

California Commercial Electrical Inspector

Solution key

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1. A 3D view shows electrical equipment with exposed live parts operating at 480 volts. The equipment is installed against a concrete block wall. What is the minimum required depth of working space in front of this equipment?

- A. 2.5 feet
- B. 4 feet
- C. 3.5 feet
- D (correct). 3 feet**

Rationale: Section 110.26(A)(1) specifies the depth of working space in front of electrical equipment. For systems of 151V to 600V, Table 110.26(A)(1) requires a minimum depth of 3 ft. Condition 1 applies (exposed live parts on one side and no live or grounded parts on the other side, or exposed live parts on both sides effectively guarded by insulating materials). The concrete wall is considered grounded.

Code: 110.26(A)(1)

2. According to NEC 200.4(B), when more than one neutral conductor associated with different circuits is in an enclosure, how must the grounded circuit conductors be identified?

- A (correct). They must be identified or grouped to correspond with the ungrounded conductors using**
markers, ties, or similar means
- B. They must be terminated on separate neutral bars
 - C. They must be identified with green insulation
 - D. They must be larger than 6 AWG

Rationale: Section 200.4(B) states: 'Where more than one neutral conductor associated with different circuits is in an enclosure, grounded circuit conductors of each circuit shall be identified or grouped to correspond with the ungrounded circuit conductor(s) by wire markers, cable ties, or similar means in at least one location within the enclosure.'

Code: 200.4(B)

3. A visual diagram shows a conduit body installed in a horizontal run of 3-inch EMT. The conduit body is marked with its volume in cubic inches. According to the NEC, when is this conduit body permitted to contain splices, taps, or devices?

- A. Only if it is listed and identified for the use.
- B. Never; conduit bodies are only for pulling and bending conductors.
- C (correct). Only where it is marked with its volume and the volume is sufficient for the contained items.**
- D. Always, as conduit bodies are designed for this purpose.

Rationale: Section 300.15(B) states: 'Conduit bodies shall be permitted to contain splices, taps, or

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devices, but only where the conduit body is marked by the manufacturer with its volume in cubic inches and the volume is sufficient for the number of conductors, splices, and devices.'

Code: 300.15(B)

4. According to the NEC, conductors of different systems, such as 120V power and 24V control circuits, are permitted to occupy the same raceway, cable, or enclosure under which of the following conditions?

A (correct). Only if all conductors have an insulation rating for the highest voltage present.

B. Only if the control circuit is Class 1.

C. Only if a barrier is installed between the systems.

D. They are never permitted in the same raceway.

Rationale: Section 300.3(C)(1) states: 'Conductors of ac and dc circuits, rated 1000 volts or less, shall be permitted to occupy the same equipment wiring enclosure, cable, or raceway. All conductors shall have an insulation rating equal to at least the maximum circuit voltage applied to any conductor within the enclosure, cable, or raceway.' The operative phrase is 'shall have an insulation rating equal to at least the maximum circuit voltage applied to any conductor.'

Code: 300.3(C)(1)

5. A listed utility-interactive inverter for a photovoltaic system is being connected to premises wiring. According to the NEC, when is it permitted to connect this inverter to the premises wiring without a grounded conductor?

A. When the inverter output is less than 30 amps.

B (correct). Where the connected premises wiring or utility system includes a grounded conductor.

C. Only when installed outdoors with a dedicated grounding electrode.

D. When the inverter is part of a stand-alone system not connected to the utility.

Rationale: Section 200.3 Exception states: 'Listed utility-interactive inverters identified for use in distributed resource generation systems such as photovoltaic and fuel cell power systems shall be permitted to be connected to premises wiring without a grounded conductor where the connected premises wiring or utility system includes a grounded conductor.'

Code: 200.3 Exception

6. According to 200.4(B), where more than one neutral conductor from different circuits is in an enclosure, they must be identified or grouped with their corresponding ungrounded conductors. Which scenario is NOT an exception to this requirement?

A (correct). A junction box contains spliced neutrals from three different 120-volt branch circuits.

B. Branch-circuit conductors pass straight through a conduit body without splices, terminations, or loops.

C. Conductors enter the enclosure from separate cables, each unique to its circuit, making grouping obvious.

D. Multiple circuits share a single neutral conductor (a multiwire branch circuit).

Rationale: Section 200.4(B) Exception No. 1 states: 'The requirement for grouping or identifying shall not apply if the branch-circuit or feeder conductors enter from a cable or a raceway unique to the circuit that makes the grouping obvious.' Exception No. 2 states: 'The requirement for grouping or identifying shall not apply where branch-circuit conductors pass through a box or conduit body without a loop as described in 314.16(B)(1) or without a splice or termination.' A junction box with multiple circuits where neutrals are spliced does not meet either exception.

Code: 200.4(B) Exception No. 1, Exception No. 2

7. According to NEC 200.4(A), a neutral conductor shall not be used for more than one branch circuit, for more than one multiwire branch circuit, or for more than one set of ungrounded feeder conductors unless:

A. The circuits are all on the same phase.

B. The neutral is sized at 200% of the largest ungrounded conductor.

C. All circuits protected at 20 amperes or less.

D. The enclosure is marked to indicate shared neutral usage.
undefined (correct). Specifically permitted elsewhere in the Code.

Rationale: Section 200.4(A) states: 'Neutral conductors shall not be used for more than one branch circuit, for more than one multiwire branch circuit, or for more than one set of ungrounded feeder conductors unless specifically permitted elsewhere in this Code.'
Code: 200.4(A)

8. According to the NEC, what is the primary purpose of the requirements in Article 300?

- A. To detail the installation requirements for service equipment only.
- B. To list the approved fittings for use with rigid metal conduit.
- C. To specify the types of conductors allowed in residential installations.
- D (correct). To provide general requirements for wiring methods and materials for all wiring installations.**

Rationale: The scope of Article 300 states it 'covers general requirements for wiring methods and materials for all wiring installations unless modified by other articles.'
Code: Article 300 Scope

9. According to Article 400, flexible cords are permitted to be used for which of the following applications?

- A (correct). For wiring of luminaires.**
- B. As a substitute for the fixed wiring of a structure.
- C. For permanent connection between outlet boxes.
- D. Concealed behind walls, above ceilings, or below floors.

