Instructions:

1. Print these pages.
2. Circle the correct answers on the answer sheet.
3. Page down to the last page for the verification forms and mailing instructions.

Grounding and Bonding 60 questions 2hour CEU correspondence course based on the 2005 NEC.

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1. A (n) _____ is an unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the normally non–current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment, or earth.

grounded conductor
ground fault
equipment ground
bonding jumper

250.2

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2. For grounded systems, noncurrent-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, shall be connected to earth so as to limit the voltage-to-ground on these materials.

A. True
B. False

250.4(A)(2)

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3. For ungrounded systems, non–current-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, shall be connected together and to the supply system grounded equipment in a manner that creates a permanent, low-impedance path for ground-fault current that is capable of carrying _____.

A. the maximum branch circuit current
B. at least twice the maximum ground fault current
C. the maximum fault current likely to be imposed on it
D. the equivalent to the main service rating

250.4(B)(2)

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4. Grounding electrode conductor fittings shall be protected from physical damage by being enclosed in _____ where there may be a possibility of physical damage.

A. metal
B. wood
C. the equivalent of a or b
D. none of these

250.1

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5. Where the service-entrance phase conductors are installed in parallel, the size of the grounded conductor in each raceway shall be based on the size of the ungrounded service-entrance conductor in the raceway, but not smaller than _____.

A. 1/0 AWG

B. 2/0 AWG
C. 3/0 AWG
D. 4/0 AWG

250.24(C)(2) and 310.4

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6. An unspliced _____ that is sized based on the derived phase conductors shall be used to connect the equipment grounding conductors of a separately derived system to the grounded conductor.
   A. system bonding jumper
   B. equipment grounding conductor
   C. grounded conductor
   D. grounding electrode conductor

250.30(A)(1)

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7. Each tap conductor to a common grounding electrode conductor for multiple separately derived systems shall be sized in accordance with _____ based on the derived phase conductors of the separately derived system it serves.
   A. 250.122
   B. 250.66
   C. 310.15
   D. 250.118

250.30(A)(4)(b)

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8. A grounding electrode at a separate building or structure is required where one multiwire branch circuit serves the building or structure.
   A. True
   B. False

250.32(A) Ex

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9. High-impedance grounded neutral systems shall be permitted for three-phase ac systems of 480 volts to 1000 volts where the conditions of maintenance and supervision ensure that only qualified persons service the installation and _____.
   A. continuity of power is required
   B. ground detectors are installed on the system
   C. line-to-neutral loads are not served
   D. all of these

250.36

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10. An electrode encased by at least 2 in. of concrete, located within and near the bottom of a concrete foundation or footing that is in direct contact with the earth, is allowed as a grounding electrode when it consists of _____.
   A. at least 20 ft of ½ in. or larger steel reinforcing bars or rods
   B. at least 20 ft of bare copper conductor of 4 AWG or larger
   C. a or b
   D. none of these

250.52(A)(3)

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11. ______ shall not be used as grounding electrodes.
    A. Metal underground gas piping systems
    B. Aluminum electrodes
    C. Metal well casings
    D. a and b

250.52(B)(1) and (2)

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12. Plate electrodes shall be installed not less than ______ below the surface of the earth.
    A. 8 ft
    B. 24 in.
    C. 30 in.
    D. 18 in.

250.53(H)

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13. When multiple ground rods are used for a grounding electrode, they shall be separated not less than ______ apart.
    A. 6 ft
    B. 8 ft
    C. 20 ft
    D. 12 ft

250.56

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14. Grounding electrode conductors ______ and larger that are not subject to physical damage can be run exposed along the surface, if securely fastened to the construction.
    A. 6 AWG
    B. 8 AWG
    C. 10 AWG
    D. 4 AWG

250.64(B)

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15. The connection of the grounding electrode conductor to a buried grounding electrode (driven ground rod) shall be made with a listed terminal device that is accessible.
    A. True
    B. False

250.68(A) Ex 1

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16. Metal enclosures and raceways for other than service conductors shall be grounded except as permitted by 250.112(I).
    A. True
    B False

