Apprentice Lineman General Practice Test (Sample)

Study Guide

Everything you need from our exam experts!

Questions

1. What factors determine necessary pole strength?

A. Height of pole, Soil conditions, Wiring type

B. Weight of apparatus, Weather conditions, Soil conditions

C. Weight of electrical apparatus and wire, Ice and wind conditions

D. Height of pole, Weather patterns, Cable type

2. What type of polarity do any transformer 200 kVA or smaller with primary voltage under 8,660 volts have?

A. Additive

B. Subtractive

C. Negative

D. Neutral

3. What device is responsible for causing harmonic voltages?

A. Capacitor

B. Transformer

C. Inductor

D. Resistor

4. What is the first action taken when using a kelly bar attachment for an anchor installation?

A. Set pins to the inner position

B. Set pins to the outer position

C. Set pins to the middle position

D. Do not adjust pins simply insert the bar

5. What is the unit for measuring resistance and what symbol is used for it?

A. Ohms, C

B. Ohms, R

C. Henries, H

D. Volts, V

6. What is a disadvantage of using old rope compared to new rope?

- **A. Old rope has a higher safety factor**
- **B. Old rope can be used for more applications**
- **C. Old rope has a lower safety factor**
- **D. Old rope breaks more easily**

7. What is meant by backfeed in electrical systems?

- **A. When the electrical current travels from the load side rather than the line side**
- **B. A dangerous electrical surge**
- **C. A method of grounding electrical systems**
- **D. A type of electrical loss in transmission**

8. Where are lightning surge arrestors recommended to be installed on a step regulator?

- **A. Only on the load side.**
- **B. Only on the source side.**
- **C. Both source and load sides.**
- **D. Nowhere; they are not needed.**

9. What distinguishes a Conventional transformer from a CSP transformer?

- **A. A separate cutout and arrestor are needed for Conventional transformers**
- **B. CSP transformers have a higher voltage rating**
- **C. Conventional transformers are smaller than CSP transformers**
- **D. CSP transformers are less efficient**

10. Which of the following is the acronym for electromotive force?

- **A. V**
- **B. E**
- **C. I**
- **D. R**

Answers

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

Explanations

1. What factors determine necessary pole strength?

A. Height of pole, Soil conditions, Wiring type

B. Weight of apparatus, Weather conditions, Soil conditions

C. Weight of electrical apparatus and wire, Ice and wind conditions

D. Height of pole, Weather patterns, Cable type

The necessary pole strength is primarily determined by the weight of the electrical apparatus and wire, as well as the ice and wind conditions that the pole is expected to withstand. The weight of the apparatus and wire placed on the pole contributes directly to the load that the pole must support, and this is critical in ensuring safety and structural integrity. Ice and wind conditions are also essential factors because they can significantly increase the load on the pole. For instance, ice accumulation can add substantial weight, while high winds can exert lateral forces on the pole, potentially leading to bending or toppling if the pole is not strong enough to withstand these forces. Rather than focusing on height, soil conditions, or cable types, understanding the specific weights and environmental influences provides a clearer picture of the pole's strength requirements. These elements are vital in engineering decisions to ensure that utility poles can safely support the infrastructure they carry.

2. What type of polarity do any transformer 200 kVA or smaller with primary voltage under 8,660 volts have?

A. Additive

B. Subtractive

C. Negative

D. Neutral

Transformers that are 200 kVA or smaller with a primary voltage under 8,660 volts typically exhibit additive polarity. Additive polarity means that when the primary and secondary windings are connected in phase, the voltages add together, which is essential for proper operation in many electrical systems. This type of polarity is common in smaller transformers because it simplifies the design and installation processes, particularly in three-phase systems, where aligning the phase relationships is critical for effective performance. Essentially, when transformers of this size are wired correctly, they ensure that the voltages from the primary and secondary windings reinforce each other, allowing for efficient energy transfer. Understanding the characteristics of transformer polarity is essential for linemen and electrical technicians, as it directly relates to the safe and efficient operation of electrical systems.

3. What device is responsible for causing harmonic voltages?

A. Capacitor

B. Transformer

C. Inductor

D. Resistor

Transformers are devices that can create harmonic voltages in an electrical system. While transformers are designed to change the voltage level from one circuit to another, they can also introduce non-linearities, particularly when they are subjected to non-linear loads. This non-linearity can cause the generation of harmonic frequencies in addition to the fundamental frequency of the system. In essence, when transformers operate under conditions that deviate from their ideal scenarios—such as saturation or high load—it can lead to the distortion of the current waveform, resulting in harmonic distortion. In contrast, capacitors and inductors typically play roles in filtering or reactive power compensation, and resistors are primarily used for energy dissipation without contributing to harmonic generation. Therefore, the transformer is the device best associated with the generation of harmonic voltages due to its potential to distort waveforms under certain loading conditions.

4. What is the first action taken when using a kelly bar attachment for an anchor installation?

A. Set pins to the inner position

B. Set pins to the outer position

C. Set pins to the middle position

D. Do not adjust pins simply insert the bar

When using a kelly bar attachment for an anchor installation, the first action typically involves setting the pins to the outer position. This adjustment is essential because it allows for the correct reach and depth needed for effective installation of the anchor. By extending the pins outward, you ensure that the attachment can operate in a wider range, which is important when dealing with the varying depths of soil or substrate that may be encountered during the installation process. This orientation allows the kelly bar to engage properly with the ground, ensuring that the anchor installation is effective and secure. Proper pin setting is critical for maintaining stability and control during the drilling process, as well as for the safety of the crew and equipment involved in the operation.