Rationale: Section 400.10 states: 'Flexible cords and cables shall be used only for the following: (1) Pendants; (2) Wiring of luminaires; (3) Connection of portable luminaires, portable and mobile signs, or appliances; (4) Elevator cables; (5) Wiring of cranes and hoists; (6) Connection of utilization equipment to facilitate frequent interchange; (7) Prevention of the transmission of noise or vibration; (8) Appliances where the fastening means and mechanical connections are designed to permit removal for maintenance and repair; (9) Connection of moving parts; (10) Where specifically permitted elsewhere in this Code.'
Code: 400.10

10. A flexible cord is used to supply a portable appliance. The cord has three current-carrying conductors. According to Table 400.5(A)(1), what is the maximum allowable ampacity for a 12 AWG Type SJO cord?

- A (correct). 15 amperes**
- B. 10 amperes
- C. 25 amperes
- D. 20 amperes

Rationale: Table 400.5(A)(1) provides the ampacities for flexible cords and cables. For a 12 AWG Type SJO cord with 3 current-carrying conductors, the table lists an ampacity of 15 amperes.
Code: Table 400.5(A)(1)

11. Which reference standard is specifically mentioned in Informational Note No. 2 for information on the classification of locations at petroleum facilities?

- A (correct). ANSI/API RP 500-2012**
- B. NFPA 70E-2015
- C. NFPA 497-2012
- D. NFPA 30-2015, Flammable and Combustible Liquids Code
undefined. ISA-12.10-1988

Rationale: 500.4(B) Informational Note No. 2 lists: 'ANSI/API RP 500-2012, Recommended Practice for Classification of Locations of Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2' as a reference standard.
Code: 500.4(B) Informational Note No. 2

12. According to NEC 200.2(A), what insulation requirement applies to a grounded conductor for systems of 1000 volts or less?

- A (correct). Its insulation must be suitable (other than color) for any ungrounded conductor of the same circuit**
- B. It must have green insulation
- C. It must have insulation rated for the maximum circuit voltage
- D. It must have double insulation

Rationale: Section 200.2(A) states: 'The grounded conductor, if insulated, shall have insulation that is (1) suitable, other than color, for any ungrounded conductor of the same circuit for systems of 1000 volts or less...'

Code: 200.2(A)

13. Under the ANSI Patent Policy notice, what may a patent holder file to indicate willingness to grant licenses?

A (correct). A statement of willingness to grant licenses.

- B. A formal infringement complaint.
- C. A provisional patent application.
- D. A copyright registration.

Rationale: The excerpt states: 'If... a patent holder has filed a statement of willingness to grant licenses under these rights on reasonable and nondiscriminatory terms and conditions to applicants...'

Code: Important Notices and Disclaimers (Patents)

14. According to 200.3, premises wiring shall not be electrically connected to a supply system unless the supply system contains a corresponding grounded conductor. Which of the following is an exception to this requirement?

- A. When the premises wiring is for temporary installations less than 90 days.
- B. When the premises wiring is part of an isolated power system in a healthcare facility.

C (correct). When using listed utility-interactive inverters for PV or fuel cell systems, if the connected wiring or utility has a grounded conductor.

- D. When the supply system operates at less than 50 volts to ground.

Rationale: Section 200.3 Exception states: 'Listed utility-interactive inverters identified for use in distributed resource generation systems such as photovoltaic and fuel cell power systems shall be permitted to be connected to premises wiring without a grounded conductor where the connected premises wiring or utility system includes a grounded conductor.'

Code: 200.3 Exception

15. What is required by NEC 500.4(A) for all areas designated as hazardous (classified) locations?

- A. All equipment must be listed for the specific Class and Division
- B. Weekly inspections must be documented and filed with the AHJ
- C (correct). Proper documentation must be created and made available to authorized personnel**
- D. A licensed professional engineer must seal the classification drawings

Rationale: Section 500.4(A) states: 'All areas designated as hazardous (classified) locations shall be properly documented. This documentation shall be available to those authorized to design, install, inspect, maintain, or operate electrical equipment at the location.'

Code: 500.4(A)

16. According to 600.1, what specific components of electric sign installations are covered by Article 600?

- A. Only the sign structure and enclosure
- B. Only the disconnecting means and overcurrent protection
- C. Only the illumination sources and transformers
- D (correct). Conductors, equipment, and field wiring**

Rationale: Section 600.1 states: 'This article covers the installation of conductors, equipment, and field wiring for electric signs, retrofit kits, and outline lighting, regardless of voltage.'

Code: 600.1

17. For solidly grounded neutral systems over 1000 volts, what insulation rating is required for the grounded conductor according to NEC 200.2(A)?

- A. Double insulated
- B. Rated not less than 1000 volts
- C. Rated for the system voltage

D (correct). Rated not less than 600 volts

Rationale: Section 200.2(A)(2) states the grounded conductor shall have insulation 'rated not less than 600 volts for solidly grounded neutral systems of over 1000 volts as described in 250.184(A).'

Code: 200.2(A)(2)

18. Emergency system wiring is permitted to occupy the same raceways, cables, boxes, and cabinets as other wiring under which condition?

- A. When the emergency system is battery-backed
- B. When the emergency wiring serves the same general area as the other wiring
- C. When both systems operate at the same voltage

D (correct). When installed in transfer equipment enclosures

Rationale: Section 700.10(B) states: 'Wiring from an emergency source or emergency source distribution overcurrent protection to emergency loads shall be kept entirely independent of all other wiring and equipment, unless otherwise permitted in (1) through (4).' The permitted conditions include sharing transfer equipment enclosures, exit or emergency luminaires supplied from two sources, and boxes or enclosures used for multiple sources supplying a common load. The key requirement is that the wiring must be kept independent unless specific exceptions apply.

Code: 700.10(B)

19. What is required for all areas designated as hazardous (classified) locations according to NEC 500.4(A)?

- A. Weekly inspection reports filed with the AHJ.
 - B. All equipment must be labeled with the classification.
 - C (correct). Proper documentation that is available to authorized personnel.**
 - D. An NFPA 70E arc flash hazard analysis must be performed.
- undefined. A permanent warning sign must be posted at all entrances.

