

# JOURNEYMAN CLOSED BOOK 1-6

ENGR. RICHARD C. BELLINGAN, ME,RMP

1. \_\_\_\_\_ can be generated.

I. Electricity II. Electrical Energy

a. I only

b. II only

c. Both I & II

d. Neither I nor II

1. \_\_\_\_\_ can be generated.

I. Electricity II. Electrical Energy

a. I only

b. **II only**

c. Both I & II

d. Neither I nor II

2. The phenomenon whereby a circuit stores electrical energy is called \_\_\_\_\_.

a. Inductance

b. Capacitance

c. Resistance

d. Susceptance

2. The phenomenon whereby a circuit stores electrical energy is called \_\_\_\_\_.

a. Inductance

b. **Capacitance**

c. Resistance

d. Susceptance

3. A general term including material, fittings, devices, appliances, fixtures, apparatus, and the like used as a part of, or in connection with, an electrical installation is \_\_\_\_\_.

- a. Premises wiring (system)
- b. Service equipment
- c. Utilization equipment
- d. Equipment

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- a. Premises wiring (system)
- b. Service equipment
- c. Utilization equipment
- d. **Equipment**

4. A switch intended for use in general distribution and branch circuits. It is rated in amperes, and it is capable of interrupting its rated current at its rated voltage, is a \_\_\_\_\_ switch.

- a. Bypass isolation
- b. General use
- c. Isolating
- d. Transfer

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a. Bypass isolation

b. **General use**

c. Isolating

d. Transfer

5. The permanent joining of metallic parts to form an electrically conductive path that will ensure electrical continuity and the capacity to conduct safely any current likely to be imposed is known as \_\_\_\_\_.

a. Ordinary tap joint

b. Scarf joint

c. Britannia joint

d. Bonding

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a. Ordinary tap joint

b. Scarf joint

c. Britannia joint

d. **Bonding**

6. An instrument that is used to measure the diameter of a wire or cable to thousandths of an inch is a \_\_\_\_\_.

a. Galvanometer

b. Micrometer

c. Hydrometer

d. Ruler

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a. Galvanometer

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c. Hydrometer

d. Ruler

7. A squirrel cage motor can be started at full voltage.

I. Design A

II. Design B

III. Design C

IV. Design D

a. I only   b. I & II only   c. III & IV only   d. I, II, III & IV

7. A squirrel cage motor can be started at full voltage.

I. Design A

II. Design B

III. Design C

IV. Design D

a. I only   b. I & II only   c. III & IV only   d. I, II, III & IV

8. A \_\_\_\_\_ is a braking system for an electric motor.

I. Friction braking

II. Plugging

III. Dynamic braking

a. I only   b. III only   c. I & III only   d. I, II, & III

8. A \_\_\_\_\_ is a braking system for an electric motor.

I. Friction braking

II. Plugging

III. Dynamic braking

a. I only   b. III only   c. I & III only   d. **I, II, & III**

9. Rigid metal conduit is permitted for wiring in hazardous locations if the conduit is threaded and made up wrench tight with at least \_\_\_\_\_ full threads.

a. 4

b. 5

c. 7

d. 9

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a. 4

b. 5

c. 7

d. 9

10. A circuit breaker that has purposely introduced a delay in the tripping action and which delay decreases as the magnitude of the current increases is a \_\_\_\_\_ circuit breaker.

- a. Inverse time
- b. Adjustable
- c. Control vented
- d. Vented power

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- d. Vented power

11. It is the intent of this Code that factory installed internal wiring or the construction of equipment need not be inspected at the time of installation of the equipment, except to \_\_\_\_\_.

I. Detect alteration

II. Detect damage

III. Detect insulation type

a. I only    b. II only    c. I & II only    d. I, II, & III

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III. Detect insulation type

a. I only    b. II only    c. **I & II only**    d. I, II, & III

12. A premises wiring system whose power is derived from a source such as a transformer that has no direct connection to the supply conductors originating in another system is a/an \_\_\_\_\_ system.

a. Integrated

b. separately derived

c. Interactive

d. Isolated

12. A premises wiring system whose power is derived from a source such as a transformer that has no direct connection to the supply conductors originating in another system is a/an \_\_\_\_\_ system.

a. Integrated

b. **separately derived**

c. Interactive

d. Isolated

13. Listed or labelled equipment shall be installed, used, or both, in accordance with any instructions included \_\_\_\_\_.

I. By the foreman

II. In the listing or labelling

III. With the equipment from the manufacturer

a. I only    b. II only    c. II & III only    d. I, II, & III

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14. Where conductors with an ampacity higher than the ampere rating or setting of the overcurrent device are used, the \_\_\_\_\_ shall determine the circuit rating.

- a. Conductor ampacity
- b. Overcurrent device
- c. Combined rating
- d. Derated ampacity

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- d. Derated ampacity

15. \_\_\_\_\_ are permitted to protect motor branch circuit conductors from overload.

I. Thermal relay

II. Inverse time circuit breakers

III. Time delay fuses

a. I only    b. II only    c. II & III only    d. I, II & III

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a. I only    b. II only    c. II & III only    d. **I, II & III**

16. The power factor of an incandescent light bulb would be \_\_\_\_\_.

a. Unity

b. 0.7 leading

c. 0.7 lagging

d. zero

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a. **Unity**

b. 0.7 leading

c. 0.7 lagging

d. zero

17. \_\_\_\_\_ is a pliable raceway.

I. EMT

II. ENT

III. PVC

a. I only b. II only c. I & III only d. I, II, & III

17. \_\_\_\_\_ is a pliable raceway.

I. EMT

II. ENT

III. PVC

a. I only b. **II only** c. I & III only d. I, II, & III

18. Flexible cords and cables shall be protected by \_\_\_\_\_ where passing through holes in covers, outlet boxes, or similar enclosures.

I. Fittings

II. Bushings

III. Tie wraps

- a. I only      b. II only      c. II & III only      d. I & II only

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I. Fittings

II. Bushings

III. Tie wraps

- a. I only      b. II only      c. II & III only      d. **I & II only**

19. A transformer would most likely have  
\_\_\_\_\_ efficiency.

a. 60 %

b. 70 %

c. 80 %

d. 90 %

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a. 60 %

b. 70 %

c. 80 %

d. 90 %

20. When alternating current flows through a conductor, there is an inductive action that causes the current in the conductor to be forced toward the outer surface. The current is greater at the surface than at the center of the conductor, this \_\_\_\_\_ will cause the resistance in the conductor to increase due to the increased heating of the conductor.

- a. Capacitive effect
- b. Skin effect
- c. Conductive effect
- d. Outer effect

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- a. Capacitive effect
- b. **Skin effect**
- c. Conductive effect
- d. Outer effect

21. A value assigned to a circuit or system for the purpose of conveniently designating its voltage class is \_\_\_\_\_.

- a. Nominal voltage
- b. Voltage to ground
- c. Voltage (of a circuit)
- d. Voltage<sup>2</sup>

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- b. Voltage to ground
- c. Voltage (of a circuit)
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22. A type of AC motor that runs at a constant speed and is used for such purposes as an electric clock motor is a \_\_\_\_\_ motor.

- a. AC squirrel cage
- b. AC induction
- c. Wound-rotor induction
- d. Synchronous

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- b. AC induction
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- d. **Synchronous**

23. \_\_\_\_\_ is the resistance at the point of contact of two conductors or one conductor and another surface.

- a. Conductor resistance
- b. Contact resistance
- c. Resistance per M/ft
- d. Resistance per K/ft

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a. Conductor resistance

b. **Contact resistance**

c. Resistance per M/ft

d. Resistance per K/ft

24. \_\_\_\_\_ is/are classified as a conduit body.

I. LB fittings

II. FS fittings

III. LR fittings

a. I & II only   b. II only   c. II & III only   d. I & III only

24. \_\_\_\_\_ is/are classified as a conduit body.

I. LB fittings

II. FS fittings

III. LR fittings

a. I & II only   b. II only   c. II & III only   d. **I & III only**

25. \_\_\_\_\_ raceways are not suitable to enclose conductors that are subject to physical damage.

- a. Rigid metal conduit
- b. Intermediate metal conduit
- c. PVC schedule 40
- d. PVC schedule 80

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- a. Rigid metal conduit
- b. Intermediate metal conduit
- c. **PVC schedule 40**
- d. PVC schedule 80

26. A low power factor in an industrial plant is most likely caused by \_\_\_\_\_.

- a. Insufficient resistive loads
- b. Insufficient inductive loads
- c. Excessive resistive loads
- d. Lack of synchronous condenser

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27. Where lighting outlets are installed in interior stairways, there shall be a wall switch at each floor level to control the lighting where the difference between floor levels is \_\_\_\_\_ steps or more.

- a. Two
- b. Four
- c. Six
- d. Eight

27. Where lighting outlets are installed in interior stairways, there shall be a wall switch at each floor level to control the lighting where the difference between floor levels is \_\_\_\_\_ steps or more.

- a. Two
- b. Four
- c. **Six**
- d. Eight

28. A voltage or current that is reversed at regular intervals is called \_\_\_\_\_ voltage or current.

I. Direct

II. Steady state

III. Sinusoidal

a. I only    b. II only    c. III only    d. None of these

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I. Direct

II. Steady state

III. Sinusoidal

a. I only    b. II only    c. **III only**    d. None of these

29. Of the following \_\_\_\_\_ is a false statement.

a. The term kilowatt indicates the measure of power which is all available for work.

b. The term kilovolt-amperes indicate the apparent power made up of an energy component and a wattless or induction component.

c. In an industrial plant, lower power factor is usually due to underloaded induction motors.

d. The power factor of a motor is much greater at partial loads than at full loads.

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d. The power factor of a motor is much greater at partial loads than at full loads.

30. It is generally not good practice to supply lights and motors from the same circuit because \_\_\_\_\_.

- a. Lamps for satisfactory service must operate within closer voltage limits than motors.
- b. Overloads and short circuits are more common on motor circuits.
- c. When motors are started, the large starting current causes a voltage drop on the circuit and the lights will blink or burn dim.
- d. All of these

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- c. When motors are started, the large starting current causes a voltage drop on the circuit and the lights will blink or burn dim.
- d. **All of these**

31. In general, motors are designed to operate in a maximum ambient temperature of \_\_\_\_\_ unless specifically designed for a higher temperature.

- a. 60 degrees celcius
- b. 50 degrees celcius
- c. 45 degrees celcius
- d. 40 degrees celcius

31. In general, motors are designed to operate in a maximum ambient temperature of \_\_\_\_\_ unless specifically designed for a higher temperature.

- a. 60 degrees celcius
- b. 50 degrees celcius
- c. 45 degrees celcius
- d. 40 degrees celcius

32. A type of single phase motor that can be operated on either AC or DC is a \_\_\_\_\_ motor.

- a. Multispeed
- b. Capacitor-start
- c. Universal
- d. Repulsion-induction

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- a. Multispeed
- b. Capacitor-start
- c. **Universal**
- d. Repulsion-induction

33. For screw shell devices with attached leads, the conductor attached to the screw shell shall be \_\_\_\_\_ in color.

- a. White or gray
- b. Orange
- c. Green
- d. Black

33. For screw shell devices with attached leads, the conductor attached to the screw shell shall be \_\_\_\_\_ in color.

a. **White or gray**

b. Orange

c. Green

d. Black

34. Branch circuit conductors shall have an ampacity not less than \_\_\_\_\_.

- a. The load increased 125 %
- b. 100% of the load to be served
- c. 80% of the load to be served
- d. 125% of the continuous load plus 80% of the noncontinuous load

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a. The load increased 125 %

b. **100% of the load to be served**

c. 80% of the load to be served

d. 125% of the continuous load plus 80% of the noncontinuous load

35. A switch when intended for isolating an electric circuit from the source of power that has no interrupting rating, and it is intended to be operated only after the circuit has been opened by some other means is a/an \_\_\_\_\_.

- a. Isolating switch
- b. Bypass isolation switch
- c. General use switch
- d. Transfer switch

35. A switch when intended for isolating an electric circuit from the source of power that has no interrupting rating, and it is intended to be operated only after the circuit has been opened by some other means is a/an \_\_\_\_\_.

- a. **Isolating switch**
- b. Bypass isolation switch
- c. General use switch
- d. Transfer switch

36. Raceways or cable trays containing electric conductors shall not contain \_\_\_\_\_.

I. Pipe for steam

II. Tube for air

III. Pipe for water

a. I only    b. II only    c. III only    d. I, II, & III

36. Raceways or cable trays containing electric conductors shall not contain \_\_\_\_\_.

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II. Tube for air

III. Pipe for water

a. I only    b. II only    c. III only    d. **I, II, & III**

37. Not readily accessible to persons unless special means for access are used is

\_\_\_\_\_.

- a. Elevated
- b. Guarded
- c. Isolated
- d. Listed

37. Not readily accessible to persons unless special means for access are used is

\_\_\_\_\_.

a. Elevated

b. Guarded

c. **Isolated**

d. Listed

38. After cutting conduit, to remove the rough edges on both ends, the conduit ends should be \_\_\_\_\_.

a. Sanded

b. Shaped

c. Burnished

d. Ground

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a. Sanded

b. Shaped

c. **Burnished**

d. Ground

39. The instrument used to indicate phase relation between current and voltage is the \_\_\_\_\_.

- a. Megger
- b. Power factor meter
- c. Voltmeter
- d. Galvanometer

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a. Megger

b. **Power factor meter**

c. Voltmeter

d. Galvanometer

40. To calculate the  $V_a$ , one needs to know the \_\_\_\_\_.

- a. Voltage & current
- b. Impedance & conductance
- c. Resistance & impedance
- d. Ohms & resistance

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- a. **Voltage & current**
- b. Impedance & conductance
- c. Resistance & impedance
- d. Ohms & resistance

41. You have an adjustable trip coil rated at 5 amps on a 200-amp switch. If you want to switch to trip at 120 amps, the trip coil should be set at \_\_\_\_\_.