250.86

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17. Bonding jumpers shall be used around _____ knockouts that are punched or otherwise formed so as to impair the electrical connection to ground. Standard locknuts or bushings shall not be the sole means for this bonding.
    A. concentric
    B. eccentric
    C. field-punched
    D. a or b

250.92(B)

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18. Equipment bonding jumpers shall be of copper or other corrosion-resistant material. A bonding jumper shall be a _____ or similar suitable conductor.
    A. conductor
    B. bus
    C. screw
    D. any of these

250.102(A)

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19. The general rule for equipment bonding jumpers installed on the outside of a raceway or enclosure is that they are not permitted to be longer than 6 ft, but an equipment bonding jumper can be longer than 6 ft at outside pole locations for the purpose of bonding or grounding isolated sections of metal raceways or elbows installed in exposed risers of metal conduit or other metal raceways.
    A. True
    B. False

250.102(E) Ex

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20. Metal raceways, enclosures, frames, and other noncurrent-carrying metal parts of electric equipment installed on a building equipped with a lightning protection system may require spacing from the lightning protection conductors, typically 6 ft through air or ___ through dense materials, such as concrete, brick, wood, etc.
    A. 2 ft
    B. 3 ft
    C. 4 ft
    D. 6 ft

250.106 FPNs

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21. Liquidtight flexible metal conduit (LFMC) up to trade size ½ can be used as the equipment grounding conductor if the length in any ground return path does not exceed 6 ft and the circuit conductors contained in the conduit are protected by overcurrent devices rated at _____ or less when the conduit is not installed for flexibility after installation.
    A. 15A
    B. 20A
    C. 30A
    D. 60A

250.118(6)(b)

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22. When ungrounded conductors are increased in size, the equipment grounding conductor is not required to be increased because it is not a current-carrying conductor.
    A. True
    B. False

250.122(B)

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23. The grounded circuit conductor is permitted to ground noncurrent-carrying metal parts of equipment, raceways, and other enclosures at the supply side or within the enclosure of the ac service disconnecting means.
    A. True
    B. False

250.142(A)

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24. A grounded circuit conductor shall not be used for grounding noncurrent-carrying metal parts of equipment on the load side of _____.
    A. the service disconnecting means
    B. the separately derived system disconnecting means
    C. overcurrent protection devices for separately derived systems not having a main disconnecting means
    D. all of these

250.142(B)

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25. The grounding conductor for secondary circuits of instrument transformers and for instrument cases shall not be smaller than _____ AWG copper.
    A. 18
    B. 16
    C. 14
    D. 12

250.178

Current Flow

26. When electrical current is given multiple conductive paths on which to flow, current will only take the path of least resistance.
    A. True
    B. False

Reference: In parallel paths, current divides and flows through each individual parallel path in accordance with Kirchoff's current law. So, when given multiple conductive paths on which to flow, current will take all of the available paths. Yes, it’s true that more current will flow through the lower resistive path, as compared to a higher resistive path in a parallel circuit, but that’s not the question.

Current Flow

27. It is important to *ground* metal parts to a suitable *grounding electrode*, so that in the event of a *ground fault*, dangerous *ground-fault current* will be shunted into the earth, away from persons; thereby protecting them against electric shock.
    A. True
    B. False

Reference: A person touching an energized metal pole, which is only *grounded*, will experience between 90 and 120 mA of current flow through the body, which is more than sufficient to cause electrocution*. *The destruction of life by means of electric current, IEEE/ANSI, Std 100. Remember: In parallel circuits, current divides and flows through each individual parallel path. Current Through Person I = E/R I = 90V*/1,000 ohms** I = 0.090A or 90 mA *IEEE 142, *Grounding Industrial and Commercial Installations.* ** IEEE 80, *IEEE Guide for Safety in AC Substations.* Current Through Earth I = E/R I = 120V/25 ohms I = 4.8A, not enough to trip the circuit breaker Voltage on metal parts can never be reduced or removed by *grounding* the metal parts to the earth. The only way to make an installation safe from a *ground fault* is to *bond* the electrical equipment to an *effective ground-fault current path* so that the fault current will be more than sufficient to quickly open the circuit protection device and clear the *ground fault* [250.2 and 250.4(A)(3)].