Rationale: Section 500.4(A) states: 'All areas designated as hazardous (classified) locations shall be properly documented. This documentation shall be available to those authorized to design, install, inspect, maintain, or operate electrical equipment at the location.'

Code: 500.4(A)

20. According to the Informational Note in 200.2(B), where should one look for information on the continuity of grounded conductors used in multiwire branch circuits?

- A (correct). 300.13(B)**
- B. 210.4
- C. 200.4(A)
- D. 250.24

Rationale: The Informational Note in 200.2(B) states: 'See 300.13(B) for the continuity of grounded conductors used in multiwire branch circuits.'

Code: 200.2(B) Informational Note

21. According to 200.2(B), the continuity of a grounded conductor shall not depend on a connection to which of the following?

- A (correct). A metallic enclosure, raceway, or cable armor.**
- B. The neutral busbar in the service equipment.
- C. The equipment grounding conductor.
- D. A grounding electrode conductor.

Rationale: Section 200.2(B) states: 'The continuity of a grounded conductor shall not depend on a connection to a metallic enclosure, raceway, or cable armor.'

Code: 200.2(B)

22. Flexible cords are permitted to be spliced or tapped, provided that the splice or tap is made in accordance with which of the following?

A (correct). They shall be used only in continuous lengths without splice or tap.

B. They may be tapped using listed cord connectors.

C. They may be spliced using wire nuts inside an accessible junction box.

D. They are permitted to be spliced or tapped in any approved manner.

Rationale: Section 400.9 states: 'Flexible cords shall be used only in continuous lengths without splice or tap. Hard-service flexible cords No. 12 and larger shall be permitted to be repaired if spliced so that the splice retains the insulation, outer sheath properties, and usage characteristics of the cord being spliced.'

Code: 400.9

23. When more than one neutral conductor from different circuits is in an enclosure, the grounded conductors must be identified or grouped to correspond with their ungrounded conductors. Under what condition does this requirement NOT apply?

A. When all conductors are #12 AWG or larger.

B. For circuits operating at 480 volts or higher.

C (correct). If the branch-circuit or feeder conductors enter from a cable or raceway unique to the circuit that makes the grouping obvious.

D. When the enclosure is located outdoors.

Rationale: Section 200.4(B) Exception No. 1 states: 'The requirement for grouping or identifying shall not apply if the branch-circuit or feeder conductors enter from a cable or a raceway unique to the circuit that makes the grouping obvious.'

Code: 200.4(B) Exception No. 1

24. A 3D view of a working space shows a 200A, 480V panelboard installed in a 30-inch wide alcove. The equipment is 30 inches deep. What is the minimum required width of the working space?

A (correct). 30 inches

B. 42 inches

C. 24 inches

D. 36 inches

Rationale: Section 110.26(A)(2) states: 'The width of the working space in front of the electrical equipment shall be the width of the equipment or 762 mm (30 in.), whichever is greater.'

Since the equipment is 30 inches wide, the minimum width is 30 inches. The operative phrase is 'the width of the equipment or 762 mm (30 in.), whichever is greater.'

Code: 110.26(A)(2)

25. Emergency circuit wiring must be designed with a minimum safety factor for voltage drop. What is the maximum permitted voltage drop on an emergency system circuit, measured from the emergency source to the connected load?

A. 5%

B. 15%

C. 3%

D (correct). 10%

Rationale: 700.26 states: 'Wiring from emergency source or equipment to emergency loads shall be designed and installed to minimize the probability of damage and shall provide a voltage to the load within the limits specified in 700.26(A) and (B).' For feeders, the drop must not exceed 10% under maximum load conditions.

Code: 700.26

26. When sizing the overcurrent protective device for an emergency system feeder, what is the minimum allowable rating if the calculated load is 185 amps and the feeder conductors are sized at 3/0 AWG THHN copper?

A (correct). 200 amps

B. 185 amps

C. 225 amps

D. 175 amps

Rationale: Section 700.10(B) states: 'The overcurrent protective devices for emergency circuit

conductors shall be coordinated to ensure selective operation of the overcurrent protective devices.' While coordination is required, the actual sizing of the overcurrent device must comply with standard conductor protection rules (240.4). For 3/0 AWG THHN copper (90°C column in Table 310.15(B)(16)), the ampacity is 225A. Standard protection rules allow the next standard size overcurrent device (240.4(B)) which would be 200A for a calculated load of 185A, provided the conductors are protected at their ampacity.

Code: 700.10(B)

27. All boxes and enclosures for emergency system overcurrent devices must be permanently marked for easy identification. What color is typically required for this marking?

- A. Green
- B. Yellow
- C (correct). Red**
- D. Orange

Rationale: 700.10(A) states: 'All boxes and enclosures (including transfer switches, generators, and power panels) for emergency circuits shall be permanently marked so they will be readily identified as a component of an emergency circuit or system.' While the NEC does not mandate a specific color in this section, industry standard and common enforcement, often referenced in other codes or standards, is red. The most specific answer from common application is red.

Code: 700.10(A)

28. What is the recommended method to determine if an NFPA Standard has been amended by a Tentative Interim Amendment (TIA) or corrected by an Errata?

- A. Check the most recent printed edition available for purchase.
- B (correct). Visit the NFPA website and check the document information page for the specific standard.**
- C. Review the National Fire Codes® Subscription Service only.
- D. Contact the NFPA by telephone.

Rationale: The excerpt states: '...visit the "Codes & Standards" section on NFPA's website. There, the document information pages located at the "List of NFPA Codes & Standards" provide up-to-date, document-specific information including any issued Tentative Interim Amendments and Errata.'

Code: Important Notices and Disclaimers (ALERT)

29. What does NEC 200.1 specify as the scope of Article 200?

- A. Service entrance equipment requirements
- B (correct). Identification of terminals and grounded conductors**
- C. Overcurrent protection for grounded conductors
- D. Grounding electrode system installation

Rationale: Section 200.1 states: 'This article provides requirements for the following: (1) Identification of terminals (2) Grounded conductors in premises wiring systems (3) Identification of grounded conductors.'

Code: 200.1

30. According to NEC Article 500, which of the following statements is true regarding the application of other Code rules in hazardous (classified) locations?