- a. 2 amps
- b. 3 amps
- c. 4 amps
- d. 5 amps

41. You have an adjustable trip coil rated at 5 amps on a 200-amp switch. If you want to switch to trip at 120 amps, the trip coil should be set at \_\_\_\_\_.

a. 2 amps

b. 3 amps

c. 4 amps

d. 5 amps

42. When an ammeter is disconnected from an in-service current transformer, the secondary terminals of the current transformer must be \_\_\_\_\_.

a. Shorted

b. Open

c. Disconnected

d. Grounded

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a. **Shorted**

b. Open

c. Disconnected

d. Grounded

43. Reactance will cause the current in a circuit to vary only when \_\_\_\_\_.

a. AC current flows

b. DC current flows

c. There is no resistance in the circuit

d. There is a resistance in the circuit

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a. **AC current flows**

b. DC current flows

c. There is no resistance in the circuit

d. There is a resistance in the circuit

44. Motors  $\frac{1}{3}$ ,  $\frac{1}{4}$ , and  $\frac{1}{8}$ hp are connected parallel. Those motors deliver a total of

\_\_\_\_\_.

a. 1 hp

b.  $\frac{7}{8}$  hp

c.  $\frac{17}{24}$  hp

d. 0.07 hp

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a. 1 hp

b.  $\frac{7}{8}$  hp

c.  **$\frac{17}{24}$  hp**

d. 0.07 hp





46. A fixture that weighs more than \_\_\_\_\_ shall be supported independently of the outlet box.

- a. 25 pounds
- b. 30 pounds
- c. 50 pounds
- d. 75 pounds

46. A fixture that weighs more than \_\_\_\_\_ shall be supported independently of the outlet box.

- a. 25 pounds
- b. 30 pounds
- c. **50 pounds**
- d. 75 pounds

47. The force which moves electrons from atom to atom through a closed conducting path is called \_\_\_\_\_.

a. Flux

b. Resistance

c. Admittance

d. EMF

47. The force which moves electrons from atom to atom through a closed conducting path is called \_\_\_\_\_.

a. Flux

b. Resistance

c. Admittance

d. **EMF (electromotive force)**

48. An advantage of a 240-volt system compared with a 120-volt system of the same wattage is \_\_\_\_\_.

- a. Reduced voltage drop
- b. Reduced power used
- c. Large currents
- d. Lower electrical pressure

48. An advantage of a 240-volt system compared with a 120-volt system of the same wattage is \_\_\_\_\_.

- a. **Reduced voltage drop**
- b. Reduced power used
- c. Large currents
- d. Lower electrical pressure

49. A resistor has an indicated tolerance error of 10%. With a value of 1000 ohms, the minimum resistance the resistor may have is \_\_\_\_\_.

- a. 1,100 ohms
- b. 990 ohms
- c. 910 ohms
- d. 900 ohms

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- a. 1,100 ohms
- b. 990 ohms
- c. 910 ohms
- d. 900 ohms

50. A transformer has a primary voltage of 120 volts and a secondary voltage of 480 volts. If there are 40 turns on the primary, the secondary contains \_\_\_\_\_.

a. 10 turns

b. 40 turns

c. 120 turns

d. 160 turns

50. A transformer has a primary voltage of 120 volts and a secondary voltage of 480 volts. If there are 40 turns on the primary, the secondary contains \_\_\_\_\_.

a. 10 turns

b. 40 turns

c. 120 turns

d. 160 turns ( $120/480=1/4$ );ratio 40/60)

51. Frequency is measured in

\_\_\_\_\_.

a. Hertz

b. Voltage

c. RPM

d. Foot pounds

51. Frequency is measured in

\_\_\_\_\_.

a. **Hertz**

b. Voltage

c. RPM

d. Foot pounds

52. Which of the following would cause the most power to be dissipated in the form of heat?

a.  $X_L$

b.  $X_C$

c. Resonance

d. Resistance

52. Which of the following would cause the most power to be dissipated in the form of heat?

a.  $X_L$

b.  $X_C$

c. Resonance

d. **Resistance**

53. \_\_\_\_\_ is the combined opposition to current by resistance and reactance.

a. Q

b. Z

c. XC

d. I<sup>2</sup>R

53. \_\_\_\_\_ is the combined opposition to current by resistance and reactance.

a. Q

b. **Z is impedance**

c. XC

d. I<sup>2</sup>R

54. An electrician in the industry would first check the \_\_\_\_\_ to correct a low power factor.

a. Resistance

b. Hysteresis

c. Inductive load

d. Reluctance

54. An electrician in the industry would first check the \_\_\_\_\_ to correct a low power factor.

a. Resistance

b. Hysteresis

c. Inductive load

d. Reluctance

55. Single conductor cable runs within building are generally more common than multicable runs because \_\_\_\_\_.

- a. Of conduit fill
- b. Of the temperature
- c. The splicing is easier
- d. The weight is evenly distributed

55. Single conductor cable runs within building are generally more common than multicable runs because \_\_\_\_\_.

a. Of conduit fill

b. Of the temperature

c. **The splicing is easier**

d. The weight is evenly distributed

56. \_\_\_\_\_ has the highest electrical breakdown strength and longest life over all other materials used for insulation.

- a. Rubber insulation
- b. Woven cloth
- c. Impregnated paper
- d. Thermoplastic

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- a. Rubber insulation
- b. Woven cloth
- c. **Impregnated paper**
- d. Thermoplastic

57. Voltage in a generator is produced by

\_\_\_\_\_.

a. Resonance

b. Pressures

c. Cutting lines of force

d. Chemical

57. Voltage in a generator is produced by

\_\_\_\_\_.

a. Resonance

b. Pressures

c. Cutting lines of force

d. Chemical

58. To adjust the voltage generated by a constant speed DC generator, you would change the \_\_\_\_\_.

a. Stator

b. Pressure

c. Brushes

d. Field current

58. To adjust the voltage generated by a constant speed DC generator, you would change the \_\_\_\_\_.

a. Stator

b. Pressure

c. Brushes

d. **Field current**

59. The generator which is best suited for electroplating power is a \_\_\_\_\_ generator.

- a. Split-phase
- b. Six pole
- c. Separately excited
- d. Compound

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- a. Split-phase
- b. Six pole
- c. **Separately excited**
- d. Compound

60. To change the rotation of a DC motor you would \_\_\_\_\_.

a. Reverse capacitor leads

b. Reverse A1 & A2

c. Reverse commutator

d. Reverse F1 & F2

60. To change the rotation of a DC motor you would \_\_\_\_\_.

a. Reverse capacitor leads

b. Reverse A1 & A2

c. Reverse commutator

d. **Reverse F1 & F2**

61. Frequency is determined by the \_\_\_\_\_ of an alternator.

I. Size

II. Number of poles

III. Voltage

IV. Rotation speed of armature

- a. II only   b. II & III only   c. II & IV only   d. I, II & IV only

61. Frequency is determined by the \_\_\_\_\_ of an alternator.

I. Size

II. Number of poles

III. Voltage

IV. Rotation speed of armature

a. II only   b. II & III only   c. **II & IV only**   d. I, II & IV only

62. An example of a “made” electrode would be \_\_\_\_\_.

- a. Metallic water pipe
- b. Metal frame of a building
- c. Concrete-encased
- d. Ground rod

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- c. Concrete-encased
- d. **Ground rod**

63. Illumination is measured in

\_\_\_\_\_.

a. Luminous flux

b. Lumens

c. Temperature

d. Foot candles

63. Illumination is measured in

\_\_\_\_\_.

a. Luminous flux

b. Lumens

c. Temperature

d. **Foot candles**

64. A motor enclosure designed and constructed to contain sparks or flashes that may ignite surrounding gas or vapour is called \_\_\_\_\_.

- a. Non-ventilated
- b. Encapsulated
- c. Explosion proof
- d. Water cooled

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- a. Non-ventilated
- b. Encapsulated
- c. **Explosion proof**
- d. Water cooled

65. The output of a  $3\emptyset$  transformer is measured in units called \_\_\_\_\_.

- a. Watts
- b. Volt-amps
- c. Impedance
- d. Turns-ratio

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a. Watts

b. **Volt-amps**

c. Impedance

d. Turns-ratio

66. Three horsepower is equivalent to

\_\_\_\_\_.

a. 764

b. 2292

c. 2238

d. None of these

66. Three horsepower is equivalent to

\_\_\_\_\_.

a. 764

b. 2292

c. 2238 (746 x 3hp = 2238)

d. None of these

67. Sometimes copper conductors are coated (tinned) to help prevent \_\_\_\_\_.

a. Higher resistance

b. Mechanical Damage

c. Capacitive reactance

d. Chemical reaction

67. Sometimes copper conductors are coated (tinned) to help prevent \_\_\_\_\_.

a. Higher resistance

b. Mechanical Damage

c. Capacitive reactance

d. **Chemical reaction**

68. A wheatstone bridge is used to measure  
                     resistance.

I. Low

II. Medium

III. High

a. I only    b. II & III only    c. III only    d. II only

68. A wheatstone bridge is used to measure  
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I. Low

II. Medium

III. High

a. I only    b. **II & III only**    c. III only    d. II only

69. To check voltage to ground, you would check from \_\_\_\_\_.

a. The breaker to the cabinet

b. Hot to neutral

c. The breaker to the grounding terminal

d. All of these

69. To check voltage to ground, you would check from \_\_\_\_\_.

a. The breaker to the cabinet

b. Hot to neutral

c. The breaker to the grounding terminal

d. **All of these**

70. The inductive action that causes current to flow on the outside surface of a conductor is known as the \_\_\_\_\_.

- a. Corona effect
- b. Skin effect
- c. Electrolytic effect
- d. DC reactance

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- a. Corona effect
- b. **Skin effect**
- c. Electrolytic effect
- d. DC reactance

71. Electrical continuity is required by the electrical code for metallic conduit

\_\_\_\_\_.

- a. To ensure equipment grounding
- b. To reduce static electricity
- c. To reduce inductive heat
- d. To trace electrical wiring

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- a. **To ensure equipment grounding**
- b. To reduce static electricity
- c. To reduce inductive heat
- d. To trace electrical wiring

72. The resistance of an open circuit is equal to \_\_\_\_\_.

a. Less than one ohm

b. Zero

c. Infinity

d. None of these

72. The resistance of an open circuit is equal to \_\_\_\_\_.

a. Less than one ohm

b. Zero

c. **Infinity**

d. None of these

73. An electrical timer switch for lighting is normally connected in \_\_\_\_\_ with the lighting circuit being controlled.

- a. Series
- b. Parallel
- c. Sequence
- d. Tandem

73. An electrical timer switch for lighting is normally connected in \_\_\_\_\_ with the lighting circuit being controlled.

- a. **Series**
- b. Parallel
- c. Sequence
- d. Tandem

74. The definition of ampacity is \_\_\_\_\_.

- a. The current-carrying capacity of conductors expressed in volt-amps
- b. The current-carrying capacity expressed in amperes
- c. The current-carrying capacity of conductors expressed in wattage
- d. The current in amperes a conductor can carry continuously under the conditions of use without exceeding its temperature rating

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- a. The current-carrying capacity of conductors expressed in volt-amps
- b. The current-carrying capacity expressed in amperes
- c. The current-carrying capacity of conductors expressed in wattage
- d. **The current in amperes a conductor can carry continuously under the conditions of use without exceeding its temperature rating**

75. The grounded conductor would connect to the \_\_\_\_\_ of a lampholder.

- a. Screw shell
- b. Filament
- c. Base contact
- d. Lead in wire

75. The grounded conductor would connect to the \_\_\_\_\_ of a lampholder.

- a. **Screw shell**
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76. A three-phase, 6-pole AC alternator 34 kva, on a Y-connected system. During one complete mechanical rotation (3600) will have \_\_\_\_\_ electrical rotations.

a. 1

b.  $1 \frac{1}{2}$

c. 3

d. 12

76. A three-phase, 6-pole AC alternator 34 kva, on a Y-connected system. During one complete mechanical rotation (3600) will have \_\_\_\_\_ electrical rotations.

a. 1

b.  $1 \frac{1}{2}$

c. **3 electrical rotation**

d. 12

77. The voltage per turn of the primary of a transformer is \_\_\_\_\_ the voltage per turn of the secondary.

- a. More than
- b. The same as
- c. Less than
- d. None of these

77. The voltage per turn of the primary of a transformer is \_\_\_\_\_ the voltage per turn of the secondary.

a. More than

b. **The same as**

c. Less than

d. None of these

78. A single concrete-encased electrode shall be augmented by one additional electrode if it does not have a resistance to ground of \_\_\_\_\_.

a. 25 ohms

b. 30 ohms

c. 50 ohms

d. Not a code requirement

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a. 25 ohms

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79. Which of the following is not true about alternating current?

a. Develops eddy current

b. It can be transformed

c. Is suitable for charging batteries

d. Interferes with communication lines

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a. Develops eddy current

b. It can be transformed

c. **Is suitable for charging batteries**

d. Interferes with communication lines

80. On a 120v 1 $\emptyset$  circuit, ground fault protection for personnel operates on the principal of unbalanced current between \_\_\_\_\_.

- a. The grounded and ungrounded conductor
- b. The ungrounded conductor
- c. The grounding conductor and the neutral conductor
- d. The service disconnect and the branch circuit

80. On a 120v 1 $\emptyset$  circuit, ground fault protection for personnel operates on the principal of unbalanced current between \_\_\_\_\_.

- a. **The grounded and ungrounded conductor (white & black)**
- b. The ungrounded conductor
- c. The grounding conductor and the neutral conductor
- d. The service disconnect and the branch circuit

81. In a  $3\emptyset$  circuit, how many electrical degrees separate each phase?

a. 360

b. 180

c. 120

d. 90

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a. 360

b. 180

c. 120

d. 90

82. \_\_\_\_\_ duty is a type of service where both the load and the time intervals may have wide variations.

a. Continuous

b. Periodic

c. Intermittent

d. Varying

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83. The definition of ambient temperature is

\_\_\_\_\_.

- a. The temperature of the conductor
- b. The insulation rating of the conductor
- c. The temperature of the area surrounding the conductor
- d. The maximum heat the insulation can be used within

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- a. The temperature of the conductor
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- c. **The temperature of the area surrounding the conductor**
- d. The maximum heat the insulation can be used within

84. As the power factor of a circuit is increased

                    .

- a. Reactive power is decreased
- b. Active power is decreased
- c. Reactive power is increased
- d. Both active and reactive power are increased



85. Tinning rubber insulated twisted cable is done to \_\_\_\_\_.

- a. Make the strands stronger
- b. Prevent chemical reactions between the copper and the rubber
- c. Increase the resistance
- d. Meet NEMA requirements

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- a. Make the strands stronger
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- c. Increase the resistance
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86. A negatively charged body has

\_\_\_\_\_.