Current Flow

28. The *grounding conductor* for a supplementary *grounding electrode* (for example, a ground rod for a machine tool) must have the capacity to conduct safely any fault current likely to be imposed on it. This is accomplished by sizing the conductor in accordance with Table 250.66 or Table 250.122, depending on the conditions.
    A. True
    B. False

Reference: A supplementary electrode is not required to be sized in accordance with the NEC [250.54]. During a *ground fault*, the amount of current flowing through the *grounding conductor* into the earth, to the power supply, is dependent on the circuit voltage and the earth's resistance. Assuming a circuit voltage of 120 and a ground rod resistance of 25 ohms, the current flowing through the *grounding conductor* into the earth, to the power supply, will be only 4.8A, not enough to trip the circuit breaker. I = E/R I = 120V/25 ohms I = 4.8A Because of the earth's high resistance, it cannot be used as an *effective ground-fault current path* [250.4(A)(5)]; therefore, the *grounding conductor* for a supplementary electrode is not sized in accordance with the NEC [250.54].

Clear a Fault

29. Electrical equipment must be *grounded* so that sufficient fault current will flow through the circuit protection device to quickly open and clear the *ground fault*. For example, a 20A circuit breaker will trip and de-energize a 120V *ground fault* to a metal pole that is *grounded* to a 25 ohm ground rod.
    A. True
    B. False

Reference: A *ground fault* that relies on the earth as the fault return path to the source is not capable of carrying sufficient current to clear the *ground fault* [250.4(A)(5)]. Result… dangerous voltage between the metal parts and the earth exists. Assuming a circuit voltage of 120 and a ground rod resistance of 25 ohms, the current flowing through the *grounding conductor* into the earth, to the power supply, will be only 4.8A, not enough to trip the circuit breaker. I = E/R I = 120V/25 ohms I = 4.8A Current

Through Person I = E/R I = 90V*/1,000 ohms** I = 0.090A or 90 mA *IEEE 142, *Grounding Industrial and Commercial Installations.* ** IEEE 80, *IEEE Guide for Safety in AC Substations.* If the metal pole were *bonded* to an *effective ground-fault current path*, the ground-fault current would be sufficient to quickly open the 20A circuit protection device [250.2 and 250.4(A)(3)]. Result… dangerous voltage on metal parts will be removed. I = E/Z_T I = 120V/0.405 ohms* I = 296A *Effective ground-fault current path:
Service: 100 ft of 3/0 AWG Copper Service Z = 0.0766 ohms per 1,000 ft x 0.20 (Chapter 9 Table 8) Service Z = 0.015 ohms
Branch Circuit: 100 ft of 12 AWG Copper Branch Z = 1.93 ohms per 1,000 ft x 0.20 (Chapter 9 Table 8) Branch Z = 0.39 ohms

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Electrical Equipment

30. Electrical equipment must be *grounded* to ensure that dangerous voltage on metal parts resulting from a *ground fault* can be reduced to a safe value.
    A. True
    B. False

Reference: *Grounding* metal parts to the earth does not reduce voltage on metal parts resulting from a *ground fault* because the earth cannot serve as an *effective ground-fault current path [250.5(A)(5)]*. Assuming a circuit voltage of 120 and a ground rod resistance of 25 ohms, the current flowing through the *grounding conductor* into the earth, to the power supply, will be only 4.8A, not enough to trip the circuit breaker. I = E/R I = 120V/25 ohms I = 4.8A Current Through Person I = E/R I = 90V*/1,000 ohms** I = 0.090A or 90 mA *IEEE 142, *Grounding Industrial and Commercial Installations.* ** IEEE 80, *IEEE Guide for Safety in AC Substations.* The only way to make this installation safe from a *ground fault* is to *bond* the electrical equipment to an *effective ground-fault current path* so that the fault current will be more than sufficient to quickly open the circuit protection device; thereby clearing the *ground fault* and removing dangerous touch voltage [250.2 and 250.4(A)(3)].

