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Texas Master Electrician

Solution key

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1. NEC 230.95 requires ground-fault protection of equipment (GFPE) for solidly grounded wye services exceeding 150V to ground but not over 600V phase-to-phase when rated:

A. 2000A or more
B. 800A or more
C. 150A or more
D (correct). 1000A or more

Rationale: NEC 230.95 requires GFPE for solidly grounded wye services at 1000A or more.
Code: NEC 230.95

2. Under NEC Article 600, electric signs must be grounded if operating at voltages above:

A. 120V
B (correct). 50V
C. 150V
D. 100V

Rationale: NEC 600.7 requires all metal parts of electric signs operating above 50 volts to be grounded.
Code: NEC 600.7

3. A 100A feeder requires an equipment grounding conductor. Per NEC Table 250.122, what is the minimum size copper EGC?

A. 6 AWG
B. 12 AWG
C (correct). 8 AWG
D. 10 AWG

Rationale: NEC Table 250.122 requires a minimum 8 AWG copper EGC for circuits protected by up to 100A overcurrent devices.
Code: NEC Table 250.122

4. A 480V, 3-phase, 4-wire commercial feeder supplies 150 kVA of balanced load. What is the full-load current per phase?

A. 120A
B (correct). 180A
C. 208A
D. 150A

Rationale: I = kVA × 1000 / (" 3 × V) = 150,000 / (1.732 × 480) "H 180A per phase.
Code: NEC 215

5. NEC Article 800 covers communication circuits. The primary protector must be located:

A (correct). As close as practicable to where conductors enter the building
B. Within 50 feet of the electrical service
C. At the main distribution frame only
D. At the service entrance panel

Rationale: NEC 800.90(B) requires the primary protector to be as close as practicable to where communication conductors enter the building.
Code: NEC 800.90

6. NEC 240.87 requires arc energy reduction for circuit breakers rated 1200A or higher. Which method is NOT an acceptable means?

A. Differential relaying
B. Zone-selective interlocking
C. Energy-reducing maintenance switching
D (correct). Reducing conductor size to limit fault current

Rationale: NEC 240.87 lists zone-selective interlocking, differential relaying, energy-reducing maintenance switching, and active arc flash mitigation — reducing conductor size is not listed.
Code: NEC 240.87

7. NEC 250.24 requires the neutral conductor to be grounded at the service entrance. Where is this grounding connection made?

A. At the load side of the service disconnect
B. At the meter base only
C (correct). At the main bonding jumper location in the service equipment
D. At the first overcurrent device downstream

Rationale: NEC 250.24(A) requires the grounded neutral to connect to the grounding electrode system at the main bonding jumper location in the service equipment.
Code: NEC 250.24

8. A Texas electrical contractor is required to carry which types of insurance as a condition of licensure?

A. Life insurance on all employees
B. Professional liability (E&O) insurance only
C (correct). Workers' compensation and general liability insurance
D. Automobile insurance only

Rationale: Texas law requires electrical contractors to maintain workers' compensation coverage and general liability insurance as conditions of their contractor license.
Code: TX Electricians Act

9. For the standard method of calculating a multifamily dwelling service per NEC 220.84, the demand factor from Table 220.84 is applied based on:

A. Total connected load in kVA
B. Number of large appliances
C. Total square footage
D (correct). Number of dwelling units

Rationale: NEC Table 220.84 provides demand factors based on the number of dwelling units — more units yield a lower demand factor.
Code: NEC 220.84

10. Under NEC Article 517, what type of grounding system is required in patient care areas of health care facilities?

A. Standard equipment grounding only
B (correct). Equipotential bonding of all conductive surfaces
C. Isolated grounding receptacles throughout
D. Double insulation on all equipment

Rationale: NEC 517.13 requires equipotential bonding of all conductive surfaces in patient care areas

to minimize microshock voltage differences.
Code: NEC 517.13

11. Under the Texas Electricians Act, a Master Electrician license is required before an individual may obtain which of the following?