- a. Excess of electrons
- b. Excess of neutrons
- c. Deficit of electrons
- d. Deficit of neutrons

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\_\_\_\_\_.

a. **Excess of electrons**

b. Excess of neutrons

c. Deficit of electrons

d. Deficit of neutrons

87. A fluorescent light that blinks “on” and “off” repeatedly may in time \_\_\_\_\_.

- a. Cause the fuse to blow
- b. Cause the switch to wear out
- c. Cause the wire to melt
- d. Result in damage to the ballast

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88. Electrical appliances are connected in parallel because it \_\_\_\_\_.

a. Makes the operation of appliances independent of each other

b. Results in reduced power loss

c. Is a simple circuit

d. Draws less current

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a. **Makes the operation of appliances independent of each other**

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d. Draws less current

89. What relationship determines the efficiency of electrical equipment?

- a. The power input divided by the output
- b. The volt-amps x the wattage
- c. The va divided by the pf
- d. The power output divided by the input

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a. The power input divided by the output

b. The volt-amps x the wattage

c. The va divided by the pf

d. The power output divided by the input(eff.)

90. What is the formula to find watt hours?

a.  $E \times T \times 1000$

b.  $E \times I \times T$

c.  $I \times E \times T/1000$

d.  $E \times T \times 1000$

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a.  $E \times T \times 1000$

b.  $E \times I \times \text{Time}$

c.  $I \times E \times T/1000$

d.  $E \times T \times 1000$

91. Of the six ways of producing emf, which method is used the least?

a. Pressure

b. Solar

c. Chemical reaction

d. Friction

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a. Pressure

b. Solar

c. Chemical reaction

d. **Friction**

92. The voltage produced by electromagnetic induction is controlled by \_\_\_\_\_.

a. The number of lines of flux cut per second

b. Eddy currents

c. The size of the magnet

d. The number of turns

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- a. **The number of lines of flux cut per second**
- b. Eddy currents
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93. As the power factor of a circuit is increased

\_\_\_\_\_.

- a. Reactive power is decreased
- b. Active power is decreased
- c. Reactive power is increased
- d. Both active and reactive power are increased

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a. **Reactive power is decreased**

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94. The breakdown voltage of an insulation depends upon \_\_\_\_\_ value of AC voltage.

a. RMS

b. Effective

c. Peak

d. 1.732 peak

94. The breakdown voltage of an insulation depends upon \_\_\_\_\_ value of AC voltage.

a. RMS

b. Effective

c. **Peak**

d. 1.732 peak

95. The AC system is preferred to the DC system because \_\_\_\_\_.

a. DC voltage cannot be used for domestic appliances

b. DC motors do not have speed control

c. AC voltages can be easily changed in magnitude

d. High-voltage AC transmission is less efficient

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b. DC motors do not have speed control

c. **AC voltages can be easily changed in magnitude**

d. High-voltage AC transmission is less efficient

96. DC series motors are used in applications where \_\_\_\_\_ is required.

- a. Constant speed
- b. High starting torque
- c. Low no-load speed
- d. None of these

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97. Basically all electric motors operate on the principle of repulsion or \_\_\_\_\_.

a. Magnetism

b. Induction

c. Resistance

d. Capacitance

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c. Resistance

d. Capacitance

98. A capacitor opposes \_\_\_\_\_.

a. Both a change in voltage & current

b. Change in current

c. Change in voltage

d. None of these

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b. Change in current

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99. The armature current drawn by any DC motor is proportional to the \_\_\_\_\_.

- a. Motor speed
- b. Voltage applied
- c. Flux required
- d. Torque applied

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100. The greater voltage drop in a circuit will occur when the \_\_\_\_\_ the current flow through that part of the circuit.

- a. Greater
- b. Slower
- c. Faster
- d. Lower

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a. **Greater**

b. Slower

c. Faster

d. Lower

101. The electromotive force required to cause a current to flow may be obtained \_\_\_\_\_.

I. Thermally

II. Mechanically

III. Chemically

a. I only b. I & III only c. II & III only d. I, II, & III

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I. Thermally

II. Mechanically

III. Chemically

a. I only b. I & III only c. II & III only d. **I, II, & III**

102. Which of the following is not true?

a. A fluorescent fixture is more efficient than an incandescent fixture.

b. Room temperature has an effect on the operation of a fluorescent lamp .

c. Fluorescent fixtures have good power factor with the current leading the voltage.

d. The life of a fluorescent bulb is affected by starting and stopping.

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b. Room temperature has an effect on the operation of a fluorescent lamp .

c. Fluorescent fixtures have good power factor with the current leading the voltage.

d. The life of a fluorescent bulb is affected by starting and stopping.

103. Resistance opposes the flow of current in a circuit and is measured in \_\_\_\_\_.

- a. Farads
- b. Joules
- c. Ohms
- d. Henrys

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a. Farads

b. Joules

c. Ohms

d. Henrys

104. Which of the following is true?

- a. Wooden plugs may be used for mounting electrical equipment in concrete.
- b. The high-leg conductor of a 4-wire delta is identified blue in color.
- c. The minimum size service permitted by the Code for a residence is 100 amps.
- d. The ungrounded conductor is connected to the screw shell of a lampholder.

104. Which of the following is true?

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105. Multiple start buttons in a motor control circuit are connected in \_\_\_\_\_.

a. Series

b. Parallel

c. Series-parallel

d. None of these

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a. Series

b. **Parallel**

c. Series-parallel

d. None of these

106. Which of the following is not true?

- a. Feeder demand factors are applicable to household electric ranges.
- b. A green colored conductor can be used as an ungrounded circuit conductor.
- c. Insulated conductors #6 or smaller shall be white or gray, no marking tape permitted.
- d. All joints or splices must be electrically and mechanically secure before soldering.

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107. Special permission is \_\_\_\_\_.

- a. Granted by the electrical foreman on the job.
- b. Verbal permission by the inspector.
- c. Given only once on one blueprint change request.
- d. The written consent of the authority having jurisdiction.

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- c. Given only once on one blueprint change request.
- d. **The written consent of the authority having jurisdiction.**

108. One million volts can also expressed as \_\_\_\_\_.

a. 1 millivolt

b. 1 kilovolt

c. 1 megavolt

d. 1 microvolt

108. One million volts can also expressed as \_\_\_\_\_.

a. 1 millivolt

b. 1 kilovolt

c. **1 megavolt**

d. 1 microvolt

109. Resistance in a circuit may be \_\_\_\_\_.

I. Resistance of the conductors

II. Resistance due to imperfect contact

a. I only

b. II only

c. Both I & II

d. Neither I nor II

109. Resistance in a circuit may be \_\_\_\_\_.

I. Resistance of the conductors

II. Resistance due to imperfect contact

a. I only

b. II only

c. **Both I & II**

d. Neither I nor II

110. Which of the following is not true?

- a. All receptacles on 15 and 20 amp branch circuits must be of the grounding type.
- b. Splices and joints shall be covered with an insulation equivalent to the conductor insulation.
- c. The size of the conductor determines the rating of the circuit.
- d. All 15 and 20 amp receptacle installed in a dwelling bathroom shall have GFCI protection.

110. Which of the following is not true?

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- d. All 15 and 20 amp receptacle installed in a dwelling bathroom shall have GFCI protection.

111. A magnetic field is created around a conductor \_\_\_\_\_.

- a. Whenever current flows in the wire, provided the wire is made of magnetic materials.
- b. Only when the wire carries a large current.
- c. Whenever current flows in the conductor.
- d. Only if the conductor is formed in a loop.

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- b. Only when the wire carries a large current.
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- d. Only if the conductor is formed in a loop.

112. A universal motor has brushes that ride on the \_\_\_\_\_.

a. Commutator

b. Stator

c. Inter-pole

d. Field

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a. **Commutator**

b. Stator

c. Inter-pole

d. Field

113. How many kw hours are consumed by 25-60 watt light bulbs burning 5 hours in a 120v circuit?

a. 1.5

b. 180

c. 7.5

d. 75

113. How many kw hours are consumed by 25-60 watt light bulbs burning 5 hours in a 120v circuit?

a. 1.5

b. 180

c. 7.5 (25 x 60=1500 x 5 = 7500/1000 = 7.5)

d. 75

114. A dynamo is \_\_\_\_\_.

a. A pole line insulator.

b. A tool used to test dielectric strength.

c. A meter used for checking the R.P.M of a motor.

d. A machine for converting mechanical energy into electrical energy.

114. A dynamo is \_\_\_\_\_.

a. A pole line insulator.

b. A tool used to test dielectric strength.

c. A meter used for checking the R.P.M of a motor.

d. **A machine for converting mechanical energy into electrical energy.**

115. Which of the following is/are generally used for field magnets?

I. Copper

II. Steel

III. Wrought iron

a. I & II only b. I & III only c. II & III only d. I, II, & III

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I. Copper

II. Steel

III. Wrought iron

a. I & II only b. I & III only c. II & III only d. **I, II, & III**

116. The difference between a neutral and a grounded circuit conductor is \_\_\_\_\_.

a. Only a neutral will have equal potential to the ungrounded conductor.

b. Only a neutrals outer covering is white or natural gray.

c. Only a neutral carries unbalanced current.

d. There is no difference.

116. The difference between a neutral and a grounded circuit conductor is \_\_\_\_\_.

a. Only a neutral will have equal potential to the ungrounded conductor.

b. Only a neutrals outer covering is white or natural gray.

c. **Only a neutral carries unbalanced current.**

d. There is no difference.

117. The normal rotation of an induction motor is \_\_\_\_\_ facing the front of the motor (The front of a motor is the end opposite the shaft).

a. Clockwise

b. Counter clockwise

117. The normal rotation of an induction motor is \_\_\_\_\_ facing the front of the motor (The front of a motor is the end opposite the shaft).

a. Clockwise

b. **Counter clockwise**

118. A function of a relay is to

\_\_\_\_\_.

- a. Turn on another circuit
- b. Produce thermal electricity
- c. Limit the flow of electrons
- d. Create a resistance in the field winding

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- a. Turn on another circuit
- b. Produce thermal electricity
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119. Which of the following is not true?

- a. It is an electrical impossibility to have a circuit with only inductive reactance because the metallic wire has a resistance.
- b. The voltage of a circuit is the greatest effective difference of potential that exists between any two conductors of a circuit.
- c. The current is said to lag the voltage in a circuit that has only capacitive reactance.
- d. Power factor is the phase displacement of current and voltage in an AC circuit.

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- c. **The current is said to lag the voltage in a circuit that has only capacitive reactance.**
- d. Power factor is the phase displacement of current and voltage in an AC circuit.

120. Unity power factor, which means that the current is in phase with the voltage, would be \_\_\_\_\_.

a. 0.50

b. 0.80

c. 0.10

d. 1.0

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a. 0.50

b. 0.80

c. 0.10

d. 1.0

121. Rheostats and potentiometers are types of \_\_\_\_\_ resistors.

a. Film

b. Variable

c. Fixed

d. Wirewound

121. Rheostats and potentiometers are types of \_\_\_\_\_ resistors.

a. Film

b. **Variable**

c. Fixed

d. Wirewound

122. A laminated pole is \_\_\_\_\_.

- a. One built up of layers of iron sheets, stamped from sheet metal and insulated.
- b. Used in transmission lines over 100kv.
- c. A pole soaked in creosote.
- d. Found in the western part of the U.S.A.

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123. Which of the following is true?

- a. Conductors of different systems may not occupy the same enclosure.
- b. Knife switches should be mounted in a horizontal position.
- c. 75 amps is a standard size fuse.
- d. Circuits are grounded to limit excess voltage to ground, which might occur from lightning or exposure to other higher voltage sources.

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- d. **Circuits are grounded to limit excess voltage to ground, which might occur from lightning or exposure to other higher voltage sources.**

124. Electrical power is measure of

\_\_\_\_\_.

- a. Work wasted
- b. Voltage
- c. Rate at which work is performed
- d. Total work performed

124. Electrical power is measure of

\_\_\_\_\_.

- a. Work wasted
- b. Voltage
- c. **Rate at which work is performed**
- d. Total work performed

125. What percentage of the maximum (peak) voltage is the effective (R.M.S.) voltage?

a. 100%

b. 70.7%

c. 63.7%

d. 57.7%

125. What percentage of the maximum (peak) voltage is the effective (R.M.S.) voltage?

a. 100%

b. 70.7%

c. 63.7%

d. 57.7%

126. A low power factor is commonly caused by

\_\_\_\_\_.

I. Induction motors

II. Synchronous motors

III. Fluorescent lights

a. III only b. II & III only c. I & III only d. I, II& III

126. A low power factor is commonly caused by

\_\_\_\_\_.

I. Induction motors

II. Synchronous motors

III. Fluorescent lights

a. III only b. II & III only c. **I & III only** d. I, II& III

127. Which of the following is not true?

- a. Conduit painted with enamel cannot be used outdoors.
- b. All AC phase wires, neutral and equipment grounding conductors if used, must be installed in the same raceway.
- c. PVC shall have a minimum burial depth of 24 “.
- d. EMT raceway can be installed in an air conditioning-space heating duct.

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- d. EMT raceway can be installed in an air conditioning-space heating duct.

128. Which of the following is not true?

- a. Equal currents flow in the branches of parallel circuits.
- b. The total resistance of a parallel circuit is less than the smallest resistor in the circuit.
- c. The total current in a parallel circuit is the sum of the branch currents.
- d. In a parallel circuit, there is more than one path for the current flow.

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129. Hysteresis is \_\_\_\_\_.

a. The tool used to read the specific gravity of a battery.

b. The lagging of magnetism, in a magnetic metal, behind the magnetizing flux which produces it.

c. The opposite of impedance.

d. None of these

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130. The electric pressure of a circuit would be the \_\_\_\_\_.

a. Voltage

b. Amperage

c. Resistance

d. Wattage

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a. **Voltage**

b. Amperage

c. Resistance

d. Wattage

131. Permeability is \_\_\_\_\_.

- a. The opposite of conductance.
- b. A measure of the ease with which magnetism passes through any substance.
- c. The total resistance to current flow.
- d. The liquid substance in a battery.

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a. The opposite of conductance.

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132. The Wheatstone bridge method is used for accurate measurements of \_\_\_\_\_.

a. Voltage

b. Amperage

c. Resistance

d. Wattage

132. The Wheatstone bridge method is used for accurate measurements of \_\_\_\_\_.

a. Voltage

b. Amperage

c. **Resistance**

d. Wattage

133. When a circuit breaker is in the open position \_\_\_\_\_.

I. You have a short in the ungrounded conductor.

II. You have a short in the grounded conductor.

a. I only

b. II only

c. Either I or II

d. both I & II

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d. both I & II

134. In solving series-parallel circuits, generally you would \_\_\_\_\_.

- a. Treat it as a series circuit
- b. Reduce it to its simplest form
- c. Assume that all loads are equal
- d. Treat it as a parallel circuit.

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a. Treat it as a series circuit

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135. A commutator is \_\_\_\_\_.

a. A ditching machine

b. The inter-poles of a generator

c. A device for causing the alternating currents generated in the armature to flow in the same direction in the external circuit.

d. A transformer with a common conductor.

