

LMS Substation 1st Year, Level II Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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SAMPLE

Questions

- 1. Using Ohm's law, if a circuit has a current of 4 A and a resistance of 55 ohms, what is the voltage?**
 - A. 220 V**
 - B. 110 V**
 - C. 240 V**
 - D. 180 V**
- 2. A device used to measure current flow in a circuit is known as what?**
 - A. Voltmeter**
 - B. Ammeter**
 - C. Ohmmeter**
 - D. Galvanometer**
- 3. What do many non-electrical individuals often incorrectly refer to an open circuit as?**
 - A. Open circuit**
 - B. Closed circuit**
 - C. Short circuit**
 - D. Stable circuit**
- 4. True or False: Ampacity is an invisible force that can produce heat, motion, and light.**
 - A. True**
 - B. False**
 - C. Conditional**
 - D. Inaccurate**
- 5. What must happen to electrons for them to create electricity?**
 - A. They must be stored**
 - B. They must be energized**
 - C. They must be neutralized**
 - D. They must be isolated**

- 6. What does the symbol E represent in Ohm's Law?**
- A. Resistance**
 - B. Current**
 - C. Voltage**
 - D. Power**
- 7. What is measured by the number of coulombs per second that move past a fixed point in a circuit?**
- A. Voltage**
 - B. Resistance**
 - C. Current**
 - D. Power**
- 8. If the selector is in the 2 mA position and the result is .25 mA, what does this signify?**
- A. The circuit is open**
 - B. The current is under the selected range**
 - C. Correct functionality of the meter**
 - D. The settings are incorrect**
- 9. What mathematical equation is used to find the current in a circuit when power and resistance are known?**
- A. $I = P/R$**
 - B. $I = P + R$**
 - C. $I = P * R$**
 - D. $I = P \wedge R$**
- 10. When the resistance in a circuit increases, what effect does this have on the current?**
- A. The current increases**
 - B. The current decreases**
 - C. The current remains constant**
 - D. The current becomes zero**

Answers

SAMPLE

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

SAMPLE

Explanations

SAMPLE

1. Using Ohm's law, if a circuit has a current of 4 A and a resistance of 55 ohms, what is the voltage?

A. 220 V

B. 110 V

C. 240 V

D. 180 V

To find the voltage in a circuit when the current and resistance are known, you can apply Ohm's Law, which is defined as $V = I \times R$. In this equation: - V represents voltage (in volts). - I represents current (in amperes). - R represents resistance (in ohms). In the given scenario, the current (I) is 4 A and the resistance (R) is 55 ohms. By substituting these values into the formula, you perform the following calculation: $V = 4 \text{ A} \times 55 \text{ ohms} = 220 \text{ V}$. This shows that the correct voltage for the circuit is 220 volts. This approach accurately utilizes Ohm's Law, demonstrating how the relationship between current, resistance, and voltage can be mathematically expressed and calculated.

2. A device used to measure current flow in a circuit is known as what?

A. Voltmeter

B. Ammeter

C. Ohmmeter

D. Galvanometer

The device used to measure current flow in a circuit is called an ammeter. An ammeter is specifically designed to provide readings of electric current, which is typically measured in amperes. It is connected in series with the circuit, allowing it to measure the flow of current directly as it passes through the device. The function of an ammeter is critical in various applications, as it helps identify how much current is running through different components of an electrical circuit. Understanding current flow is essential for troubleshooting issues and ensuring that electrical systems operate within their specified parameters. While other devices have different purposes, such as a voltmeter, which measures voltage, or an ohmmeter, which measures resistance, an ammeter is uniquely suited for measuring current flow specifically. A galvanometer can also measure current, but it is often used for detecting and measuring small amounts of current rather than for providing precise readings in all scenarios, making the ammeter the more commonly used instrument for this task.

3. What do many non-electrical individuals often incorrectly refer to an open circuit as?

- A. Open circuit**
- B. Closed circuit**
- C. Short circuit**
- D. Stable circuit**

Many non-electrical individuals often mistakenly refer to an open circuit as a short circuit due to a misunderstanding of the terminology associated with electrical circuits. An open circuit is one where the electrical path is incomplete, preventing the flow of current. On the other hand, a short circuit occurs when there is an unintended path that allows current to flow with little or no resistance, potentially leading to excessive current flow and equipment damage. This confusion arises because both terms deal with the flow of electricity, but they represent opposite conditions. People may associate the term "short" with something being less, which can lead them to wrongly use the term when they observe an incomplete circuit where, in fact, there is no current flowing due to the open condition. Understanding these distinctions is essential for clear communication about electrical systems.

4. True or False: Ampacity is an invisible force that can produce heat, motion, and light.

- A. True**
- B. False**
- C. Conditional**
- D. Inaccurate**

Ampacity refers to the maximum amount of electric current (measured in amperes) that a conductor or device can carry without exceeding its temperature rating. It is a crucial concept in electrical engineering and is physical in nature, as it relates to how electrical current flows through conductors. The assertion that ampacity is an "invisible force" is misleading. Ampacity itself does not produce heat, motion, or light; rather, it is a property that determines how safely and efficiently current can flow through electrical materials. When electrical current flows, it can indeed generate heat (due to resistance in conductors), and it can create magnetic fields that cause motion in motors or generate light in devices like light bulbs. However, these effects are the result of the flow of electrical current rather than ampacity itself. Therefore, stating that ampacity is an invisible force capable of producing various effects mischaracterizes the concept, leading to the conclusion that the statement is false. Understanding this distinction is critical for recognizing how electrical systems operate safely and effectively.