- A. Only rules from Chapter 5 apply in hazardous locations.
- B (correct). All other applicable Code rules apply, except as modified by Articles 500 through 504.**
- C. General installation rules from Chapters 1-4 do not apply in hazardous locations.
- D. Only Articles 500 through 504 apply; all other Code rules are superseded.

Rationale: Section 500.3 states: 'Except as modified in Articles 500 through 504, all other applicable rules contained in this Code shall apply to electrical equipment and wiring installed in hazardous (classified) locations.'

Code: 500.3

31. According to NEC 200.4(A), neutral conductors shall not be used for more than one branch circuit, multiwire branch circuit, or set of ungrounded feeder conductors unless specifically permitted elsewhere in the Code. What is the primary restriction?

- A (correct). A neutral can only serve one branch circuit or one multiwire branch circuit**
- B. A neutral can serve multiple circuits if they are on the same phase
- C. A neutral must be sized at 125% of the load
- D. A neutral can serve unlimited circuits if properly identified

Rationale: Section 200.4(A) states: 'Neutral conductors shall not be used for more than one branch circuit, for more than one multiwire branch circuit, or for more than one set of ungrounded feeder conductors unless specifically permitted elsewhere in this Code.'

Code: 200.4(A)

32. According to the disclaimer, how should users determine if an NFPA Standard has been amended by a Tentative Interim Amendment (TIA) or corrected by Errata?

- A (correct). Visit the 'Codes & Standards' section on the NFPA website.**
- B. Refer to the latest printed edition available for purchase.
- C. Contact the NFPA by telephone.
- D. Check the National Fire Codes® Subscription Service only.

Rationale: The excerpt states: 'In order to determine whether an NFPA Standard has been amended through the issuance of Tentative Interim Amendments or corrected by Errata, visit the "Codes & Standards" section on NFPA's website.'

Code: Important Notices and Disclaimers

33. A visual inspection of a conduit body shows three 12 AWG THHN conductors entering and three exiting. According to the NEC, what is the primary factor that determines if this conduit body is acceptable for use?

- A. The conduit body is installed in an accessible location.
- B (correct). The conduit body is durably and legibly marked by the manufacturer with its volume.**
- C. The conductors are 12 AWG or smaller.
- D. The total number of conductors does not exceed six.

Rationale: Section 300.15(C) states: 'Conduit bodies, junction, pull, and outlet boxes shall be provided with a cover or faceplate. Boxes shall be installed so that the wiring contained in them can be rendered accessible without removing any part of the building or structure. Conduit bodies shall be permitted to contain splices, taps, or devices, but only where they are durably and legibly marked by the manufacturer with their volume. The maximum number of conductors permitted in conduit bodies shall be as specified in 314.16(C).' The operative phrase is 'only where they are durably and legibly marked by the manufacturer with their volume.'

Code: 300.15(C)

34. According to 200.4(A), a neutral conductor shall not be used for more than one branch circuit, multiwire branch circuit, or set of ungrounded feeder conductors unless:

- A. The installation is in a residential occupancy.
- B (correct). Specifically permitted elsewhere in the Code.**
- C. The circuits are all on the same phase.
- D. The conductor is sized at 200% of the calculated load.

Rationale: Section 200.4(A) states: 'Neutral conductors shall not be used for more than one branch circuit, for more than one multiwire branch circuit, or for more than one set of ungrounded feeder conductors unless specifically permitted elsewhere in this Code.'

Code: 200.4(A)

35. A diagram shows a pull box with a straight pull. The entering raceway is 3-inch EMT. What is the minimum length of this pull box?

- A. 18 inches
- B. 36 inches
- C. 30 inches
- D (correct). 24 inches**

Rationale: Section 314.28(A)(1) states: 'For straight pulls, the length of the box shall not be less

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than eight times the trade diameter of the largest raceway.' For a 3-inch raceway: 3 in. x 8 = 24 inches. The operative phrase is 'not be less than eight times the trade diameter of the largest raceway.'

Code: 314.28(A)(1)

36. According to NEC 200.2(B), what must the continuity of a grounded conductor NOT depend on?

- A. Connection to the grounding electrode conductor.
- B. Termination at the neutral busbar in the panel.
- C (correct). A connection to a metallic enclosure, raceway, or cable armor.**
- D. Proper wire nut connections.

Rationale: Section 200.2(B) states: 'The continuity of a grounded conductor shall not depend on a connection to a metallic enclosure, raceway, or cable armor.'

Code: 200.2(B)

37. According to NEC Article 600, which of the following installations is NOT covered by the scope of the article?

- A (correct). A 12V landscape lighting system not part of a sign or outline lighting**
- B. A decorative art installation using cold cathode neon tubing
- C. An outline lighting system using high-intensity discharge (HID) lamps
- D. A 120V outdoor electric sign with fluorescent lamps

Rationale: Section 600.1 states: 'This article covers the installation of conductors, equipment, and field wiring for electric signs, retrofit kits, and outline lighting, regardless of voltage. All installations and equipment using neon tubing, such as signs, decorative elements, skeleton tubing, or art forms, are covered by this article.' The key phrase 'regardless of voltage' indicates voltage is not an exclusion. Therefore, a low-voltage LED sign is covered, as LED illumination systems are included per the Informational Note.

Code: 600.1

38. For systems of 1000 volts or less, the insulation on an insulated grounded conductor must be suitable for which of the following?

- A. A minimum of 1000 volts regardless of circuit voltage.
- B. Any equipment grounding conductor in the same raceway.
- C. The system voltage plus 10 percent.
- D (correct). Any ungrounded conductor of the same circuit.**

Rationale: Section 200.2(A) states: 'The grounded conductor, if insulated, shall have insulation that is (1) suitable, other than color, for any ungrounded conductor of the same circuit for systems of 1000 volts or less...'

Code: 200.2(A)

39. According to NEC 200.3, what does 'electrically connected' mean in the context of connecting premises wiring to a supply system?

- A (correct). Connected so as to be capable of carrying current, not through electromagnetic induction**
- B. Connected through a listed connector
- C. Connected through a bonding jumper
- D. Connected through an equipment grounding conductor

Rationale: Section 200.3 states: 'For the purpose of this section, electrically connected shall mean connected so as to be capable of carrying current, as distinguished from connection through electromagnetic induction.'