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c. **A device for causing the alternating currents generated in the armature to flow in the same direction in the external circuit.**

d. A transformer with a common conductor.

136. Which of the following is true?

- a. EMT may be treaded
- b. The “white” colored conductor connected to the silver colored post on a duplex receptacle on a 120v two-wire branch circuit is called the “neutral” conductor.
- c. Plastic water pipe is approved to be used for electrical conduit.
- d. The screw shell of a lampholder may support a fixture weighing 6 pounds.

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- d. **The screw shell of a lampholder may support a fixture weighing 6 pounds.**

137. To fasten a box to a terra cotta wall you would use which of the following?

- a. Wooden plugs
- b. Lag bolt
- c. Expansion bolt
- d. Toggle bolt/rawl plugs

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- b. Lag bolt
- c. Expansion bolt
- d. **Toggle bolt/rawl plugs**

138. If a 240-volt heater is used on 120 volts, the amount of heat produced will be

\_\_\_\_\_.

- a. Twice as great
- b. Four times as great
- c.  $\frac{1}{4}$  as much
- d. The same

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139. Which of the following about a strap wrench is/are true?

I. You can turn pipe using one hand

II. Use in a tight corner

III. Use on different sizes of pipe

a. I only b. II only c. III only d. I, II & III

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I. You can turn pipe using one hand

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III. Use on different sizes of pipe

a. I only b. II only c. III only d. **I, II & III**

140. When soldering a joint, the flux is used to \_\_\_\_\_.

- a. Keep the wire cool
- b. Keep the surface clean
- c. Lubricate the joint
- d. Maintain a tight connection

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a. Keep the wire cool

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141. The transferring of electrons from one material to another would be \_\_\_\_\_.

- a. Electrochemistry
- b. Static electricity
- c. Solar electricity
- d. Piezoelectricity

141. The transferring of electrons from one material to another would be \_\_\_\_\_.

- a. Electrochemistry
- b. **Static electricity**
- c. Solar electricity
- d. Piezoelectricity

142. A minimum thickness of \_\_\_\_\_  
inch/inches of concrete over conduits and  
raceways should be used to prevent cracking.

a. 1

b. 2

c. 3

d. 4

142. A minimum thickness of \_\_\_\_\_  
inch/inches of concrete over conduits and  
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a. 1

b. 2

c. 3

d. 4

143. Wire Connectors are generally classified as \_\_\_\_\_ type(s).

I. Thermal

II. Pressure

a. I only   b. II only   c. both I & II   d. neither I nor II

143. Wire Connectors are generally classified as \_\_\_\_\_ type(s).

I. Thermal

II. Pressure

a. I only   b. II only   c. **both I & II**   d. neither I nor II

144. One of the disadvantages of indenter or crimp connectors is \_\_\_\_\_.

a. They must be re-crimped at each annual maintenance inspection.

b. That special tools are required to make the joint.

c. Eventually they will loosen.

d. They can only be used for copper conductors.

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a. They must be re-crimped at each annual maintenance inspection.

b. **That special tools are required to make the joint.**

c. Eventually they will loosen.

d. They can only be used for copper conductors.

145. The usual service conditions under which a transformer should be able to carry its rated load are \_\_\_\_\_.

I. At rated secondary voltage or not in excess of 105% of the rated value.

II. At rated frequency.

III. Temperature of the surrounding cooling air at no time exceeding 40°C (104°F) and average temperature of the surrounding cooling air during any 24-hour period not exceeding 30°C (86°F).

a. I only

b. II only

c. III only

d. I,II& III

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a. I only

b. II only

c. III only

d. I, II & III

146. Which of the following is not true?

- a. An autotransformer may be used as part of the ballast for lighting circuits.
- b. A branch circuit can never be supplied through an autotransformer.
- c. The losses of the autotransformer are less than those of a two-coil transformer.
- d. Autotransformers may be used as starting compensators for AC motors.

146. Which of the following is not true?

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b. **A branch circuit can never be supplied through an autotransformer.**

c. The losses of the autotransformer are less than those of a two-coil transformer.

d. Autotransformers may be used as starting compensators for AC motors.

147. Conductors supplying two or more motors shall have an ampacity equal to that sum of the following current rating of all the motors plus \_\_\_\_\_ % of the highest rated motor in the group.

- a. 25
- b. 80
- c. 100
- d. 125

147. Conductors supplying two or more motors shall have an ampacity equal to that sum of the following current rating of all the motors plus \_\_\_\_\_ % of the highest rated motor in the group.

- a. 25
- b. 80
- c. 100
- d. 125

148. The symbol for a wye connection is

\_\_\_\_\_.

a.  $\Sigma$

b.  $\Delta$

c.  $\phi$

d.  $\gamma$

148. The symbol for a wye connection is

\_\_\_\_\_.

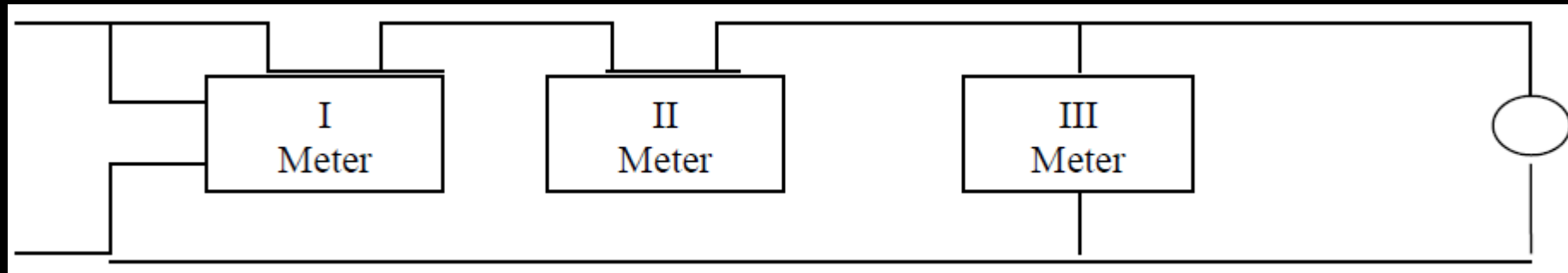
a.  $\Sigma$

b.  $\Delta$

c.  $\phi$

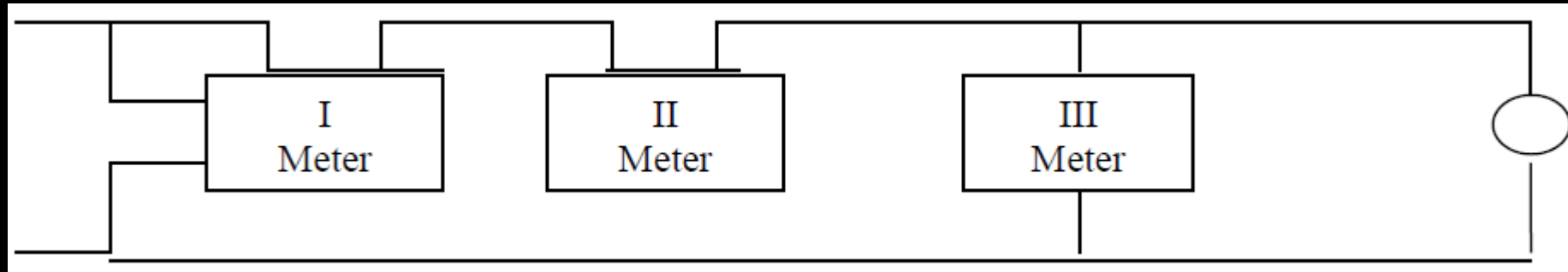
d.  $\gamma$

149. Which of the following meters is a wattmeter?



- a. I only      b. II only      c. III only      d. I, II & III

149. Which of the following meters is a wattmeter?



only wattmeter is series-parallel

- a. I only      b. II only      c. III only      d. I, II & III

150. The voltage of a circuit is best defined as \_\_\_\_\_.

- a. The potential between two conductors.
- b. The greatest difference of potential between two conductors.
- c. The effective difference of potential between two conductors.
- d. The average RMS difference of potential between any two conductors.

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- a. The potential between two conductors.
- b. The greatest difference of potential between two conductors.
- c. **The effective difference of potential between two conductors.**
- d. The average RMS difference of potential between any two conductors.

151. Electrical current is measured in terms of \_\_\_\_\_.

a. Electron pressure

b. Electron passing a point per second

c. Watts

d. Resistance

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a. Electron pressure

b. Electron passing a point per second

c. Watts

d. Resistance

152. A stop switch is wired \_\_\_\_\_  
in a motor circuit.

a. Series

b. Series-shunt

c. Series-parallel

d. Parallel

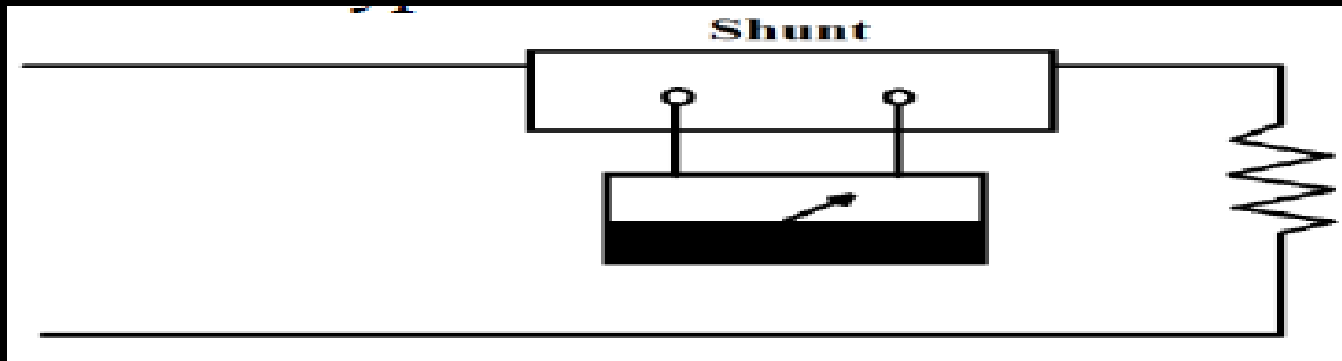
152. A stop switch is wired \_\_\_\_\_  
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- a. **Series**
- b. Series-shunt
- c. Series-parallel
- d. Parallel



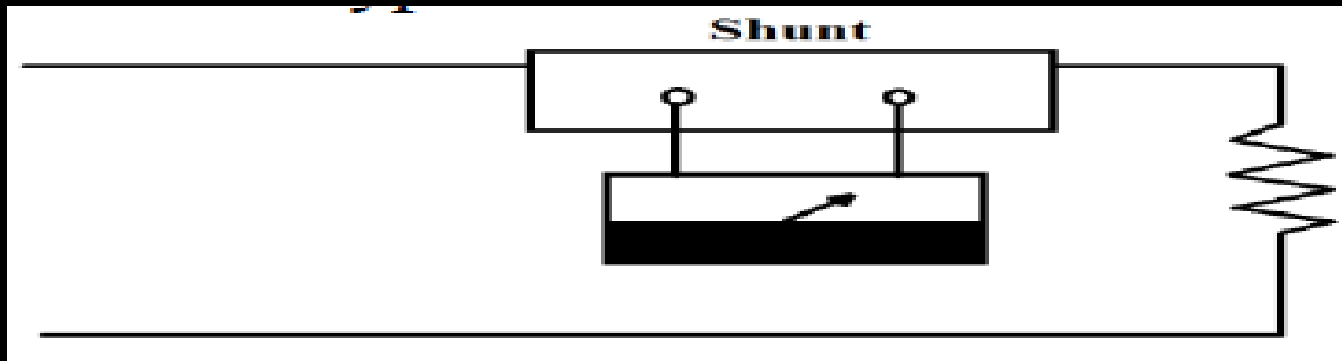


154. What type of meter is shown below?



- a. Wattmeter
- b. Ammeter
- c. Ohmmeter
- d. Voltmeter

154. What type of meter is shown below?



- a. Wattmeter
- b. **Ammeter**
- c. Ohmmeter
- d. Voltmeter

155. Concrete, brick or tile are considered as being \_\_\_\_\_.

a. Isolated

b. Insulators

c. Grounded

d. Dry locations

155. Concrete, brick or tile are considered as being \_\_\_\_\_.

a. Isolated

b. Insulators

c. **Grounded**

d. Dry locations

156.  is the symbol for a \_\_\_\_\_ panel.

- a. Power
- b. Wall-mounted
- c. Lighting
- d. Surface-mounted

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- a. Power
- b. Wall-mounted
- c. **Lighting**
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157. A corroded electrical connection

\_\_\_\_\_.