5. What is the unit for measuring resistance and what symbol is used for it?

A. Ohms, C

B. Ohms, R

C. Henries, H

D. Volts, V

The unit for measuring resistance is the ohm, which is represented by the symbol Ω. Resistance is a crucial concept in electrical circuits, defining how much a component resists the flow of electric current. This relationship between voltage (V), current (I), and resistance (R) is articulated by Ohm's Law, which states that V = I × R. In this context, understanding the correct unit and its symbol is vital for interpreting electrical equations and applications. The other options mention units or symbols that pertain to different electrical quantities: henries for inductance, volts for voltage, and a misattribution of the symbol for ohms. Recognizing these correctly ensures clarity in communication about electrical principles.

6. What is a disadvantage of using old rope compared to new rope?

A. Old rope has a higher safety factor

B. Old rope can be used for more applications

C. Old rope has a lower safety factor

D. Old rope breaks more easily

Using old rope has the disadvantage of having a lower safety factor. Over time, rope materials can degrade due to factors such as exposure to weather, UV rays, abrasion, and chemical exposure. As a rope ages, its strength reduces, making it less reliable for safety-critical applications. This decrease in integrity can lead to an increased risk of failure during use, which is particularly critical in scenarios where safety is paramount, such as in line work. While it's true that old rope might have anecdotal uses in non-critical applications, the key limitation remains its reduced safety characteristics. Unlike new rope, which is manufactured to meet specific safety standards and performance metrics, old rope can no longer guarantee the same level of reliability and strength. Thus, the safety factor diminishes, highlighting why old rope poses more significant risks compared to new rope in lineman operations.

7. What is meant by backfeed in electrical systems?

A. When the electrical current travels from the load side rather than the line side

B. A dangerous electrical surge

C. A method of grounding electrical systems

D. A type of electrical loss in transmission

Backfeed in electrical systems refers to the phenomenon where electrical current flows in the opposite direction from what is typically expected. This occurs when current travels from the load side, which is generally where electricity is consumed, rather than from the line side, where electricity is supplied. This situation can arise, for example, when a distributed energy resource, such as a solar panel or generator, feeds electricity back into the grid or supply system instead of receiving it. Understanding backfeed is crucial in electrical work, as it can pose safety risks, especially in the event of maintenance or emergencies. If technicians are working on a line that is assumed to be de-energized, they may be at risk if backfeed occurs unexpectedly. That makes awareness and proper system design essential for safety protocols. The other options describe different concepts in electrical systems that do not accurately define the term backfeed. A dangerous electrical surge relates to a sudden increase in voltage, grounding involves creating a path for electrical current to safely dissipate, and electrical loss in transmission pertains to energy loss as electricity travels over distances. None of these capture the essence of what backfeed signifies in the context of electrical flow.

8. Where are lightning surge arrestors recommended to be installed on a step regulator?

A. Only on the load side.

B. Only on the source side.

C. Both source and load sides.

D. Nowhere; they are not needed.

Installing lightning surge arrestors on both the source and load sides of a step regulator is important for ensuring maximum protection against voltage surges caused by lightning strikes. By placing surge arrestors on the source side, any surges generated upstream are intercepted before they can affect the regulator and downstream equipment. Conversely, having additional protection on the load side safeguards against residual surges that might still enter the system after passing through the regulator, as well as any surges generated within the load itself. This dual installation approach enhances the resilience of the electrical system, helping to prevent damage to sensitive equipment, maintain system reliability, and reduce downtime due to electrical interference. In scenarios where only one side is protected, there remains an increased risk, as surges can still enter from the unprotected side, potentially causing harm to the equipment connected to the step regulator. Therefore, the comprehensive protection provided by installing surge arrestors on both sides is crucial for safeguarding against electrical surges, particularly in outdoor or exposed installations where lightning activity is a legitimate concern.

9. What distinguishes a Conventional transformer from a CSP transformer?

A. A separate cutout and arrestor are needed for Conventional transformers

B. CSP transformers have a higher voltage rating

C. Conventional transformers are smaller than CSP transformers

D. CSP transformers are less efficient

A Conventional transformer is typically designed to operate with separate components such as cutouts and arrestors for protection and voltage regulation. This design requires additional equipment to be installed and maintained alongside the transformer, emphasizing its reliance on these external components for proper operation. In contrast, a CSP (Compact Single Phase) transformer integrates several of these functionalities, such as protective cutouts and arrestors, directly into its design. This integration often enhances reliability and simplifies installation since the CSP transformer is optimized for efficiency in space and resource usage. The other options do not accurately highlight the essential distinctions between these transformer types. CSP transformers may not necessarily have a higher voltage rating; it varies based on specific applications. Regarding size, it is not universally correct that Conventional transformers are smaller than CSP transformers, as sizes can vary widely depending on the specific use case and design. Lastly, regarding efficiency, CSP transformers are actually designed to be more compact and efficient, making them suitable for urban and space-constrained installations.

10. Which of the following is the acronym for electromotive force?

A. V

B. E

C. I

D. R

The acronym for electromotive force is represented as "E." This notation is widely used in electrical engineering and physics to denote the electromotive force generated in a circuit, which is essentially the voltage produced by a source, such as a battery or generator. This force is responsible for pushing electric charge through a circuit and is a critical concept in understanding how electrical systems function. The other choices represent different electrical concepts; "V" typically stands for voltage, which is the measurement of electric potential difference, "I" stands for current, which is the flow of electric charge, and "R" represents resistance, which is the opposition to the flow of current in a circuit. Understanding these distinctions is essential for grasping the fundamental principles of electricity and circuit theory.