Code: 200.3

40. For a solidly grounded neutral system operating at 4,160 volts, what is the minimum insulation voltage rating required for the grounded conductor according to 200.2(A)?

- A. 4,160 volts
- B (correct). 600 volts**
- C. 1,000 volts

D. 2,000 volts

Rationale: Section 200.2(A)(2) states that for 'solidly grounded neutral systems of over 1000 volts as described in 250.184(A)', the grounded conductor insulation shall be 'rated not less than 600 volts.'

Code: 200.2(A)(2)

41. According to Article 700, which of the following is NOT required to be permanently marked as an emergency circuit or source?

- A. A power panel for emergency circuits
- B. A transfer switch enclosure
- C (correct). The individual branch circuit conductors**
- D. A generator housing

Rationale: Section 700.10(A) states: 'All boxes and enclosures (including transfer switches, generators, and power panels) for emergency circuits shall be permanently marked so they will be readily identified as a component of an emergency circuit or system.' This requirement applies to boxes, enclosures, transfer switches, generators, and power panels. It does not specifically require individual branch circuit conductors to be permanently marked.

Code: 700.10(A)

42. According to 700.12(B)(6), what is the minimum required capacity for a storage battery used as the sole supply for an emergency system?

- A. 4 hours
- B. 2 hours
- C. 1 hour
- D (correct). 1½ hours**

Rationale: 700.12(B)(6) states: 'Storage batteries, if used, shall be of suitable rating and capacity to supply and maintain the total load for a minimum period of 1½ hours...'

Code: 700.12(B)(6)

43. What does the NFPA specifically disclaim liability for concerning the use of NFPA Standards?

- A. For patent infringement resulting from the standards development process.
- B. Only for errors in the printing of the standards.
- C. For the accuracy of Formal Interpretations issued by NFPA.
- D (correct). For personal injury, property damage, or other damages resulting from use or reliance on the standards.**

Rationale: The excerpt states: 'The NFPA disclaims liability for any personal injury, property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on NFPA Standards.'

Code: Important Notices and Disclaimers

44. According to 500.1, what types of locations do Articles 500 through 504 cover?

- A. Only Class I, Division 1 locations with flammable gases
- B. Zone 0, 1, and 2 locations with flammable gases or vapors
- C. All hazardous locations regardless of classification system
- D (correct). Class I, II, and III, Divisions 1 and 2 locations with specified fire/explosion hazards**

Rationale: 500.1 states: 'Articles 500 through 504 cover the requirements for electrical and electronic equipment and wiring for all voltages in Class I, Divisions 1 and 2; Class II, Divisions 1 and 2; and Class III, Divisions 1 and 2 locations where fire or explosion hazards may exist due to flammable gases, flammable liquid-produced vapors, combustible liquid-produced vapors, combustible dusts, or ignitable fibers/flyings.'

Code: 500.1

45. A diagram shows a 3-inch rigid metal conduit run supported by a beam clamp 8 feet from a junction box. What is the maximum permitted distance to the next required support for this horizontal run?

- A. 12 feet
- B (correct). 10 feet**
- C. 8 feet
- D. 14 feet

Rationale: Table 344.30(B)(2) provides support intervals for rigid metal conduit. For a 3-inch conduit, the maximum distance between supports is 10 feet. The operative phrase from the table is the value for 3-inch conduit: 10 ft.

Code: Table 344.30(B)(2)

46. What action does the NFPA specifically state it does NOT undertake regarding NFPA Standards?

- A. Publish and sell the standards.
- B. Develop standards through a consensus process.
- C (correct). Police, enforce compliance, or certify products/installations for compliance.**
- D. Register trademarks for its publications.

Rationale: The excerpt states: 'The NFPA has no power, nor does it undertake, to police or enforce compliance with the contents of NFPA Standards. Nor does the NFPA list, certify, test, or inspect products, designs, or installations for compliance with this document.'

Code: Important Notices and Disclaimers

47. A visual shows a section of flexible metal conduit (FMC) used as a grounding means. What is a NEC requirement for this application?

- A. It can only be used in lengths not exceeding 6 feet.
- B. It must be listed for grounding.
- C (correct). The circuit conductors must be protected by overcurrent devices rated 20A or less.**
- D. An equipment grounding conductor must always be installed inside it.

Rationale: Section 250.118(5) lists Flexible Metal Conduit (FMC) as an acceptable equipment grounding conductor, but with conditions. The operative condition from 250.118(5) is: 'The circuit conductors contained therein are protected by overcurrent devices rated at 20 amperes or less.'

Code: 250.118(5)

48. A conduit fill diagram shows a 1-inch EMT containing nine 14 AWG THHN conductors. What is the maximum allowable percentage fill for this raceway?

- A (correct). 40%**
- B. 53%
- C. 31%
- D. 60%

Rationale: Table 1, Chapter 9 specifies the maximum percent of conduit and tubing fill. For 1 EMT containing 9 conductors, the maximum fill is 40% of the conduit's total cross-sectional area. The operative phrase from the table is the column for 'Over 2 conductors': 40%.

Code: Table 1, Chapter 9

49. What action does the NFPA specifically disclaim regarding the enforcement of NFPA Standards?

- A. Developing the standards through a consensus process.
- B. Providing interpretations of the standards upon request.
- C. Publishing updated editions of the standards.
- D (correct). Policing or enforcing compliance with the standards.**

Rationale: The excerpt states: 'The NFPA has no power, nor does it undertake, to police or enforce compliance with the contents of NFPA Standards.'

Code: Important Notices and Disclaimers

50. What is the scope of Article 600 regarding voltage?

- A. Only installations operating at 50 volts or less
- B (correct). Installations regardless of voltage**
- C. Only low-voltage installations under Article 411

D. Only installations operating at over 50 volts

Rationale: Section 600.1 states: 'This article covers the installation of conductors, equipment, and field wiring for electric signs, retrofit kits, and outline lighting, regardless of voltage.'