Electrical Equipment

31. Metal traffic signal poles and handhole covers must be *grounded* to a suitable *grounding electrode* to ensure that dangerous voltage on metal parts resulting from a *ground fault* can be reduced to a safe value.
    A. True
    B. False

Reference: *Grounding* metal parts to the earth does not reduce voltage on metal parts resulting from a *ground fault* because the earth cannot serve as an *effective ground-fault current path [250.5(A)(5)]*. The only way to make this installation safe from a *ground fault* is to *bond* the metal traffic signal poles and handhole covers to an *effective ground-fault current path* so that the fault current will be more than sufficient to quickly open the circuit protection device; thereby clearing the *ground fault* and removing dangerous touch voltage [250.2 and 250.4(A)(3)].

Electrical Equipment

32. *Grounding* of metal manhole covers to a suitable *grounding electrode* ensures that dangerous voltage on metal parts resulting from a *ground fault* can be reduced to a safe value.
    A. True
    B. False

Reference: *Grounding* metal parts to the earth does not reduce voltage on metal parts resulting from a *ground fault* because the earth cannot serve as an *effective ground-fault current path* [250.5(A)(5)]. The only way to make this installation safe from a *ground fault* is to isolate the manhole cover from energized parts or to *bond* the metal parts to an *effective ground-fault current path* so that the fault current will be more than sufficient to quickly open the circuit protection device; thereby clearing the *ground fault* and removing dangerous touch voltage [250.2 and 250.4(A)(3)].

Service Equipment

33. *Service equipment* must be *grounded* to a *grounding electrode* to ensure that dangerous voltage on metal parts, caused by a *ground fault*, can be removed or be reduced to a safe value.
    A. True
    B. False

Reference: *Grounding* metal parts to the earth does not removing or reduce voltage on metal parts resulting from a *ground fault* because the earth cannot serve as an *effective ground-fault current path* [250.5(A)(5)]. The only way to make this installation safe from a *ground fault* is to *bond service equipment* to an *effective ground-fault current path* so that the fault current will be more than sufficient to quickly open the circuit protection device; thereby clearing the *ground fault* and removing dangerous touch voltage [250.2, 250.4(A)(3), and 250.24(C)].

Service Equipment

34. Service equipment is *grounded* to a *grounding electrode* to ensure that metal parts, subject to a ground fault, remain at the same potential as the earth.
    A. True
    B. False

Reference: *Grounding* metal parts to the earth serves no part in reducing the difference of potential between metal parts and the earth from a *ground fault*. The only way to make this installation safe is to *bond service equipment* to an *effective ground-fault current path* so that the *ground fault* current will be more than sufficient to quickly open the circuit protection device; thereby clearing the *ground fault* and removing dangerous touch voltage [250.2, 250.4(A)(3), and 250.24(C)].

Service Equipment

35. *Grounding* of service equipment to a *grounding electrode* is necessary to stabilize the system voltage.
    A. True
    B. False

Reference: The earth serves no part in stabilizing the system voltage. System voltage is stabilized by the grounding of the utility secondary winding [250.4(A)(1)].

Service Equipment

36. The grounding of service equipment ensures that all metal parts of equipment that personnel can come into contact with, are always at or near zero (0) volts with respect to ground (earth).
    A. True
    B. False

Reference: The earth serves no purpose in establishing or maintaining a zero difference of potential between metal parts of electrical equipment and the earth during a ground fault.

Separately Derived System

37. The metal parts of separately derived systems are grounded to ensure that the voltage, as measured between the metal parts of the electrical installation and the earth remains at the same potential during a ground fault.
    A. True
    B. False

Reference: The earth serves no purpose in establishing or maintaining a zero difference of potential between metal parts of electrical equipment and the earth.