5. What must happen to electrons for them to create electricity?

- A. They must be stored**
- B. They must be energized**
- C. They must be neutralized**
- D. They must be isolated**

For electrons to create electricity, they need to be energized. This means that the electrons must gain enough energy to break free from their atomic bonds and move through a conductor. When electrons are energized, typically through various means such as thermal energy, electromagnetic energy, or chemical reactions, they gain the kinetic energy necessary for flow. This movement of energized electrons constitutes an electric current, which is the basis of electricity. In contrast, storing electrons would not generate electricity on its own; they need to be in a state of movement. Neutralizing electrons, which would mean balancing them with protons, would eliminate the flow necessary for current. Isolating electrons also prevents their movement, which is crucial for electric current generation. Therefore, energizing electrons is essential for the creation of electricity.

6. What does the symbol E represent in Ohm's Law?

- A. Resistance**
- B. Current**
- C. Voltage**
- D. Power**

In the context of Ohm's Law, the symbol E represents voltage. Ohm's Law establishes the relationship between voltage, current, and resistance in an electrical circuit, often expressed as the formula $V = IR$. Here, "V" is used for voltage, "I" for current, and "R" for resistance. Voltage is the electrical potential difference that drives current through a circuit. It can be thought of as the force that pushes electric charges through a conductor, enabling the flow of current. Understanding the role of voltage is crucial in circuit analysis, as it directly affects how current behaves in response to changes in resistance and voltage levels. The other terms like resistance, current, and power have their own specific symbols in electrical engineering, which helps to differentiate their roles in the principles governing electric circuits. Resistance is indicated by R, current by I, and power typically denoted by P. Hence, recognizing that E symbolizes voltage is fundamental to grasping the core concepts of Ohm's Law and electrical circuits as a whole.

7. What is measured by the number of coulombs per second that move past a fixed point in a circuit?

- A. Voltage**
- B. Resistance**
- C. Current**
- D. Power**

The measure of the number of coulombs per second that pass a fixed point in a circuit directly corresponds to electric current. Current is defined in terms of the flow of electric charge, specifically how much charge (in coulombs) moves through a conductor in a given time (in seconds). Essentially, one coulomb of charge passing a point in one second constitutes a current of one ampere. This fundamental relationship is critical for understanding how electrical systems operate, as current is a key parameter influencing the behavior of electronic components, circuit design, and overall system functionality. In contrast, voltage measures electrical potential difference, resistance quantifies opposition to current flow, and power is the rate at which energy is transferred or converted, which are distinct concepts from current itself.

8. If the selector is in the 2 mA position and the result is .25 mA, what does this signify?

- A. The circuit is open**
- B. The current is under the selected range**
- C. Correct functionality of the meter**
- D. The settings are incorrect**

When the selector is in the 2 mA position and the result reads 0.25 mA, this indicates that the current being measured falls below the minimum measurement capability of the currently selected range. In this case, since the meter is set to measure current up to 2 mA, a reading of 0.25 mA confirms that the current detected is indeed within the operational range of the multimeter but is lower than the selected maximum of 2 mA. The correct interpretation here is that the current being measured is significantly underserved by the selected range, requiring to either adjust the range or confirm that this is the expected measurement. This situation does not imply that the circuit is open, which would typically result in a reading of zero, nor does it confirm the meter's functionality, as a reading is being taken. Additionally, the settings are technically correct because the meter is set to read in the 2 mA range, even though the observed current is less than that maximum limit.

9. What mathematical equation is used to find the current in a circuit when power and resistance are known?

A. $I = P/R$

B. $I = P + R$

C. $I = P * R$

D. $I = P ^ R$

The equation used to find the current in a circuit when power and resistance are known is derived from the relationship between power (P), current (I), and resistance (R). The correct equation, which is expressed as $I = P / R$, is based on Ohm's Law and the power equation in electrical circuits. In electrical terms, power is defined as the product of current and voltage ($P = I * V$). Ohm's Law states that voltage (V) is the product of current (I) and resistance (R) ($V = I * R$). By substituting R in the power equation, we can express the current in terms of power and resistance. When rearranging the equations, you can derive current as $I = P / V$ and since $V = I * R$, it can be rearranged to $V = I * R$. Since V can again be expressed in terms of P and I, this leads us to $I = P / R$ when we know both power and resistance. This understanding highlights that current is inversely proportional to resistance when the power supply remains a constant factor. Thus, if the resistance increases while power remains constant, the current will decrease, and vice versa. The incorrect choices include expressions that

10. When the resistance in a circuit increases, what effect does this have on the current?

A. The current increases

B. The current decreases

C. The current remains constant

D. The current becomes zero

When resistance in a circuit increases, the effect on current can be understood through Ohm's Law, which states that current (I) is equal to the voltage (V) across the circuit divided by the resistance (R), or $I = \frac{V}{R}$. This relationship indicates that if the voltage remains constant while the resistance increases, the current must decrease. As resistance rises, it becomes more difficult for electric charges to flow through the circuit. Consequently, the overall flow of current reduces in response to the increased opposition that resistance provides. Therefore, as you correctly identified, the current decreases when resistance is increased, assuming the voltage stays constant. This fundamental principle is essential in understanding circuit behavior and design in electrical engineering.