Code: 600.1

51. According to the notice concerning patents, what should users of NFPA Standards be aware of?

- A. NFPA guarantees that no patented inventions are referenced in its standards.
- B. NFPA will defend users against any patent infringement claims.
- C. All inventions in NFPA Standards are freely available for public use.
- D (correct). Compliance with an NFPA Standard may require use of a patented invention.**

Rationale: The excerpt states: 'NOTICE: The user's attention is called to the possibility that compliance with an NFPA Standard may require use of an invention covered by patent rights.'

Code: Important Notices and Disclaimers

52. According to 200.4(B), where more than one neutral conductor associated with different circuits is in an enclosure, they must be identified or grouped. Under what condition does Exception No. 1 state this requirement does NOT apply?

- A. If the enclosure is a junction box larger than 100 cubic inches.
- B (correct). If the conductors enter from a cable or raceway unique to the circuit that makes the grouping obvious.**
- C. If the conductors are all the same color.
- D. If the circuits are all part of a multiwire branch circuit.

Rationale: Section 200.4(B) Exception No. 1 states: 'The requirement for grouping or identifying shall not apply if the branch-circuit or feeder conductors enter from a cable or a raceway unique to the circuit that makes the grouping obvious.'

Code: 200.4(B) Exception No. 1

53. For requirements regarding electrical equipment in locations with combustible dusts classified using the Zone system (Zone 20, 21, 22), which Article should be referenced according to Informational Note No. 3?

- A. Article 500
- B. Article 510
- C. Article 505
- D (correct). Article 506**

Rationale: 500.1 Informational Note No. 3 states: 'For the requirements for electrical and electronic equipment and wiring for all voltages in Zone 20, Zone 21, and Zone 22 hazardous (classified) locations where fire or explosion hazards may exist due to combustible dusts or ignitable fibers/flyings, refer to Article 506.'

Code: 500.1 Informational Note No. 3

54. Flexible cords are NOT permitted to be used in which of the following situations?

- A. For connection of portable luminaires.
- B. For prevention of the transmission of vibration.
- C (correct). Where run through holes in structural ceilings.**
- D. As elevator cables.

Rationale: Section 400.12 states: 'Unless specifically permitted in 400.10, flexible cords and cables shall not be used for the following: (1) As a substitute for the fixed wiring of a structure; (2) Where run through holes in walls, structural ceilings, suspended ceilings, dropped ceilings, or floors; (3) Where run through doorways, windows, or similar openings; (4) Where attached to building surfaces; (5) Where concealed by walls, floors, or ceilings or located above suspended or dropped ceilings; (6) Where installed in raceways, except as otherwise permitted in this Code; (7) Where subject to physical damage.'

Code: 400.12

55. According to NEC 600.1, what types of installations using neon tubing are covered by Article 600?

- A. Only signs and outline lighting with neon tubing
- B (correct). All installations and equipment using neon tubing, including signs, decorative elements, skeleton tubing, or art forms**
- C. Only commercial electric signs with neon tubing
- D. Only neon tubing installations operating at over 1000 volts

Rationale: Section 600.1 states: 'All installations and equipment using neon tubing, such as signs, decorative elements, skeleton tubing, or art forms, are covered by this article.'
Code: 600.1

56. For the purpose of 200.3, 'electrically connected' is defined as connected so as to be capable of carrying current, as distinguished from connection through what?

- A (correct). Electromagnetic induction.**
- B. A listed connector.
- C. A bonding jumper.
- D. A raceway.

Rationale: Section 200.3 states: 'For the purpose of this section, electrically connected shall mean connected so as to be capable of carrying current, as distinguished from connection through electromagnetic induction.'
Code: 200.3

57. A diagram depicts a 4 AWG THHN copper conductor installed in a raceway for a branch circuit. The ambient temperature is 40°C. Using Table 310.15(B)(16), what is the maximum allowable ampacity for this conductor under these conditions?

- A (correct). 90 amperes**
- B. 95 amperes
- C. 70 amperes
- D. 85 amperes

Rationale: Table 310.15(B)(16) lists the ampacity for 4 AWG THHN copper in the 90°C column as 95 amperes. For ambient temperature correction, 310.15(B)(2)(a) requires applying a correction factor. At 40°C, the correction factor for 90°C insulation is 0.91. $95 \text{ A} \times 0.91 = 86.45 \text{ A}$, which is not a standard rating. Per 240.4(B), the next standard overcurrent device rating is 90 amperes, provided the calculated load does not exceed the conductor's adjusted ampacity.
Code: Table 310.15(B)(16)

58. According to 600.1, what aspect of electric sign installations does Article 600 specifically cover?

- A. Only the sign structure and mounting requirements
- B (correct). Installation of conductors, equipment, and field wiring**
- C. Only the interior wiring within factory-built signs
- D. Only the power supply requirements for signs

Rationale: Section 600.1 states: 'This article covers the installation of conductors, equipment, and field wiring for electric signs, retrofit kits, and outline lighting, regardless of voltage.'
Code: 600.1

59. A 3/4-inch EMT conduit containing three 10 AWG THHN current-carrying conductors is run through a suspended ceiling. According to the NEC, what is the maximum permitted distance between supports for this installation?

- A. 3 feet
- B. 5 feet
- C. 12 feet
- D (correct). 10 feet**

Rationale: The question tests the application of support intervals for EMT, a wiring method. The excerpt establishes the scope as Chapter 3, Wiring Methods and Materials. The correct answer is derived from the standard support requirement for EMT, which is 10 feet. The distractors represent other common support intervals for different raceway types or misinterpretations of the rule.

Code: 358.30(A)

60. A 120/240V single-phase, 3-wire feeder supplies two separate panelboards in a commercial building. According to 200.4(A), how many neutral conductors are required for these two sets of ungrounded feeder conductors?

- A (correct). Two neutral conductors, one for each feeder.**
- B. One neutral conductor may be shared by both feeders.
- C. No neutral conductor is required for feeders.
- D. The number of neutrals is determined by the calculated load.

Rationale: Section 200.4(A) states: 'Neutral conductors shall not be used for more than one branch circuit, for more than one multiwire branch circuit, or for more than one set of ungrounded feeder conductors unless specifically permitted elsewhere in this Code.' Therefore, each set of ungrounded feeder conductors requires its own dedicated neutral conductor.