- a. Decreases the voltage drop
- b. Decreases the resistance of the connection
- c. Increases the resistance of the connection
- d. Increases the ampacity at the connection

157. A corroded electrical connection

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- a. Decreases the voltage drop
- b. Decreases the resistance of the connection
- c. **Increases the resistance of the connection**
- d. Increases the ampacity at the connection

158. An AC ammeter or voltmeter is calibrated to read RMS values; this means the meter is reading the \_\_\_\_\_ value.

a. Maximum

b. Peak

c. Average

d. Effective

158. An AC ammeter or voltmeter is calibrated to read RMS values; this means the meter is reading the \_\_\_\_\_ value.

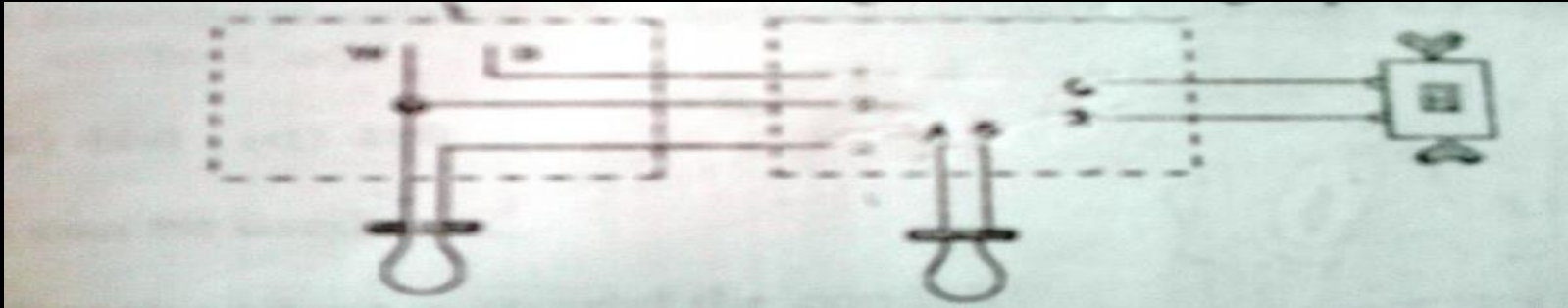
a. Maximum

b. Peak

c. Average

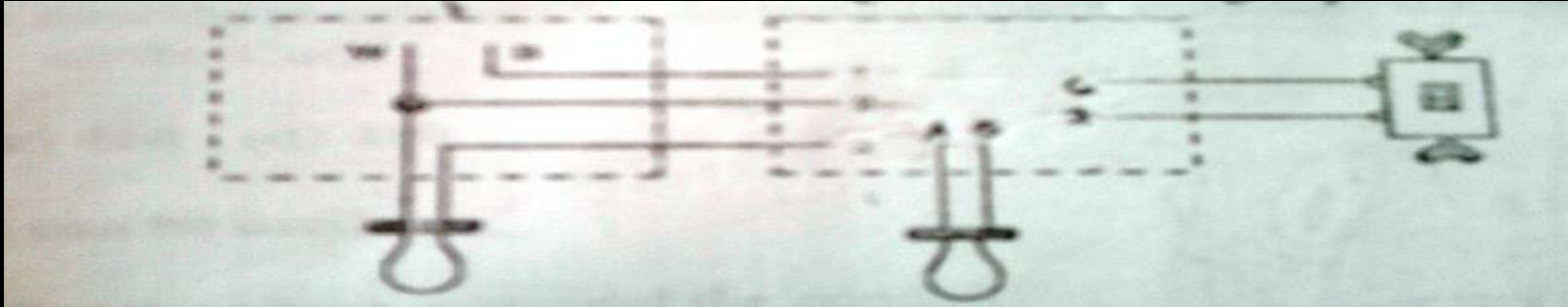
d. **Effective**

159. The correct connection for the two 120 volt lights to the single-pole switch would be \_\_\_\_\_.



- a. 1-4 2-6 3-5-7
- b. 1-6 2-5 3-4-7
- c. 1-7 2-5-6 3-4
- d. 1-5 2-6-7 3-4

159. The correct connection for the two 120 volt lights to the single-pole switch would be \_\_\_\_\_.



- a. 1-4 2-6 3-5-7
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- c. 1-7 2-5-6 3-4
- d. 1-5 2-6-7 3-4

160. The location of a wall receptacle outlet in the bathroom of a dwelling shall be installed \_\_\_\_\_.

- a. The Code does not specify the location
- b. Adjacent to the toilet
- c. Within 36" of outside edge of basin
- d. Across from the shower

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- a. The Code does not specify the location
- b. Adjacent to the toilet
- c. **Within 36'' of outside edge of basin**
- d. Across from the shower

161. On a delta three-phase four-wire secondary, how many hot wires may use the common neutral?

a. 1

b. 2

c. 3

d. 4

161. On a delta three-phase four-wire secondary, how many hot wires may use the common neutral?

a. 1

b. 2

c. 3

d. 4

162. It shall be permissible to apply a demand factor of \_\_\_\_\_ to the nameplate-rating load of four or more appliances fastened in place served by the same feeder in a dwelling.

a. 70%

b. 75 %

c. 60%

d. 80%

162. It shall be permissible to apply a demand factor of \_\_\_\_\_ to the nameplate-rating load of four or more appliances fastened in place served by the same feeder in a dwelling.

a. 70%

b. 75 %

c. 60%

d. 80%

163. Insulated nonmetallic boxes are made of

\_\_\_\_\_.

I. Polyninyl chloride

II. Bakelite

III. Bower-Barff lacquer

a. I only b. II only c. I & II only d. I, II & III

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\_\_\_\_\_.

I. Polyninyl chloride

II. Bakelite

III. Bower-Barff lacquer

a. I only b. II only c. **I & II only** d. I, II & III

164. Tungsten-filament lamps can be used on \_\_\_\_\_ circuits.

- a. AC
- b. DC
- c. AC and DC
- d. None of these

164. Tungsten-filament lamps can be used on \_\_\_\_\_ circuits.

a. AC

b. DC

c. **AC and DC**

d. None of these

165. An overcurrent protective device with a circuit opening fusible part that is heated and severed by the passage of overcurrent through it is called a

\_\_\_\_\_.

- a. Current-limiter
- b. Fuse
- c. Circuit breaker
- d. Thermal overload

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\_\_\_\_\_.

- a. Current-limiter
- b. **Fuse**
- c. Circuit breaker
- d. Thermal overload

166. The service conductors between the terminals of the service equipment and a point usually outside the building, clear of building walls, where joined by a tap or splice to the service drop is called the \_\_\_\_\_.

- a. Service drop
- b. Service-entrance conductors
- c. Service equipment
- d. None of these

166. The service conductors between the terminals of the service equipment and a point usually outside the building, clear of building walls, where joined by a tap or splice to the service drop is called the \_\_\_\_\_.

- a. Service drop
- b. **Service-entrance conductors**
- c. Service equipment
- d. None of these

167. If you needed to know the provisions for the installation of stationary storage batteries, you would refer to the Article \_\_\_\_\_ of the Code.

a. 225

b. 445

c. 460

d. 480

167. If you needed to know the provisions for the installation of stationary storage batteries, you would refer to the Article \_\_\_\_\_ of the Code.

a. 225

b. 445

c. 460

d. 480

168. A chain wrench can be used \_\_\_\_\_.

I. With one hand only

II. In confined places & close to walls

III. For all sizes of conduit.

a. I & II only

b. I & III only

c. II & III only

d. I, II & III

168. A chain wrench can be used \_\_\_\_\_.

I. With one hand only

II. In confined places & close to walls

III. For all sizes of conduit.

a. I & II only

b. I & III only

c. II & III only

d. **I, II & III**



169. To cut rigid conduit you should

- 
- a. Use 3-wheel pipe cutter
  - b. Use cold chisel and ream the ends
  - c. **Use hacksaw and ream the ends**
  - d. Order it to cut size

170. A fixture that weighs more than \_\_\_\_\_ pounds shall be supported independently of the outlet box.

a. 25

b. 30

c. 35

d. 50

170. A fixture that weighs more than \_\_\_\_\_ pounds shall be supported independently of the outlet box.

a. 25

b. 30

c. 35

d. 50

171. Is it permissible to install direct current and alternating current conductors in the same outlet box?

a. Yes, if insulated for the maximum voltage of any conductor

b. No, never

c. Yes, if the ampacity is the same for both conductors

d. Yes, in dry locations

171. Is it permissible to install direct current and alternating current conductors in the same outlet box?

a. Yes, if insulated for the maximum voltage of any conductor

b. No, never

c. Yes, if the ampacity is the same for both conductors

d. Yes, in dry locations

172. Electrical equipment shall be installed

\_\_\_\_\_.

- a. Better than the minimum Code allows.
- b. According to the Local Code when more stringent than the N.E.C.
- c. According to the N.E.C regardless of Local Code
- d. According to the Local Code when less stringent than the N.E.C.

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- d. According to the Local Code when less stringent than the N.E.C.

173. Voltage drop in a wire is

\_\_\_\_\_.

- a. The wire resistance times the voltage
- b. The percentage of the applied voltage
- c. A function of insulation
- d. Part of the load voltage

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\_\_\_\_\_.

- a. The wire resistance times the voltage
- b. The percentage of the applied voltage**
- c. A function of insulation
- d. Part of the load voltage

174. Conductors shall not be installed in locations where the operating temperature will exceed that specified for the type of \_\_\_\_\_ used.

- a. Connectors
- b. Protection
- c. Insulation
- d. Wiring

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a. Connectors

b. Protection

c. **Insulation**

d. Wiring

175. Galvanized conduit has a finish exterior and interior of \_\_\_\_\_.

a. Lead

b. Copper

c. Nickel

d. Zinc

175. Galvanized conduit has a finish exterior and interior of \_\_\_\_\_.

a. Lead

b. Copper

c. Nickel

d. Zinc

176. Which of the following is the best type of saw to use to cut a 3" diameter hole through 1/2" plywood?

- a. Circular Saw
- b. Saber saw
- c. Hack saw
- d. Cross-cut saw

176. Which of the following is the best type of saw to use to cut a 3" diameter hole through 1/2" plywood?

a. Circular Saw

b. **Saber saw**

c. Hack saw

d. Cross-cut saw

177. Which of the following machine screws has the smallest diameter?

a. 6-32 x 1"

b. 10-32 x  $\frac{3}{4}$ "

c. 8-32 x  $\frac{1}{2}$ "

d. 10-24 x  $\frac{3}{8}$ "

177. Which of the following machine screws has the smallest diameter?

a. 6-32 x 1"

b. 10-32 x  $\frac{3}{4}$ "

c. 8-32 x  $\frac{1}{2}$ "

d. 10-24 x  $\frac{3}{8}$ "

178. Which of the following is the most important factor contributing to an electricians safety on the job?

- a. Work at slow pace
- b. Always wear leather gloves
- c. Be alert at all times
- d. Never be late for break

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a. Work at slow pace

b. Always wear leather gloves

c. **Be alert at all times**

d. Never be late for break

179. A one-quarter bend in a raceway is equivalent to an angle of \_\_\_\_\_ degrees.

a. 90

b. 45

c. 25

d. 180

179. A one-quarter bend in a raceway is equivalent to an angle of \_\_\_\_\_ degrees.

a. 90

b. 45

c. 25

d. 180

180. A  $3\Omega$ , a  $6\Omega$ , a  $9\Omega$  and a  $12\Omega$  resistor are connected in parallel. Which resistor will consume the most power?

a.  $3\Omega$

b.  $6\Omega$

c.  $9\Omega$

d.  $12\Omega$

180. A  $3\Omega$ , a  $6\Omega$ , a  $9\Omega$  and a  $12\Omega$  resistor are connected in parallel. Which resistor will consume the most power?

a.  $3\Omega$

b.  $6\Omega$

c.  $9\Omega$

d.  $12\Omega$

181. Listed ceiling (paddle) fans that do not exceed \_\_\_\_\_ pounds in weight, with or without accessories, shall be permitted to be supported by outlet boxes identified for such use.

- a. 35
- b. 45
- c. 50
- d. 60

181. Listed ceiling (paddle) fans that do not exceed \_\_\_\_\_ pounds in weight, with or without accessories, shall be permitted to be supported by outlet boxes identified for such use.

a. 35

b. 45

c. 50

d. 60

182. The best way to lay out a 40 foot long straight line on a floor is to \_\_\_\_\_.

- a. Use a steel measuring tape with dark crayon
- b. Use a plumb bob with long string
- c. Use a long 2 x 4 and a lead pencil
- d. Use a chalk line

182. The best way to lay out a 40 foot long straight line on a floor is to \_\_\_\_\_.

- a. Use a steel measuring tape with dark crayon
- b. Use a plumb bob with long string
- c. Use a long 2 x 4 and a lead pencil
- d. **Use a chalk line**

183. Silver is used on electrical contacts to \_\_\_\_\_.

- a. Avoid corrosion
- b. Improve efficiency
- c. Improve continuity
- d. Improve appearance

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- a. Avoid corrosion
- b. Improve efficiency
- c. **Improve continuity**
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184. Electricians should be familiar with the rules and regulations of their job mainly to

\_\_\_\_\_.

- a. Eliminate overtime
- b. Increase wages
- c. Perform their duties properly
- d. Save time

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\_\_\_\_\_.

- a. Eliminate overtime
- b. Increase wages
- c. **Perform their duties properly**
- d. Save time

185. To determine if the raceway is truly vertical an electrician would use a

\_\_\_\_\_.

- a. Plumb bob
- b. Transmit level
- c. Square
- d. Level

185. To determine if the raceway is truly vertical an electrician would use a

\_\_\_\_\_.

- a. Plumb bob
- b. Transmit level
- c. Square
- d. **Level**

186. In order to prevent a safety hazard an electrician should never \_\_\_\_\_.

- a. Strike a hardened steel surface with a hardened steel hammer.
- b. Use a soft brass hammer to strike a soft brass surface.
- c. Strike a soft iron surface with a hardened steel hammer.
- d. Use a soft iron hammer to strike a hardened steel surface.

186. In order to prevent a safety hazard an electrician should never \_\_\_\_\_.

- a. **Strike a hardened steel surface with a hardened steel hammer.**
- b. Use a soft brass hammer to strike a soft brass surface.
- c. Strike a soft iron surface with a hardened steel hammer.
- d. Use a soft iron hammer to strike a hardened steel surface.

187. Service drop conductors not in excess of 600 volts shall have a minimum clearance of \_\_\_\_\_ feet over residential property and driveways, and those commercial areas not subject to truck traffic.

- a. 10
- b. 12
- c. 15
- d. 18

187. Service drop conductors not in excess of 600 volts shall have a minimum clearance of \_\_\_\_\_ feet over residential property and driveways, and those commercial areas not subject to truck traffic.

a. 10

b. 12

c. 15

d. 18

188. When conduit or tubing nipples having a maximum length not to exceed 24" are installed between boxes they shall be permitted to be filled \_\_\_\_\_ percent of its total cross-sectional area.

- a. 31
- b. 40
- c. 53
- d. 60

188. When conduit or tubing nipples having a maximum length not to exceed 24” are installed between boxes they shall be permitted to be filled \_\_\_\_\_ percent of its total cross-sectional area.

