed in the SI system?**
- A. Metre/minute**
 - B. Metre/hour**
 - C. Metre/second**
 - D. Metre/24 hours**
- 10. Which of the following represents a decrease in velocity?**
- A. Positive acceleration**
 - B. Negative acceleration**
 - C. Zero acceleration**
 - D. Constant velocity**

Answers

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

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Explanations

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1. One watt is equivalent to which of the following?

- A. 1 joule
- B. 1 joule/second**
- C. 1 newton-metre
- D. 1 newton/second

One watt is defined as the rate of energy transfer equivalent to one joule per second. This means that if you have a device operating with a power output of one watt, it is consuming or converting energy at the rate of one joule every second. This definition stems from the relationship between power, which measures how quickly work is done or energy is transferred, and energy itself. In practical terms, understanding this connection is crucial for applications such as calculating energy consumption in electrical devices, where knowing the power rating in watts allows for estimation of energy use over time. Therefore, when considering the choices, the definition of wattage aligns perfectly with this concept, confirming that one watt indeed corresponds to one joule per second.

2. What does the angle measure in a vector represent?

- A. The speed of the object
- B. The direction of the resultant**
- C. The distance covered
- D. The acceleration of the vector

The angle measure in a vector specifically represents the direction of the resultant vector. In vector mathematics, each vector has both magnitude and direction, and the angle helps define which way the vector points in a coordinate system. By knowing the angle, one can determine how to resolve the vector into its components, effectively understanding its influence on movement or force in a specific direction. The other options touch upon concepts related to vectors but do not correctly capture the significance of the angle. Speed and acceleration pertain to how fast an object is moving or changing its velocity, respectively, and distance covered is a scalar quantity that does not convey any directional information. Thus, the focus on direction makes the angle measure fundamental in vector analysis.

3. What is the key view when projecting views of an object?

- A. Right side view
- B. Left side view
- C. Bottom view
- D. Front view**

The front view is typically considered the key view when projecting views of an object because it provides the most informative representation of the object's features. In technical drawing and engineering, the front view is the primary perspective from which the other views, such as the top and side views, are derived. This view usually displays the height and width of the object, making it essential for understanding the object's layout and design. The front view allows for a clear representation of details that are most significant for identification and comprehension of the object's structural aspects. Other views, while useful, are often supplementary and used to convey additional details not visible in the front view, such as depth or internal features. By starting from the front view, engineers and designers can ensure that their projections remain coherent and aligned with the characteristics of the object they are depicting.

4. How many liters are there in a cubic meter?

- A. 100
- B. 1,000**
- C. 10,000
- D. 100,000

A cubic meter is a unit of volume defined as the volume of a cube with each edge measuring one meter in length. Since one liter is equivalent to one cubic decimeter (0.1 meter on each side), it follows that there are 1,000 cubic decimeters in one cubic meter. Therefore, when converting from cubic meters to liters, the relationship indicates that each cubic meter contains 1,000 liters. This fundamental understanding of metric volume conversion supports the selection of the answer indicating that there are 1,000 liters in a cubic meter. The other choices do not represent the correct conversion factor from cubic meters to liters, as they either underestimate or overestimate the actual number of liters contained in a cubic meter.

5. A cylinder with a diameter of 5 m and a height of 8 m is half full of liquid. What volume does the liquid occupy?

- A. 157.1 cubic cm
- B. 78.5 cubic cm**
- C. 39.3 cubic cm
- D. 19.6 cubic cm

To find the volume of liquid that occupies the half-full cylinder, you first need to calculate the total volume of the cylinder and then halve it since the cylinder is stated to be half full. The formula for the volume of a cylinder is given by: $V = \pi r^2 h$
Where: V is the volume, r is the radius of the base of the cylinder, h is the height of the cylinder, π is approximately 3.14159. Given the diameter of the cylinder is 5 m, the radius r can be calculated as follows: $r = \frac{\text{diameter}}{2} = \frac{5\text{m}}{2} = 2.5\text{m}$ The height h of the cylinder is given as 8 m. Now, substituting these values into the formula for volume: $V = \pi (2.5\text{m})^2 (8\text{m})$
 $V = \pi (6.25\text{m}^2) (8\text{m})$
 $V = \pi (50\text{m}^3)$