Code: 200.4(A)

61. According to 200.3, premises wiring shall not be electrically connected to a supply system unless the supply system contains a corresponding grounded conductor. What is an exception to this rule?

- A. For separately derived systems that are not connected to a utility supply.
- B (correct). For listed utility-interactive inverters in distributed resource generation systems** where the premises wiring or utility system includes a grounded conductor.
- C. For systems operating at less than 50 volts.
- D. For temporary wiring installations of less than 90 days.

Rationale: Section 200.3 Exception states: 'Listed utility-interactive inverters identified for use in distributed resource generation systems such as photovoltaic and fuel cell power systems shall be permitted to be connected to premises wiring without a grounded conductor where the connected premises wiring or utility system includes a grounded conductor.'

Code: 200.3 Exception

62. For systems of 1000 volts or less, if insulated, the grounded conductor must have insulation that is suitable, other than color, for any ungrounded conductor of the same circuit. This requirement is found in which section?

- A. 200.2(B)
- B (correct). 200.2(A)(1)**
- C. 200.4(A)
- D. 200.3

Rationale: Section 200.2(A)(1) states the grounded conductor insulation shall be 'suitable, other than color, for any ungrounded conductor of the same circuit for systems of 1000 volts or less, or impedance grounded neutral systems of over 1000 volts.'

Code: 200.2(A)(1)

63. What is the minimum bending radius for a flexible cord containing conductors sized 10 AWG?

- A (correct). 5 times the diameter of the cord.**
- B. 3 times the diameter of the cord.
- C. 10 times the diameter of the cord.
- D. 8 times the diameter of the cord.

Rationale: Section 400.34 states: 'The minimum bending radii for flexible cords and cables during installation and handling in service shall be as specified in Table 400.34.' Table 400.34 specifies: 'For portable cords and cables, not specifically listed in Table 400.34, the minimum bending radius is 5 times the diameter of the cord or cable.' However, for a typical cord with 10 AWG conductors, a common exam reference is the column for 'Portable cords and cables, not specifically listed' which often uses a multiplier. A standard exam question uses 5 times the diameter. The rationale cites the requirement to use Table 400.34.

Code: 400.34

64. A visual shows a conduit run passing through a concrete floor slab. The conduit contains service conductors. What is the minimum burial depth required for this conduit if it is rigid metal conduit (RMC) and not subject to vehicular traffic?

- A. 6 inches
- B. 12 inches
- C (correct). 0 inches**
- D. 18 inches

Rationale: Table 300.5 specifies minimum cover requirements. For Rigid Metal Conduit (RMC) under a building or concrete slab, the minimum cover is 0 inches. The operative phrase from the table is the column for 'Rigid Metal Conduit (RMC)' and the row for 'Under a building' or 'Under minimum of 2 in. of concrete': 0 in.

Code: Table 300.5

65. A 3D view of an electrical room shows a 480V panelboard with exposed live parts on the front. The working space in front of the equipment has a concrete floor. What is the minimum required depth of this working space?

- A. 4 feet
- B (correct). 3 feet**
- C. 2.5 feet
- D. 3.5 feet

Rationale: Section 110.26(A)(1) specifies working space depths. For equipment operating at 480V (which is over 150V to ground and up to 600V), Condition 1 applies. The minimum required depth is 3 ft. The operative phrase is the table value for Condition 1: 3 ft.

Code: 110.26(A)(1)

66. Flexible cords are permitted to be used for the connection of utilization equipment to facilitate frequent interchange, provided that the cord is equipped with which of the following?

- A. A listed cord connector.
- B. A twist-lock connector.
- C (correct). An attachment plug and receptacle.**
- D. A busway plug.

Rationale: Section 400.10 states: 'Flexible cords and cables shall be used only for the following: ... (6) Connection of utilization equipment to facilitate frequent interchange.' While the section does not explicitly list a required device, the principle of 'facilitating frequent interchange' implies the use of a connector designed for that purpose, such as an attachment plug and receptacle. This is a direct knowledge question about the intent of the permitted use.

Code: 400.10(6)

67. Under which condition does NEC 200.4(B) Exception No. 1 exempt the requirement for grouping or identifying neutral conductors in an enclosure?

- A. When the enclosure is located outdoors
- B. When the conductors are part of a multiwire branch circuit
- C. When all conductors are the same color
- D (correct). When the conductors enter from a cable or raceway unique to the circuit, making grouping obvious**

Rationale: Section 200.4(B) Exception No. 1 states: 'The requirement for grouping or identifying shall not apply if the branch-circuit or feeder conductors enter from a cable or a raceway unique to the circuit that makes the grouping obvious.'

Code: 200.4(B) Exception No. 1

68. Under 200.4(B) Exception No. 2, the requirement for grouping or identifying neutral conductors does not apply where branch-circuit conductors pass through a box or conduit body under what specific condition?

- A. If the box is listed for through-wiring.
- B (correct). Without a loop as described in 314.16(B)(1) or without a splice or termination.**
- C. If the box contains only low-voltage circuits.
- D. If the conductors are all 12 AWG or larger.

Rationale: Section 200.4(B) Exception No. 2 states the requirement does not apply 'where

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branch-circuit conductors pass through a box or conduit body without a loop as described in 314.16(B)(1) or without a splice or termination.'
Code: 200.4(B) Exception No. 2

69. According to NEC 200.3, premises wiring shall not be electrically connected to a supply system unless the supply system contains a corresponding grounded conductor. Which of the following is an exception to this requirement?

- A (correct).** When using listed utility-interactive inverters for photovoltaic systems under specific conditions
- B. When the premises wiring is in a metallic raceway
- C. When the premises wiring is for emergency systems only
- D. When the supply system operates at over 1000 volts

Rationale: Section 200.3 Exception states: 'Listed utility-interactive inverters identified for use in distributed resource generation systems such as photovoltaic and fuel cell power systems shall be permitted to be connected to premises wiring without a grounded conductor where the connected premises wiring or utility system includes a grounded conductor.'
Code: 200.3 Exception

70. Which of the following is NOT a service the NFPA disclaims undertaking according to the liability disclaimer?

- A. Policing compliance with the standards.
- B. Certifying products for compliance with the standards.
- C. Independently testing information in the standards.
- D (correct).** Publishing the NFPA Standards.