Separately Derived System

38. *Separately derived systems* must be *grounded* to a *grounding electrode* to ensure that dangerous voltage on metal parts, caused by a *ground fault*, can be removed or be reduced to a safe value.
    A. True
    B. False

Reference: *Grounding a separately derived system* to the earth serves no purpose in removing or reducing voltage on metal parts caused by a *ground fault*. The only way to make this installation safe from a *ground fault* is to *bond* the metal parts of the *separately derived system* by using a *system bonding jumper* so that the *ground fault* current will be sufficient to quickly open the circuit protection device; thereby clearing the *ground fault* and removing dangerous touch voltage [250.2, 250.4(A)(3), and 250.4(A)(3)].

Separately Derived System

39. An ungrounded system gets its name from the fact that both the *separately derived system* and the metal case of the *separately derived system* are isolated from *ground* (earth).
    A. True
    B. False

Reference: The NEC requires the metal case of ungrounded *separately derived systems* to be *grounded* to a *grounding electrode* [250.30(B)(1)].

Transformers

40. Failure to *ground* the metal case of a transformer to a *grounding electrode* can result in a dangerous difference of potential between the metal parts of different *separately derived systems*.
    A. True
    B. False

Reference: *Grounding* the metal case of a transformer to a *grounding electrode* is not necessary to reduce the difference of potential between the metal parts of different *separately derived system*. This is because there is no difference between the metal parts of the separately derived systems, because all metal parts of electrical installations are required to be bonded to an *effective ground-fault current path* [250.4(A)(3)]. The NEC requires the metal case of all *separately derived systems* to be *grounded* to a suitable *grounding electrode* [250.30(A)(3) and (7)], even though there is no technical reason for this.

Generators

41. The metal case of generators are *grounded* to a suitable *grounding electrode* to ensure that dangerous voltage on metal parts, caused by a *ground fault*, can be reduced to a safe value.

A. True
B. False

Reference: *Grounding* metal parts to the earth does not remove or reduce voltage on metal parts resulting from a *ground fault* because the earth cannot serve as an *effective ground-fault current path* [250.5(A)(5)]. The only way to make this installation safe from a *ground fault* is to *bond* the metal case of the generator to an *effective ground-fault current path* so that the fault current will be more than sufficient to quickly open the circuit protection device; thereby clearing the *ground fault* and removing dangerous touch voltage [250.2, 250.4(A)(3), and 250.30(A)(1)].

Remote Building
42. Building disconnecting means at a remote building supplied by a feeder must be *grounded* to a *grounding electrode* to ensure that dangerous voltage on metal parts, caused by a *ground fault*, can be removed or be reduced to a safe value.
A. True
B. False

Reference: *Grounding* metal parts to the earth does not remove or reduce voltage on metal parts resulting from a *ground fault* because the earth cannot serve as an *effective ground-fault current path* [250.5(A)(5)]. The only way to make this installation safe from a *ground fault* is to *bond* the building disconnecting means to an *effective ground-fault current path* so that the fault current will be more than sufficient to quickly open the circuit protection device; thereby clearing the *ground fault* and removing dangerous touch voltage [250.2, 250.4(A)(3), and 250.32(B)].

Remote Building
43. The metal disconnecting means at a remote building, supplied by a feeder with an *equipment grounding conductor*, is not required to be *grounded* to a *grounding electrode.*
A. True
B. False

Reference: *Grounding* of the remote building disconnecting means to the earth is necessary to reduce voltage on the metal parts from lightning; thereby reducing the likelihood of a fire caused by elevated voltage seeking a path to the earth by arcing across combustible materials. The *equipment grounding conductor* provides the low-impedance path to the source necessary to clear a *ground fault*; its function is not to serve as a path for lightning to the earth.

Outdoor Metal Light Pole
44. Outdoor metal light poles must be *grounded* to a suitable *grounding electrode* to ensure that dangerous voltage on metal parts, caused by a *ground fault*, can be reduced to a safe value.
A. True
B. False

Reference: *Grounding* metal parts to the earth does not remove or reduce voltage on metal parts resulting from a *ground fault* because the earth cannot serve as an *effective ground-fault current path* [250.5(A)(5)]. The only way to make this installation safe from a *ground fault* is to bond the metal light pole to an effective ground-fault current path so that the fault current will be more than sufficient to quickly open the circuit protection device; thereby clearing the ground fault and removing dangerous touch voltage [250.2 and 250.4(A)(3)].