- a. 31
- b. 40
- c. 53
- d. 60

189. Before using rubber gloves when working on high voltage equipment in the gloves should be \_\_\_\_\_.

- a. Cleaned inside & out
- b. Tested to withstand the high voltage
- c. Oiled inside & out
- d. Brand new

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a. Cleaned inside & out

b. Tested to withstand the high voltage

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d. Brand new

190. Stranded wire should be \_\_\_\_\_  
before being placed under a screw head.

- a. Tinned
- b. Twisted together tightly
- c. Coated with an inhibitor
- d. Sanded

190. Stranded wire should be \_\_\_\_\_  
before being placed under a screw head.

- a. Tinned
- b. **Twisted together tightly**
- c. Coated with an inhibitor
- d. Sanded

191. A  $3\Omega$ , a  $6\Omega$ , a  $9\Omega$  and a  $12\Omega$  resistor are connected in series. The resistor will consume the most power is the \_\_\_\_\_ ohm.

a.  $3\Omega$

b.  $6\Omega$

c.  $9\Omega$

d.  $12\Omega$

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a.  $3\Omega$

b.  $6\Omega$

c.  $9\Omega$

d.  $12\Omega$

192. What Article of the NEC refers to grounding?

a. 230

b. 240

c. 250

d. 300

192. What Article of the NEC refers to grounding?

a. 230

b. 240

c. 250

d. 300

193. The total of the following numbers  $8\frac{5}{8}$ ",  $6\frac{1}{4}$ ",  $7\frac{3}{16}$ ", and  $5\frac{1}{4}$ " is \_\_\_\_\_.

a.  $27\frac{5}{16}$ "

b.  $26\frac{1}{8}$ "

c.  $28\frac{7}{8}$ "

d. none of these

193. The total of the following numbers  $8\frac{5}{8}$ ",  $6\frac{1}{4}$ ",  $7\frac{3}{16}$ ", and  $5\frac{1}{4}$ " is \_\_\_\_\_.

a.  $27\frac{5}{16}$ "

b.  $26\frac{1}{8}$ "

c.  $28\frac{7}{8}$ "

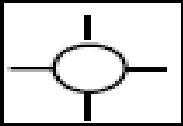
d. none of these

194. A fusestat is different from the ordinary plug fuse because a fusestat \_\_\_\_\_.

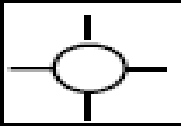
- a. Doesn't have threads
- b. Has left-hand threads
- c. Has different size threads
- d. Has an aluminum screw shell

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- a. Doesn't have threads
- b. Has left-hand threads
- c. **Has different size threads**
- d. Has an aluminum screw shell

195. The symbol  usually indicates a  
(an) \_\_\_\_\_.

- a. A switch
- b. Receptacle
- c. Ceiling outlet
- d. Exhaust fan

195. The symbol  usually indicates a  
(an) \_\_\_\_\_.

a. A switch

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196. A fuse on a 20 amp branch circuit has blown. The fuse is replaced with a 20 amp fuse and the fuse blows when the switch is turned on. The electrician should \_\_\_\_\_.

- a. Check the ground rod connection first
- b. Change to a circuit breaker
- c. Install a 30 amp fuse
- d. Check the circuit for a problem

196. A fuse on a 20 amp branch circuit has blown. The fuse is replaced with a 20 amp fuse and the fuse blows when the switch is turned on. The electrician should \_\_\_\_\_.

- a. Check the ground rod connection first
- b. Change to a circuit breaker
- c. Install a 30 amp fuse
- d. **Check the circuit for a problem**

197. To sharpen an electrician's knife, you would use a \_\_\_\_\_ stone.

a. Rubber

b. Carborundum

c. Rosin

d. Bakelite

197. To sharpen an electrician's knife, you would use a \_\_\_\_\_ stone.

a. Rubber

b. Carborundum

c. Rosin

d. Bakelite

198. The decimal equivalent of  $3/16$  is

\_\_\_\_\_.

a. 0.125

b. 0.1875

c. 5.33

d. None of these

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\_\_\_\_\_.

a. 0.125

b. **0.1875**

c. 5.33

d. None of these

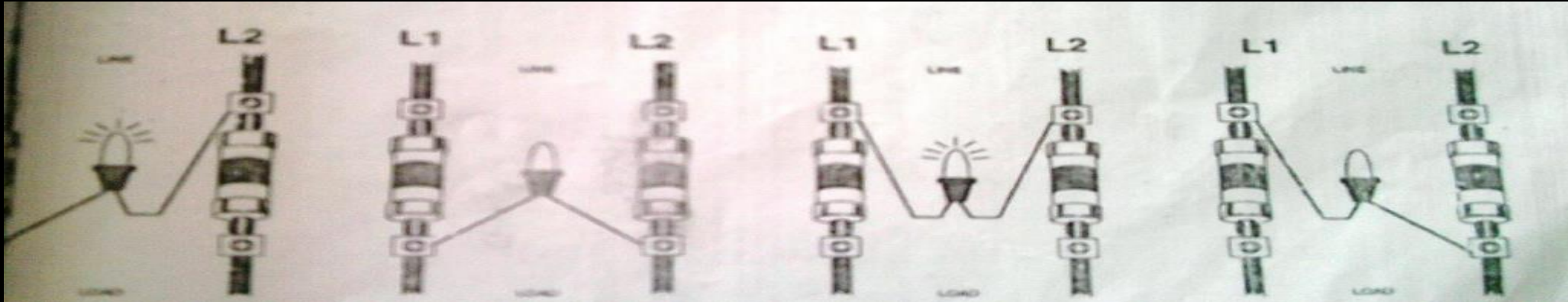
199. When drilling into a steel I-beam, the most likely cause for breaking a drill bit would be \_\_\_\_\_.

- a. The drill bit is too dull
- b. Too slow a drill speed
- c. Too much pressure on the bit
- d. Too much cutting oil on bit

199. When drilling into a steel I-beam, the most likely cause for breaking a drill bit would be \_\_\_\_\_.

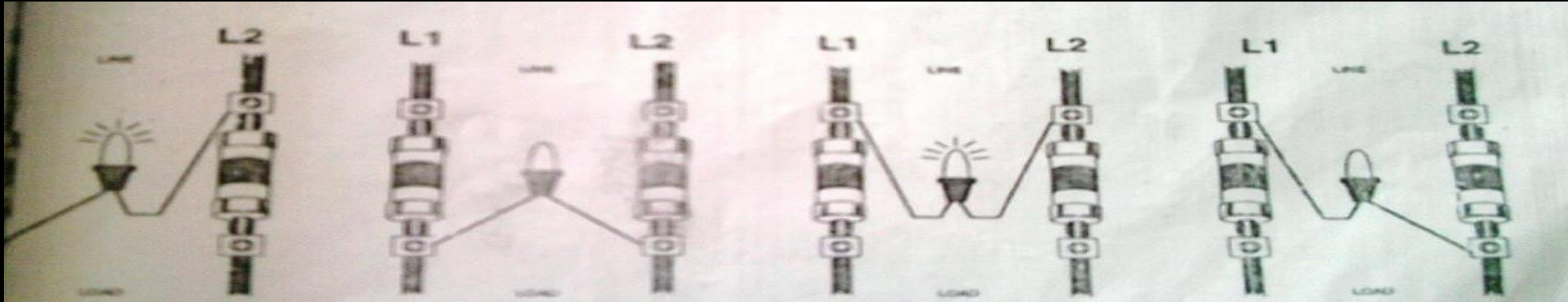
- a. The drill bit is too dull
- b. Too slow a drill speed
- c. **Too much pressure on the bit**
- d. Too much cutting oil on bit

200. Which of the fuses is blown?



- a. L1 fuse is blown
- b. L2 fuse is blown
- c. Both fuses are blown
- d. Neither fuse is blown

200. Which of the fuses is blown?



- a. L1 fuse is blown
- b. **L2 fuse is blown**
- c. Both fuses are blown
- d. Neither fuse is blown

201. Locknuts are sometimes used in making electrical connections on studs. In these cases the purpose of the locknuts is to \_\_\_\_\_.

- a. Be able to connect several wires to one stud
- b. Make it difficult to tamper with the connection
- c. Make a tighter connection
- d. Prevent the connection from loosening under vibration

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- a. Be able to connect several wires to one stud
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- d. **Prevent the connection from loosening under vibration**

202. To cut rigid conduit you should

\_\_\_\_\_.

- a. Use a 3-wheel pipe cutter
- b. Use a cold chisel and ream the ends
- c. Use a hacksaw and ream the ends
- d. Order it to cut size

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- a. Use a 3-wheel pipe cutter
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203. In the course of normal operation the instrument which will be least effective in indicating that a generator may overheat because it is overloaded, is \_\_\_\_\_.

- a. A wattmeter
- b. A voltmeter
- c. An ammeter
- d. A stator thermocouple

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- a. A wattmeter
- b. **A voltmeter**
- c. An ammeter
- d. A stator thermocouple

204. Two switches in one box under one face-plate is called a \_\_\_\_\_.

a. Double-pole switch

b. Two-gang switch

c. 2-way switch

d. Mistake

204. Two switches in one box under one face-plate is called a \_\_\_\_\_.

a. Double-pole switch

b. **Two-gang switch**

c. 2-way switch

d. Mistake

205. A conduit body is \_\_\_\_\_.

a. A cast fitting such as an FD or FS box

b. A standard 10foot length of conduit

c. A sealtight enclosure

d. A “LB” or “T”, or similar fitting

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a. A cast fitting such as an FD or FS box

b. A standard 10foot length of conduit

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206. A dwelling unit is \_\_\_\_\_.

- a. One unit of an apartment.
- b. One or more rooms used by one or more persons.
- c. One or more rooms with space for eating, living and sleeping
- d. One or more rooms used as a housekeeping unit and having permanent cooking and sanitation provisions.

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- a. One unit of an apartment.
- b. One or more rooms used by one or more persons.
- c. One or more rooms with space for eating, living and sleeping
- d. **One or more rooms used as a housekeeping unit and having permanent cooking and sanitation provisions.**

207. Enclosed means, surrounded by a \_\_\_\_\_  
which will prevent persons from accidentally  
contacting energized parts.

I. Wall

II. Fenced

III. Housing or case

a. I only    b. II only    c. III only    d. I, II & III

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which will prevent persons from accidentally  
contacting energized parts.

I. Wall

II. Fenced

III. Housing or case

a. I only    b. II only    c. III only    d. **I, II & III**

208. Where the conductor material is not specified in the Code, the conductors are assumed to be \_\_\_\_\_.

a. Bus bars

b. Aluminum

c. Copper-clad aluminum

d. Copper

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a. Bus bars

b. Aluminum

c. Copper-clad aluminum

d. **Copper**

209. The voltage lost across a portion of a circuit is called the \_\_\_\_\_.

a. Power loss

b. Current

c. Voltage drop

d. Wattage

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a. Power loss

b. Current

c. **Voltage drop**

d. Wattage

210. In a series circuit \_\_\_\_\_ is common.

a. Resistance

b. Current

c. Voltage

d. Wattage

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a. Resistance

b. Current

c. Voltage

d. Wattage

211. Batteries supply \_\_\_\_\_  
current.

a. Positive

b. Negative

c. Direct

d. Alternating

211. Batteries supply \_\_\_\_\_  
current.

a. Positive

b. Negative

c. **Direct**

d. Alternating

212. Electron flow produced by means of applying pressure to a material is called

\_\_\_\_\_.

- a. Photo conduction
- b. Electrochemistry
- c. Piezoelectricity
- d. Thermoelectricity

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\_\_\_\_\_.

- a. Photo conduction
- b. Electrochemistry
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213. Raceways shall be provided with                      to compensate for thermal expansion and contraction.

- a. According joints
- b. Thermal fittings
- c. Expansion joints
- d. Control-expansion

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- a. According joints
- b. Thermal fittings
- c. **Expansion joints**
- d. Control-expansion

214. An alternation is \_\_\_\_\_.

a. One-half cycle

b. One hertz

c. One alternator

d. Two cycles

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a. **One-half cycle**

b. One hertz

c. One alternator

d. Two cycles

215. What is the function of a neon glow tester?

I. Determines if circuit is alive

II. Determines the polarity of DC circuits

III. Determines if circuits is AC or DC

a. I only b. II only c. III only d. I, II & III

215. What is the function of a neon glow tester?

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216. What Chapter in the Code is Mobile Homes referred to?

- a. Chapter 3
- b. Chapter 5
- c. Chapter 6
- d. Chapter 8

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- a. Chapter 3
- b. **Chapter 5**
- c. Chapter 6
- d. Chapter 8

217. Never approach a victim of an electrical injury until you \_\_\_\_\_.

a. Find a witness

b. Are sure the power is turned off

c. Have a first-aid kit

d. Contact the supervisor

217. Never approach a victim of an electrical injury until you \_\_\_\_\_.

a. Find a witness

b. **Are sure the power is turned off**

c. Have a first-aid kit

d. Contact the supervisor

218. A wattmeter indicates \_\_\_\_\_.

I. Real power

II. Apparent power if PF is not in unity

III. Power factor

a. I only   b. II only   c. III only   d. I, II & III

218. A wattmeter indicates \_\_\_\_\_.

I. Real power

II. Apparent power if PF is not in unity

III. Power factor

a. **I only**   b. II only   c. III only   d. I, II & III

219. The connection of a ground clamp to a grounding electrode shall be \_\_\_\_\_.

- a. Accessible
- b. Visible
- c. Readily accessible
- d. In sight

219. The connection of a ground clamp to a grounding electrode shall be \_\_\_\_\_.

- a. **Accessible**
- b. Visible
- c. Readily accessible
- d. In sight

220. The current will lead the voltage when

\_\_\_\_\_.

- a. Inductive reactance exceeds the capacitive reactance in the circuit.
- b. Reactance exceeds the resistance in the circuit.
- c. Resistance exceeds the reactance in the circuit.
- d. Capacitive reactance exceeds the inductive reactance in the circuit.

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\_\_\_\_\_.

- a. Inductive reactance exceeds the capacitive reactance in the circuit.
- b. Reactance exceeds the resistance in the circuit.
- c. Resistance exceeds the reactance in the circuit.
- d. **Capacitive reactance exceeds the inductive reactance in the circuit.**

221. Mandatory rules of the Code are identified by the use of the word \_\_\_\_\_.

a. Should

b. Shall

c. Must

d. Could

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a. Should

b. **Shall**

c. Must

d. Could

222. Which of the following is not one of the considerations that must be evaluated in judging equipment?

- a. Wire-bending and connection space
- b. Arcing effects
- c. Longevity
- d. Electrical insulation

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a. Wire-bending and connection space

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223. To increase the range of an AC ammeter which one the following is most commonly used?

- a. A current transformer
- b. A condenser
- c. An inductance
- d. A straight shunt (not U-shaped)

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224. If a test lamp light, when placed in series with a condenser and a suitable source of DC, it is a good indication that the condenser is

\_\_\_\_\_.

- a. Fully-charged
- b. Short-circuited
- c. Open-circuited
- d. Fully discharged

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- c. Open-circuited
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225. To transmit power economically over considerable distances, it is necessary that the voltages be high. High voltages are readily obtainable with \_\_\_\_\_ currents.

- a. Rectified
- b. AC
- c. DC
- d. Carrier

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a. Rectified

b. AC

c. DC

d. Carrier

226. Two 500 watt lamps connected in series across a 110 volt line draws 2 amperes. The total power consumed is \_\_\_\_\_ watts.

a. 50

b. 150

c. 220

d. 1000

226. Two 500 watt lamps connected in series across a 110 volt line draws 2 amperes. The total power consumed is \_\_\_\_\_ watts.

a. 50

b. 150

c. 220

d. 1000

227. The resistance of a copper wire to the flow of electricity\_\_\_\_\_.

- a. Decreases as the length of the wire increases.
- b. Decreases as the diameter of the wire decreases.
- c. Increases as the diameter of the wire increases.
- d. Increases as the length of the wire increases.