Rationale: The excerpt states the NFPA disclaims: '...independently test, evaluate, or verify the accuracy of any information...', '...police or enforce compliance...', and '...list, certify, test, or inspect products, designs, or installations for compliance...'.
Publishing the standard is its core function, not a disclaimed service.
Code: Important Notices and Disclaimers

71. What is the minimum required bending radius for a flexible cord used as pendant or fixture wiring, where the cord is not subject to flexing after installation?

- A. Eight times the diameter of the cord.
- B. Five times the diameter of the cord.
- C. Six times the diameter of the cord.
- D (correct).** Such as to not cause damage to the cord or cable.

Rationale: Section 400.14 states: 'The bending radius for flexible cords and cables shall be such as to not cause damage to the cord or cable. For other than flexible cords and cables that are not subject to flexing after installation, the minimum bending radius shall be as specified in Table 400.14.'
Code: 400.14

72. Which of the following standards is referenced in NEC 500.4(B) for information on the classification of locations at petroleum facilities?

- A. NFPA 497-2012
 - B. ISA-12.10-1988
 - C (correct).** ANSI/API RP 500-2012
 - D. NFPA 70E
- undefined. NFPA 30-2015

Rationale: Section 500.4(B) Informational Note No. 2 references: 'ANSI/API RP 500-2012, Recommended Practice for Classification of Locations of Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2'
Code: 500.4(B) Informational Note No. 2

73. What is the maximum allowable distance that a flexible cord used for connection of utilization equipment can extend from an outlet box to the equipment it supplies?

- A. 3 feet
- B (correct). There is no specified maximum distance, provided it facilitates quick disconnection.**
- C. 6 feet
- D. 10 feet

Rationale: Section 400.10(A) states: 'Flexible cords and cables shall be used only for the following: ... (12) Connection of utilization equipment that must be able to be quickly disconnected in accordance with 400.10(A).' The specific distance is not defined in Article 400, but the requirement is for quick disconnection, implying a short, practical length. The question tests direct knowledge of the permitted uses, not a specific distance.
Code: 400.10(A)

74. A flexible cord is used to connect a portable stage lighting unit. The cord is 16 AWG Type SJ. According to Table 400.5(A)(1), what is the maximum allowable ampacity for this cord with two current-carrying conductors?

- A (correct). 10 amperes**
- B. 6 amperes
- C. 15 amperes
- D. 13 amperes

Rationale: Table 400.5(A)(1) provides the ampacities for flexible cords and cables. For a 16 AWG Type SJ cord with 2 current-carrying conductors, the table lists an ampacity of 10 amperes.
Code: Table 400.5(A)(1)

75. What does NEC 200.2(B) state about the continuity of a grounded conductor?

- A. It must be bonded to metallic enclosures at all termination points
- B (correct). Its continuity must not depend on connection to metallic enclosure, raceway, or cable armor**
- C. It may rely on metallic raceways for continuity in emergency systems
- D. It must be continuous through all junction boxes

Rationale: Section 200.2(B) states: 'The continuity of a grounded conductor shall not depend on a connection to a metallic enclosure, raceway, or cable armor.'
Code: 200.2(B)

76. Under NEC 200.4(B) Exception No. 2, when is the grouping or identifying requirement for neutral conductors NOT required?

- A. When conductors are in a wireway
- B. When the box is less than 100 cubic inches
- C. When all conductors are #12 AWG or larger
- D (correct). When conductors pass through a box without a loop, splice, or termination**

Rationale: Section 200.4(B) Exception No. 2 states: 'The requirement for grouping or identifying shall not apply where branch-circuit conductors pass through a box or conduit body without a loop as described in 314.16(B)(1) or without a splice or termination.'
Code: 200.4(B) Exception No. 2

77. Which of the following illumination systems is NOT specifically mentioned in the informational note to 600.1 as being included in sign and outline lighting systems?

- A. Cold cathode neon tubing
- B. High-intensity discharge lamps (HID)
- C. Light-emitting diodes (LEDs)
- D (correct). Metal halide lamps**

Rationale: The informational note to 600.1 states: 'Sign and outline lighting illumination systems include, but are not limited to, cold cathode neon tubing, high-intensity discharge lamps (HID), fluorescent or incandescent lamps, light-emitting diodes (LEDs), and electroluminescent and inductance lighting.' Metal halide lamps are a type of HID lamp, but are not specifically listed separately.
Code: 600.1 Informational Note

78. A diagram depicts a section of EMT containing four 10 AWG THHN current-carrying conductors. The ambient temperature is 30°C. What is the maximum allowable ampacity for each conductor?

- A (correct). 30 amperes**
- B. 40 amperes
- C. 32 amperes
- D. 35 amperes

Rationale: Table 310.15(B)(16) lists the ampacity for 10 AWG THHN (90°C column) as 40A. Since there are 4 current-carrying conductors, a derating factor of 80% from Table 310.15(B)(3)(a) applies. $40A \times 0.80 = 32A$. The final ampacity cannot exceed the 75°C column value for termination ratings (typically 30A for 10 AWG), which is the limiting factor. The operative phrase from Table 310.15(B)(16) for 10 AWG THHN is 40A at 90°C.
Code: Table 310.15(B)(16)

79. For a solidly grounded neutral system over 1000 volts, what is the minimum insulation voltage rating required for the grounded conductor according to 200.2(A)?

- A. 300 volts
- B. 1000 volts
- C (correct). 600 volts**
- D. The same as the ungrounded conductors of the circuit.

Rationale: Section 200.2(A)(2) states the grounded conductor shall have insulation 'rated not less than 600 volts for solidly grounded neutral systems of over 1000 volts as described in 250.184(A).'

Code: 200.2(A)(2)

80. What does Article 200 specifically provide requirements for, according to 200.1?

- A. Overcurrent protection for grounded conductors.
- B (correct). Identification of terminals, grounded conductors in premises wiring systems, and identification of grounded conductors.**
- C. Sizing of grounded conductors.
- D. Grounding electrode system installation.

Rationale: Section 200.1 states: 'This article provides requirements for the following: (1) Identification of terminals (2) Grounded conductors in premises wiring systems (3) Identification of grounded conductors.'

Code: 200.1