Outdoor Metal Light Pole

45. Grounding metal light poles to a grounding electrode helps in reducing lightning damage to the luminaires on the metal light pole from a direct lightning strike.
    A. True
    B. False

Reference: If lightning strikes the pole, the luminaire on the pole is toast. Nothing can be done about this.

Outdoor Metal Light Pole

46. Grounding metal light poles to a grounding electrode helps in preventing damage to building wiring and equipment from lightning striking one of the metal light poles.
    A. True
    B. False

Reference: Grounding a metal light pole to the earth does nothing to prevent damage to interior wiring and equipment of a building from lightning. Interior wiring and equipment can be protected from lightning-induced voltage transients on the circuit conductors by the use of properly designed TVSS protection devices.

Outdoor Metal Light Pole

47. Grounding metal light poles to a grounding electrode is necessary to prevent lightning damage to the concrete pole base.
    A. True
    B. False

Reference: Ralph Lee, in a 1966 study, proved that lightning does not crack the concrete of a concrete encased grounding electrode.

Sensitive Electronic Equipment

48. Studies have shown that a low-resistive grounding system improves power quality for sensitive electronic equipment.
    A. True
    B. False

Reference: If lightning strikes the pole, the The earth serves no purpose in improving power quality.

Sensitive Electronic Equipment

49. Single-point grounding improves equipment performance by preventing ground-loop currents.
    A. True
    B. False

Reference: Grounding sensitive electrical equipment to the same electrode serves no purpose in preventing or reducing ground-loop currents. This is because ground-loop currents flow when improper neutral-to-ground connections are made on the load side of service equipment or separately derived systems in violation of 250.142. To remove ground-loop currents, simply ensure the installation is in compliance with the NEC.

Sensitive Electronic Equipment

50. Studies have shown that grounding sensitive electronic equipment to an isolated counter-poise ground improves equipment performance.
    A. True
    B. False

Reference: Grounding sensitive electronic equipment to the earth serves no purpose in improving equipment performance or power quality. As a matter of fact, grounding equipment to an isolated grounding electrode can cause equipment damage when lightning current flows produces a potential difference between the counter-poise ground and the structure ground.

Sensitive Electronic Equipment

51. If an electrical system is properly installed and operating normally, there should be no potential (voltage) difference between the neutral terminal and the ground terminal at a receptacle.
    A. True
    B. False

Reference: There will always be voltage between the neutral and ground terminals at a receptacle. For example: the NEC recommends that under a load conduction, a maximum voltage drop of 3% for the feeder, which works out to be 3.6V for a 120V circuit. Under this condition, the voltage (feeder neutral voltage drop) as measured between the receptacles' neutral and ground terminals would be 1.8V if no current flows through the branch circuit supplying the receptacle. Naturally if the branch circuit is loaded, the voltage between the neutral and ground terminal would be greater than 1.8V. A study by the Electrical Power Research Institute (EPRI) demonstrated that elevated neutral-to-ground voltage has no affect on equipment performance.

Stray Voltage or Neutral-to-Earth Voltage (NEV)

52. Grounding premises wiring to a low resistive grounding grid can help reduce stray voltage or neutral-to-earth voltage on metal parts.
    A. True
    B. False

Reference: Grounding metal parts to the earth serves no purpose in reducing stray or NEV voltage. However, bonding metal parts together reduces the difference of potential between the metal parts, but the stray or NEV voltage, as measured between the metal parts and the earth, will not be reduced. Stray voltage or neutral-to-earth voltage can come from the electric utility's distribution system, the building's electric system, or both of these sources.

Stray Voltage or NEV

53. Grounding metal parts of electrical equipment to an equipotential plane can help reduce stray or NEV voltage on the metal parts.
    A. True
    B. False

Reference: Bonding metal parts to an equipotential plane does reduce the difference of potential between the metal parts and the equipotential plane, but stray or NEV voltage, as measured between the metal parts and the earth, will not be reduced.