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- a. Decreases as the length of the wire increases.
- b. Decreases as the diameter of the wire decreases.
- c. Increases as the diameter of the wire increases.
- d. **Increases as the length of the wire increases.**

228. Enclosed knife switches that require the switch to be open before the housing door can be opened, called \_\_\_\_\_ switches.

a. Release

b. Air-break

c. Safety

d. Service

228. Enclosed knife switches that require the switch to be open before the housing door can be opened, called \_\_\_\_\_ switches.

a. Release

b. Air-break

c. **Safety**

d. Service

229. A type of cable protected by a spiral metal cover is called \_\_\_\_\_ in the field.

a. BX

b. Greenfield

c. Sealtight

d. Romex

229. A type of cable protected by a spiral metal cover is called \_\_\_\_\_ in the field.

a. **BX**

b. Greenfield

c. Sealtight

d. Romex

230. The resistance of a circuit may vary due to \_\_\_\_\_.

- a. A loose Connection
- b. Change in voltage
- c. Change in current
- d. Induction

230. The resistance of a circuit may vary due to \_\_\_\_\_.

- a. **A loose Connection**
- b. Change in voltage
- c. Change in current
- d. Induction

231. Grounding conductors running with circuit conductors may be \_\_\_\_\_.

I. Uninsulated

II. A continuous green if covered

III. Continuous green with yellow stripe, if covered

a. I only

b. II only

c. III only

d. I,II & III

231. Grounding conductors running with circuit conductors may be \_\_\_\_\_.

I. Uninsulated

II. A continuous green if covered

III. Continuous green with yellow stripe, if covered

a. I only

b. II only

c. III only

d. I,II & III

232. For voltage and current to be in phase, \_\_\_\_\_.

I. The circuit impedance has only resistance.

II. The voltage and current appear at their zero and peak values at the same time.

a. I only

b. II only

c. both I & II

d. neither I nor II

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I. The circuit impedance has only resistance.

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a. I only

b. II only

c. **both I & II**

d. neither I nor II

233. The definition of ampacity is \_\_\_\_\_.

- a. The current-carrying capacity of conductors expressed in volt-amps.
- b. The current-carrying capacity expressed in amperes.
- c. The current-carrying capacity of conductor expressed in wattage.
- d. The current in amperes a conductor can carry continuously under the conditions of use without exceeding its temperature rating.

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c. The current-carrying capacity of conductor expressed in wattage.

d. The current in amperes a conductor can carry continuously under the conditions of use without exceeding its temperature rating.

234. Continuous duty is \_\_\_\_\_.

a. A load where the maximum current is expected to continue for three hours or more.

b. A load where the maximum current is expected to continue for one hour or more.

c. Intermittent operation in which the load conditions are regularly recurrent.

d. Operation at a substantially constant load for an indefinitely long time.

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b. A load where the maximum current is expected to continue for one hour or more.

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d. Operation at a substantially constant load for an indefinitely long time.

235. A location classified as dry may be temporarily subject to

\_\_\_\_\_.

I. Wet

II. Dampness

a. I only

b. II only

c. both I & II

d. neither I nor II

235. A location classified as dry may be temporarily subject to

\_\_\_\_\_.

I. Wet

II. Dampness

a. I only

b. II only

c. **both I & II**

d. neither I nor II

236. A \_\_\_\_\_ is an enclosure designed either for surface or flush mounting and provided with a frame, mat or trim in which a swinging door or doors are or may be hung.

a. Cabinet

b. Panelboard

c. Cutout box

d. Switchboard

236. A \_\_\_\_\_ is an enclosure designed either for surface or flush mounting and provided with a frame, mat or trim in which a swinging door or doors are or may be hung.

- a. **Cabinet**
- b. Panelboard
- c. Cutout box
- d. Switchboard

237. A 15 ohm resistance carrying 20 amperes of current uses \_\_\_\_\_ watts of power.

a. 300

b. 3000

c. 6000

d. None of these

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a. 300

b. 3000

c. 6000

d. None of these

238. When using a #14-2 with ground Romex, the ground \_\_\_\_\_ carry current under normal operation.

- a. Will
- b. Will not
- c. Will sometimes
- d. None of these

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a. Will

b. **Will not**

c. Will sometimes

d. None of these

239. As compared with solid wire, stranded wire of the same gauge size is \_\_\_\_\_.

- a. Better for higher voltage
- b. Given a higher ampacity
- c. Easier to skin
- d. Larger in total diameter

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240. The type of AC system commonly used to supply both commercial light and power is the \_\_\_\_\_.

- a. 3-phase, 3-wire
- b. 3-phase, 4-wire
- c. 2-phase, 3-wire
- d. Single-phase, 2-wire

240. The type of AC system commonly used to supply both commercial light and power is the \_\_\_\_\_.

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- b. 3-phase, 4-wire**
- c. 2-phase, 3-wire
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241. To make a good soldered connection between two stranded wires, it is least important to

\_\_\_\_\_.

- a. Use enough heat to make the solder to flow freely.
- b. Clean the wires carefully.
- c. Twist the wires together before soldering.
- d. Apply solder to each strand before twisting the two wires together.

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242. The most important reason for using a conduit-type fitting in preference to making a bend in a one-inch conduit is to \_\_\_\_\_.

- a. Avoid the possible flattening of the conduit when making the bend.
- b. Cut down the amount of the conduit.
- c. Make a neater job.
- d. Make wire pulling easier.

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243. When skinning a small wire, the insulation should be “penciled down” rather than cut square to \_\_\_\_\_.

- a. Allow more room for the splice
- b. Save time in making the splice
- c. Decrease the danger of nicking the wire
- d. Prevent the braid from fraying

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- d. Prevent the braid from fraying

244. Rubber insulation on an electrical conductor would quickly be damaged by continuous contact with \_\_\_\_\_.

a. Water

b. Acid

c. Oil

d. Alkali

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a. Water

b. Acid

c. Oil

d. Alkali

245. A tester using an ordinary light bulb is commonly used to test \_\_\_\_\_.

- a. Whether a circuit is AC or DC
- b. For polarity of a DC circuit
- c. An overload circuit
- d. For grounds on 120volt circuit

245. A tester using an ordinary light bulb is commonly used to test \_\_\_\_\_.

a. Whether a circuit is AC or DC

b. For polarity of a DC circuit

c. An overload circuit

d. For grounds on 120volt circuit

246. Pigtails are used on brushes to

\_\_\_\_\_.

- a. Compensate for wear
- b. Supply the proper brush tension
- c. Make a good electrical connection
- d. Hold the brush in the holder

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\_\_\_\_\_.

- a. Compensate for wear
- b. Supply the proper brush tension
- c. **Make a good electrical connection**
- d. Hold the brush in the holder

247. With respect to fluorescent lamps it is correct to state \_\_\_\_\_.

a. The filaments seldom burn out

b. The starter and tubes must be replaced at the same time.

c. They are easier to install than the incandescent light bulbs.

d. Their efficiency is less than the efficiency of incandescent light bulbs.

247. With respect to fluorescent lamps it is correct to state \_\_\_\_\_.

a. **The filaments seldom burn out**

b. The starter and tubes must be replaced at the same time.

c. They are easier to install than the incandescent light bulbs.

d. Their efficiency is less than the efficiency of incandescent light bulbs.

248. A \_\_\_\_\_ stores energy in much the same manner as a spring stores mechanical energy.

a. Resistor

b. Coil

c. Condenser

d. None of these

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a. Resistor

b. Coil

c. **Condenser**

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249. An overcurrent trip unit of a circuit shall be connected in series with each \_\_\_\_\_.

- a. Transformer
- b. Grounded conductor
- c. Overcurrent device
- d. Ungrounded Conductor

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- a. Transformer
- b. Grounded conductor
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- d. **Ungrounded Conductor**

250. \_\_\_\_\_ lighting is a string of outdoor lights suspended between two points.

a. Pole

b. Festoon

c. Equipment

d. Outline

250. \_\_\_\_\_ lighting is a string of outdoor lights suspended between two points.

a. Pole

b. Festoon

c. Equipment

d. Outline

251. Something that would affect the ampacity of a conductor would be \_\_\_\_\_.

I. Voltage

II. Amperage

III. Length

IV. Temperature

a. I only

b. II only

c. III only

d. IV only

251. Something that would affect the ampacity of a conductor would be \_\_\_\_\_.

I. Voltage

II. Amperage

III. Length

IV. Temperature

a. I only

b. II only

c. III only

d. **IV only**

252. Alternating currents may be increased or decreased by means of a \_\_\_\_\_.

a. Motor

b. Transformer

c. Dynamo

d. Megger

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a. Motor

b. Transformer

c. Dynamo

d. Megger

253. Fixtures supported by the framing members of suspended ceiling systems shall be securely fastened to the ceiling framing member by mechanical means such as \_\_\_\_\_.

I. Bolts or screws

II. Rivets

III. Clips identified for this use.

a. I only

b. II only

c. III only

d. I, II & III

253. Fixtures supported by the framing members of suspended ceiling systems shall be securely fastened to the ceiling framing member by mechanical means such as \_\_\_\_\_.

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II. Rivets

III. Clips identified for this use.

a. I only

b. II only

c. III only

d. I, II & III

254. Which has the highest electrical resistance?

a. Brass

b. Iron

c. Water

d. Paper

254. Which has the highest electrical resistance?

a. Brass

b. Iron

c. Water

d. Paper

255. Conductor sizes are expressed

\_\_\_\_\_.

- a. Only in circular mils
- b. In AWG or in circular mils
- c. In diameter or area
- d. In AWG or millimeters

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\_\_\_\_\_.

- a. Only in circular mils
- b. In AWG or in circular mils**
- c. In diameter or area
- d. In AWG or millimeters

256. Of the following, which is not a type of file?

a. Half-round

b. Bastard

c. Tubular

d. Mill

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a. Half-round

b. Bastard

c. Tubular

d. Mill

257. Oil is used in many large transformers to \_\_\_\_\_.

- a. Prevent breakdown due to friction
- b. Lubricate the core
- c. Cool and insulate the transformer
- d. Lubricate the coils

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- a. Prevent breakdown due to friction
- b. Lubricate the core
- c. **Cool and insulate the transformer**
- d. Lubricate the coils

258. Fractional horsepower universal motors have brushes usually made of \_\_\_\_\_.

- a. Copper strands
- b. Mica
- c. Carbon
- d. Thin wire rings

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- a. Copper strands
- b. Mica
- c. **Carbon**
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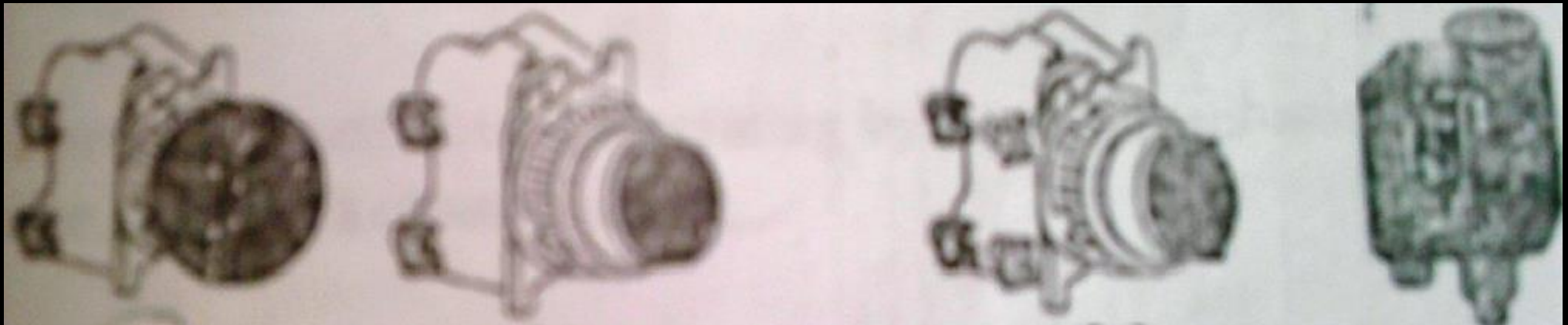
259. When administering first aid to a worker suffering from fright as a result of falling from a ladder, the most important thing to do is \_\_\_\_\_.

- a. Position the person to a sitting position.
- b. Cover the person and keep the person warm.
- c. Apply artificial respiratory immediately.
- d. Check the rungs of the ladder.

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- a. Position the person to a sitting position.
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260. Which of the following would be used as a stop button?



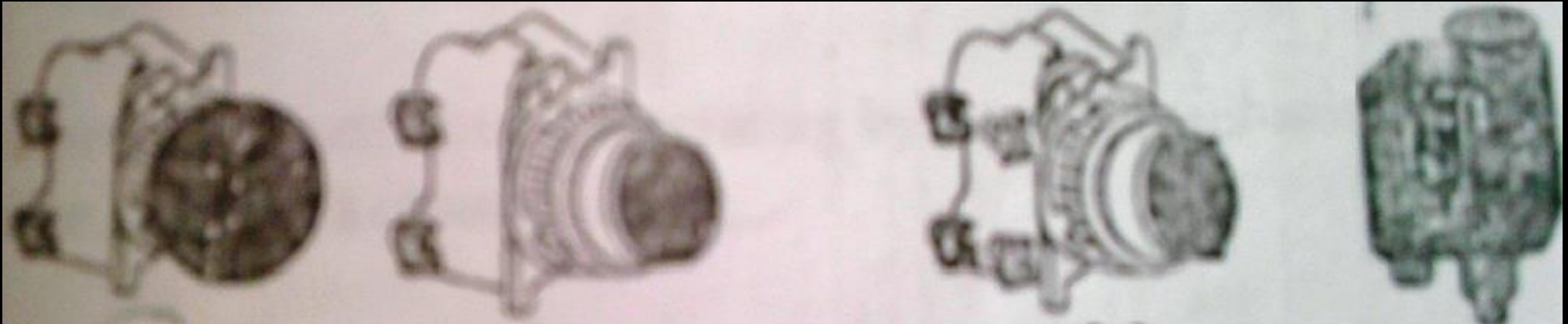
a.

b.

c.

d.

260. Which of the following would be used as a stop button?



a.

b.

c.

d.