6. What is the formula for calculating kinetic energy?

A. $KE = 1/2 mv^2$

B. $KE = mgh$

C. $KE = Fd$

D. $KE = pV$

The formula for calculating kinetic energy is represented as $KE = 1/2 mv^2$. This equation expresses that kinetic energy (KE) is directly proportional to the mass (m) of an object and the square of its velocity (v). The factor of 1/2 is included to account for the integration of force over distance, which leads to this formulation in physics. Kinetic energy quantifies the energy that an object possesses due to its motion. As the velocity of an object increases, its kinetic energy increases exponentially because velocity is squared in the formula. This means that even a small increase in speed can result in a significant increase in kinetic energy. Additionally, this formula is foundational in mechanics and plays a crucial role in various applications, from understanding the motion of vehicles to analyzing the energy of particles in physics. The other provided options represent different physical concepts: - The formula mgh calculates gravitational potential energy, not kinetic energy. - The expression Fd relates to work done when a force (F) acts over a distance (d). - The equation pV pertains to pressure-volume work, commonly used in thermodynamics. Understanding the distinction between these equations is essential for applying the correct principles in different contexts of physics and engineering.

7. Six kg is a measure of an object's:

A. Weight

B. Volume

C. Mass

D. Length

The measure of six kilograms pertains to the object's mass. Mass is a fundamental property of matter that quantifies the amount of substance within an object. It remains constant regardless of the object's location in the universe. Mass is typically measured in kilograms or grams, making the choice of six kg an indication of mass. Weight, on the other hand, refers to the force exerted by gravity on an object and is dependent on both mass and gravitational acceleration. Therefore, if discussing weight, the measurement would be expressed in newtons rather than kilograms. Volume refers to the amount of space an object occupies and is measured in liters, cubic meters, or similar units. Length is a measure of distance and is typically measured in meters or centimeters. Since six kg directly quantifies how much matter is present in an object, it is accurately described as its mass.

8. Which process is NOT considered a physical change?

- A. Melting ice
- B. Boiling water
- C. Burning wood**
- D. Breaking glass

Burning wood is the process that is not considered a physical change because it involves a chemical reaction. When wood burns, it undergoes combustion, producing ash, smoke, and various gases. This transformation alters the chemical structure of the wood, resulting in new substances that are different from the original material. In contrast, melting ice, boiling water, and breaking glass are all examples of physical changes. These processes involve changes in the state or form of matter without altering its chemical composition. Melting ice turns solid water into liquid water, boiling water converts liquid water into steam, and breaking glass changes its shape without changing its chemical structure. Thus, the correct identification of burning wood as a non-physical change highlights the distinction between physical changes, which are reversible and do not affect the substance's chemical identity, and chemical changes, which result in the formation of new substances.

9. What is the base unit for speed in the SI system?

- A. Metre/minute
- B. Metre/hour
- C. Metre/second**
- D. Metre/24 hours

The base unit for speed in the SI (International System of Units) system is the metre/second. This unit is derived from the two fundamental SI units: the metre, which is used to measure distance, and the second, which is used to measure time. Speed is defined as the distance traveled per unit of time, and using metres and seconds provides a consistent and universally accepted standard within the framework of SI units. While other options involve different time intervals (like minute, hour, or 24 hours), they are not the standard units of measurement for scientific calculations. Metres per second allows for greater precision and is the most commonly used unit for speed in scientific contexts as it aligns with other measurements and calculations encountered in physics and engineering. This unit facilitates clear communication and accurate calculations in various scientific disciplines, making it the ideal choice for representing speed.

10. Which of the following represents a decrease in velocity?

A. Positive acceleration

B. Negative acceleration

C. Zero acceleration

D. Constant velocity

A decrease in velocity is represented by negative acceleration. Negative acceleration, also known as deceleration, occurs when an object is slowing down. This means that the object's speed is decreasing over time, which leads to a reduction in its overall velocity. When an object experiences negative acceleration, it indicates that the direction of the object's velocity is opposite to that of its acceleration. For example, if a car is moving forward and starts to slow down, it is experiencing negative acceleration, marking a decrease in its velocity. In contrast, positive acceleration indicates an increase in velocity, while zero acceleration means that the object's speed is constant and does not change. Constant velocity means that there is no change in speed or direction, therefore not signifying any decrease in velocity.