TVSS

54. A low resistive earth ground is necessary for the proper operation of transient voltage surge suppressors (TVSSs).
    A. True
    B. False

Reference: The earth serves no purpose in the operation of a TVSS device. TVSS protection devices protect electrical equipment by shunting high-frequency impulse currents away from the load and back to the source via the circuit conductors, not via the earth.

General

55. Because salt water is more conductive than fresh water, a person is more likely to be electrocuted while swimming at a saltwater marina, than a freshwater marina.
    A. True
    B. False

Reference: Because the voltage gradient in salt water is much lower than fresh water, the likelihood of death will be greater in a fresh water marina.

General

56. A 115V hair dryer plugged into a GFCI protected receptacle will always trip if it's immersed in water?
    A. True
    B. False

Reference: If the water is contained in a nonmetallic sink or bathtub, where there is no conductive path to the power supply, the GFCI protection device will not tip and the water will be energized with a dangerous voltage gradient!

General

57. Where a lightning protection system is installed, it must be grounded to an independent grounding electrode without any electrical connections to the building electrical system.
    A. True
    B. False

Reference: The lightning protection system is required to be bonded to the building or structure grounding electrode system by both NFPA 780, Lightning Protection Code and NFPA 70, the National Electrical Code [250.106].

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58. A ground-fault current path is an electrically conductive path from the point of a line-to-case fault extending to the ______

    A. ground
    B. earth
    C. electrical supply source
    D. none of the above

250.2

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59. Electrical systems are grounded to the ______ to stabilize the system voltage.
    A. ground
    B. earth
    C. electrical supply source
    D. none of the above

250.4(A)(1)

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60. For grounded systems, the metal parts of the electrical equipment in a building or structure must be connected to the _____ for the purpose of limiting the voltage to ground on these materials.
    A. ground
    B. earth
    C. electrical supply source
    D. none of the above

250.4(A)(1)

2005 Ground and Bonding -Quiz Answer Sheet

1	a	b	c	d	26	a	b	c	d	51	a	b	c	d
2	a	b	c	d	27	a	b	c	d	52	a	b	c	d
3	a	b	c	d	28	a	b	c	d	53	a	b	c	d
4	a	b	c	d	29	a	b	c	d					
5	a	b	c	d	30	a	b	c	d					
6	a	b	c	d	31	a	b	c	d					
7	a	b	c	d	32	a	b	c	d					
8	a	b	c	d	33	a	b	c	d					
9	a	b	c	d	34	a	b	c	d					
10	a	b	c	d	35	a	b	c	d					
11	a	b	c	d	36	a	b	c	d					
12	a	b	c	d	37	a	b	c	d					
13	a	b	c	d	38	a	b	c	d					
14	a	b	c	d	39	a	b	c	d					
15	a	b	c	d	40	a	b	c	d					
16	a	b	c	d	41	a	b	c	d					
17	a	b	c	d	42	a	b	c	d					
18	a	b	c	d	43	a	b	c	d					
19	a	b	c	d	44	a	b	c	d					
20	a	b	c	d	45	a	b	c	d					
21	a	b	c	d	46	a	b	c	d					
22	a	b	c	d	47	a	b	c	d					
23	a	b	c	d	48	a	b	c	d					
24	a	b	c	d	49	a	b	c	d					
25	a	b	c	d	50	a	b	c	d					

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1. Mail in just the answer sheet and keep the quiz for your records.
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3. Applicable fees by check payable to our business name: **GaryKlinka.com**
4. Mail to: **GaryKlinka.com** at 1316 Cardinal Circle, Neenah, WI 54956

Live Support at 920-381-6714 or tmklinka@hotmail.com

------------------------------Educational Course Attendance Verification Form ----------------------------

Attendee's name____Date______________________

Address____

Credential Number___________________________Phone#________________________________

Course Title and Name__ Grounding and Bonding____________ ___Course ID#____8251_________

List the name of each credential held by attendee____

____Credited_______2 hrs______

Email address____

Fax#____Course Fee____$25___________

To be completed by GaryKlinka.com

Attendee passed the course with a greater than 70% score on date___________________________

Instructor Signature ____