261. If a co-worker is burned by acid from a storage battery, the proper first aid treatment is to wash with \_\_\_\_\_.

- a. Iodine and leave it open to the air
- b. Vinegar and apply a wet dressing
- c. Water and apply Vaseline
- d. Lye and apply a dry bandage

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- a. Iodine and leave it open to the air
- b. Vinegar and apply a wet dressing
- c. **Water and apply Vaseline**
- d. Lye and apply a dry bandage

262. A type of motor that will not operate on DC is the \_\_\_\_\_.

- a. Series
- b. Short shunt
- c. Long shunt compound
- d. Squirrel cage

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- a. Series
- b. Short shunt
- c. Long shunt compound
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263. Receptacles installed on \_\_\_\_\_ ampere branch circuits shall be of the grounding type.

a. 15 and 20

b. 25

c. 30

d. 40

263. Receptacles installed on \_\_\_\_\_ ampere branch circuits shall be of the grounding type.

a. 15 and 20

b. 25

c. 30

d. 40

264. Where conductors carrying alternating current are installed in metal enclosures or metal raceways, they shall be so arranged as to avoid heating the surrounding metal by induction, to accomplish this \_\_\_\_\_ shall be grouped together.

I. All phase conductors

II. Where used the neutral

III. All equipment grounding conductors

a. I only      b. I & II only      c. I & III only      d. I, II & III

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265. A (an) \_\_\_\_\_ changes AC to DC.

a. Battery

b. Capacitor

c. Alternator

d. Rectifier

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a. Battery

b. Capacitor

c. Alternator

d. **Rectifier**

266. A steel measuring tape is undesirable for use around electrical equipment. The least important reason is the \_\_\_\_\_.

- a. Danger of entanglement in rotating machines
- b. Shock hazard
- c. Short circuit hazard
- d. Magnetic effect

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- d. **Magnetic effect**

267. \_\_\_\_\_ is the ability of a material to permit the flow of electrons.

a. Voltage

b. Current

c. Resistance

d. Conductance

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a. Voltage

b. Current

c. Resistance

d. **Conductance**

268. Automatically is self-acting, operating by its own mechanism when actuated by some impersonal influence, such as change in \_\_\_\_\_.

I. Temperature

II. Pressure

III. Current strength

a. I only      b. I & II only      c. II only      d. I, II & III

268. Automatically is self-acting, operating by its own mechanism when actuated by some impersonal influence, such as change in \_\_\_\_\_.

I. Temperature

II. Pressure

III. Current strength

- a. I only      b. I & II only      c. II only      d. I, II & III

269. A fitting is \_\_\_\_\_.

a. Part of a wiring system that is intended primarily to perform an electrical function.

b. Pulling cable into a confined area.

c. To be suitable or proper for.

d. Part of a wiring system that is intended primarily to perform mechanical function.

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a. Part of a wiring system that is intended primarily to perform an electrical function.

b. Pulling cable into a confined area.

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d. Part of a wiring system that is intended primarily to perform mechanical function.

270. The neutral conductor \_\_\_\_\_.

a. Is always the “white” grounded conductor.

b. Has 70% applied for household clothes dryer for a branch circuit.

c. Never apply ampacity corrections.

d. Carries the unbalanced current.

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a. Is always the “white” grounded conductor.

b. Has 70% applied for household clothes dryer for a branch circuit.

c. Never apply ampacity corrections.

d. **Carries the unbalanced current.**

271. An appliance that is not easily moved from one place to another in normal use is a \_\_\_\_\_ appliance.

- a. Fastened in place
- b. Dwelling-unit
- c. Fixed
- d. Stationary

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- a. Fastened in place
- b. Dwelling-unit
- c. Fixed
- d. **Stationary**

272. All wiring must be installed so that when completed\_\_\_\_\_.

- a. It meets the current-carrying requirements of the load.
- b. It is free of shorts and unintentional grounds.
- c. It is acceptable to Code compliance authorities.
- d. It will withstand a hy-pot test.

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c. It is acceptable to Code compliance authorities.

d. It will withstand a hy-pot test.

273. Rosin is preferable to acid as a flux for soldering wire because rosin is

\_\_\_\_\_.

- a. A powder dry
- b. A better conductor
- c. A nonconductor
- d. Noncorrosive

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\_\_\_\_\_.

- a. A powder dry
- b. A better conductor
- c. A nonconductor
- d. **Noncorrosive**

274. Utilization equipment is equipment which utilizes \_\_\_\_\_ energy for mechanical, chemical, heating, lighting or similar purposes.

I. Chemical

II. Electric

III. Heat

a. I only

b. II only

c. III only

d. I, II & III

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I. Chemical

II. Electric

III. Heat

a. I only

b. **II only**

c. III only

d. I, II & III

275. The main purpose of using a cutting fluid when threading conduit is to \_\_\_\_\_.

- a. Prevent the formation of rust
- b. Wash away the metal chips
- c. Improve the finish of the thread
- d. Prevent the formation of electrolytic pockets.

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276. Of the following, the best indication of the condition of the charge of the lead acid battery is the \_\_\_\_.

- a. Temperature of the electrolyte
- b. Level of the electrolyte
- c. Open circuit cell voltage
- d. Specific gravity

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277. In general, the most important point to watch in the operation of transformers is the

\_\_\_\_\_.

- a. Core loss
- b. Exciting current
- c. Temperature
- d. Primary voltage

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278. When mounting electrical equipment, wooden plugs driven into holes in \_\_\_\_\_ shall not be used.

I. Masonry

II. Concrete

III. Plaster

a. I only

b. II only

c. III only

d. I, II & III

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279. Mica is commonly used in electrical construction for \_\_\_\_\_.

- a. Commutator bar separators
- b. Heater cord insulator
- c. Strain insulators
- d. Switchboard panels

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- a. **Commutator bar separators**
- b. Heater cord insulator
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- d. Switchboard panels

280. If a fuse becomes hot under normal load, a probable cause is \_\_\_\_\_.

- a. Excessive tension in the fuse clips
- b. Rating of the fuse is too low
- c. Insufficient pressure at the fuse clips
- d. Rating of the fuse is too high

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281. For the maximum safety the magnetic contactors used for reversing the direction of rotation of a motor should be \_\_\_\_\_.

- a. Operated from independent sources
- b. Electrically interlocked
- c. Mechanically interlocked
- d. Electrically and mechanically interlocked

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282. Large squirrel cage induction motors are usually started at a voltage considerably lower than the line voltage to \_\_\_\_\_.

- a. Allow the rotor current to build up gradually
- b. Permit starting under full load
- c. Avoid excessive starting current
- d. Obtain a low starting speed

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- b. Permit starting under full load
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- d. Obtain a low starting speed

283. Which of the following is a motor starter?



a.

b.

c.

d.

283. Which of the following is a motor starter?



a.

b.

c.

d.

284. If the voltage on a light bulb is increased 10%, the bulb will \_\_\_\_\_.

- a. Fail by insulation breakdown
- b. Have a longer life
- c. Burn more brightly
- d. Consume less power

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- a. Fail by insulation breakdown
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285. All edges that are invisible should be represented in a drawing by lines that are \_\_\_\_\_.

- a. Dotted
- b. Curved
- c. Solid
- d. Broken

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- a. Dotted
- b. Curved
- c. Solid
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286. A light bulb usually contains

\_\_\_\_\_.

- a. Air
- b. Neon
- c. H<sub>2</sub>O
- d. Either a vacuum or gas

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\_\_\_\_\_.

- a. Air
- b. Neon
- c. H<sub>2</sub>O
- d. **Either a vacuum or gas**

287. The service disconnecting means shall be installed \_\_\_\_\_.

I. Outside a building

II. Inside a building

III. At the meter

a. I only    b. II only    c. III only    d. either I or II

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I. Outside a building

II. Inside a building

III. At the meter

a. I only    b. II only    c. III only    d. **either I or II**

288. Critical burns are potentially

\_\_\_\_\_.

a. Life-threatening

b. Disfiguring

c. Disabling

d. All of these

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\_\_\_\_\_.

a. Life-threatening

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d. **All of these**

289. A set of lights switched from three different places can be controlled by \_\_\_\_\_ switches.

- a. Two 3-way and one 4-way
- b. Two 3-way and one 2-way
- c. 2 single-pole
- d. Four pole

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d. Four pole

290. A fellow electrician is not breathing after receiving an electrical shock, but is no longer in contact with the electricity; the most important thing for you to do is \_\_\_\_\_.

- a. Start artificial respiratory immediately
- b. Cover the person and keep warm
- c. Move the person to a window
- d. Remove the persons shoes

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291. A wrench you would not use to connect rigid metal conduit is a \_\_\_\_\_ wrench.

a. Box end

b. Chain

c. Strap

d. Stillson

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a. **Box end**

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292. The instrument that would prove least useful in testing for opens, grounds, and shorts after the wiring has been completed is the \_\_\_\_\_.

a. Voltmeter

b. Ammeter

c. Ohmmeter

d. Megger

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b. **Ammeter**

c. Ohmmeter

d. Megger

293. A stranded wire is given the same size designation as a solid wire if it has the same                     .

- a. Weight per foot
- b. Overall diameter
- c. Strength
- d. Cross-sectional area

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- c. Strength
- d. **Cross-sectional area**

294. A lighting fixture is to be controlled independently from two different locations. The type of switch required in each of the two locations is a \_\_\_\_\_.

- a. Double-pole, double-throw
- b. Double-throw, single-pole
- c. Single-throw, double-pole
- d. Single-throw, single-pole

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- d. Single-throw, single-pole

295. The rating “1000 ohms, 10 watts” would generally apply to a \_\_\_\_\_.

a. Transformer

b. Relay

c. Resistor

d. Heater

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a. Transformer

b. Relay

c. **Resistor**

d. Heater

296. The open circuit test on a transformer is a test for measuring its \_\_\_\_\_.

a. Insulation resistor

b. Copper losses

c. Iron losses

d. Equivalent resistance of the transformer

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c. **Iron losses**

d. Equivalent resistance of the transformer

297. The proper way to open a knife switch carrying a heavy load is to \_\_\_\_\_.

a. Open it with care, to avoid damage to the auxiliary blade by the arc.

b. Open it slowly so that there will not be a flashover at the contacts.

c. Tie a 5 foot rope on the switch handle and stand clear of the switch.

d. Open it with a jerk so as to quickly break any arc.

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298. When the thermal overload relays are used for the protection of polyphase induction motors, their primary purpose is to protect the motors in case of \_\_\_\_\_.

- a. Short circuit between phase
- b. Low line voltages
- c. Reversal of phases in the supply
- d. Sustained overload

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299. The National Electrical Code is sponsored by the \_\_\_\_\_.

a. Underwriters Lab

b. National Safety Council

c. National Electrical Manufacturers Association

d. National Fire Protection Association

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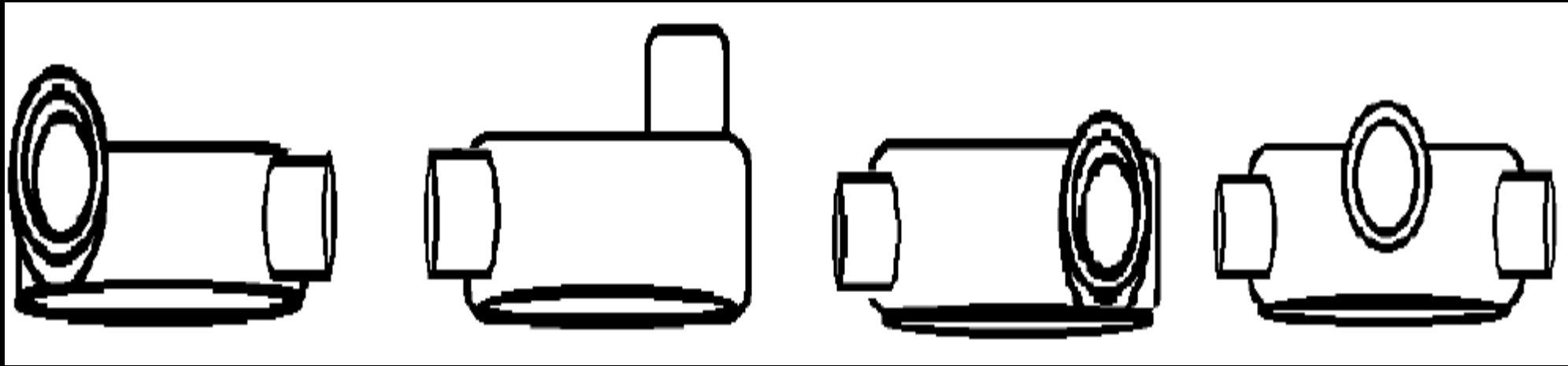
a. Underwriters Lab

b. National Safety Council

c. **National Electrical Manufacturers Association**

d. National Fire Protection Association

300. Which of the following is an LB conduit body?



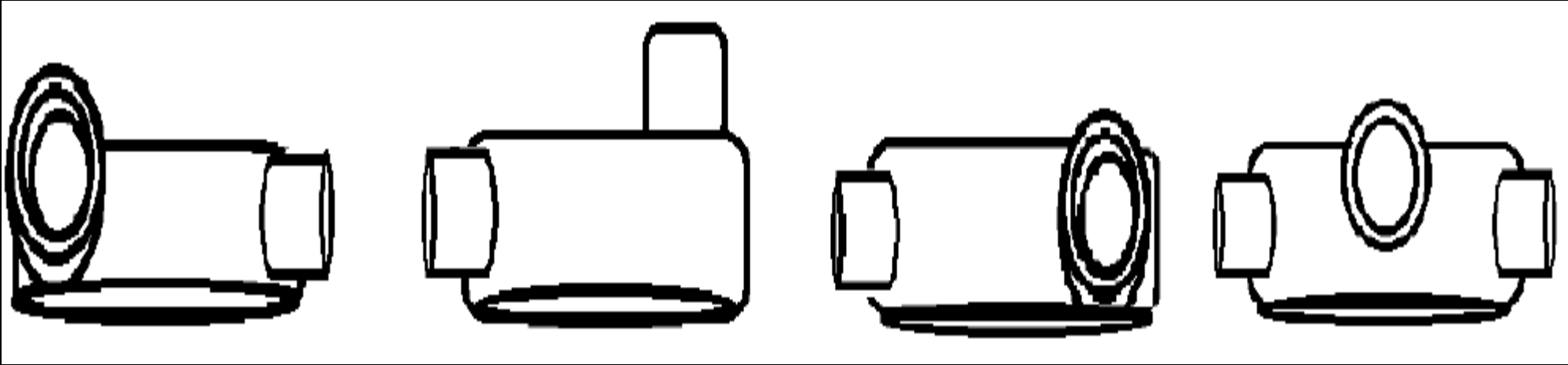
a.

b.

c.

d.

300. Which of the following is an LB conduit body?



a.

b.

c.

d.