A. Pass the journeyman exam
B (correct). Obtain an Electrical Contractor license
C. Work as an apprentice on residential wiring
D. Supervise journeyman electricians

Rationale: In Texas, a Master Electrician license is a prerequisite for an Electrical Contractor license. The master licensee qualifies the business and bears responsibility for all work performed.
Code: TX Electricians Act

12. Under NEC Article 550, mobile home service equipment must be rated at a minimum of:

A. 50A
B. 200A
C. 150A
D (correct). 100A

Rationale: NEC 550.32(C) requires mobile home service equipment to have a minimum rating of 100 amperes.
Code: NEC 550.32

13. In Texas, which state agency issues Master Electrician licenses?

A. Texas State Board of Plumbing Examiners (TSBPE)
B (correct). Texas Department of Licensing and Regulation (TDLR)
C. Texas Workforce Commission (TWC)
D. Texas Commission on Environmental Quality (TCEQ)

Rationale: The Texas Department of Licensing and Regulation (TDLR) administers the Texas Electricians Act and licenses master electricians, journeyman electricians, and apprentices.
Code: TX Electricians Act

14. Under NEC Article 424, fixed electric space heating branch circuits must be sized at a minimum of what percentage of the total heating load?

A. 150%
B. 100%
C. 115%
D (correct). 125%

Rationale: NEC 424.3(B) requires branch circuits for fixed electric space heating to have ampacity not less than 125% of the total load.
Code: NEC 424.3

15. Per NEC 240.4(D), what is the maximum overcurrent protection for 12 AWG copper conductors?

A (correct). 20A
B. 25A
C. 30A
D. 15A

Rationale: NEC 240.4(D)(5) limits overcurrent protection of 12 AWG copper conductors to a maximum of 20 amperes.
Code: NEC 240.4

16. A 200A, 240V single-phase service is installed. What is the total VA capacity of this service?

A. 40,000 VA
B. 32,000 VA
C. 24,000 VA

D (correct). 48,000 VA

Rationale: Power = V × A = 240 × 200 = 48,000 VA total apparent power capacity.
Code: NEC 230

17. Per NEC 430.102, a motor disconnecting means must be within sight from the controller or be lockable open. "Within sight" means visible and not more than:

A. 25 feet
B. 100 feet
C. 10 feet
D (correct). 50 feet

Rationale: NEC Article 100 defines "within sight" as visible and not more than 50 feet distant.
Code: NEC 430.102

18. NEC Article 450 covers transformers. A dry-type transformer rated over 112.5 kVA installed indoors must be in a room with a minimum fire resistance rating of:

A. 3-hour fire rating
B. No fire rating required for dry-type transformers
C. 2-hour fire rating
D (correct). 1-hour fire rating

Rationale: NEC 450.21(B) requires dry-type transformers over 112.5 kVA to be in a fire-resistant transformer room with not less than a 1-hour fire rating.
Code: NEC 450.21

19. Per NEC 230.79, what is the minimum service disconnect rating for a one-family dwelling?

A (correct). 100A
B. 150A
C. 200A
D. 60A

Rationale: NEC 230.79(C) requires a minimum 100-ampere, 3-wire service for a one-family dwelling.
Code: NEC 230.79

20. Per NEC 250.53(A)(2), if a single ground rod does not achieve 25 ohms or less resistance to ground, what must be done?

A (correct). Install a second electrode at least 6 feet away
B. Install a ground ring
C. Increase the GEC conductor size
D. Use a concrete-encased electrode instead

Rationale: NEC 250.53(A)(2) requires a second electrode to be added, separated from the first by at least 6 feet.
Code: NEC 250.53

21. A Type S fuse is designed to be non-tamperable. What prevents replacing it with a higher-rated fuse?

A. Physical size difference between ratings
B. Time-delay design
C (correct). Rejection feature requiring a matching adapter
D. Color coding by ampere rating

Rationale: NEC 240.53 requires Type S fuses to use a rejection feature — each ampere class uses a different adapter accepting only matching-rated fuses.
Code: NEC 240.53

22. NEC 250.36 permits high-impedance grounded neutral systems on 3-phase AC systems with a voltage of:

A (correct). 480V to 1000V
B. 120V to 240V

C. 120V to 480V
D. 277V to 480V

Rationale: NEC 250.36 permits high-impedance grounded neutral systems on 3-phase AC systems where line-to-ground voltage is 480V to 1000V.
Code: NEC 250.36

23. Per NEC 430.32, a continuous-duty motor with a service factor of 1.15 or more must have overload protection set at no more than what percentage of full-load current?

A (correct). 125%
B. 140%
C. 150%
D. 115%

Rationale: NEC 430.32(A)(1) requires overload protection for motors with SF "e 1.15 to be set at no more than 125% of full-load current.
Code: NEC 430.32

24. A commercial restaurant kitchen has 6 electric cooking units. Per NEC Table 220.56, what demand factor applies?

A. 70%
B. 80%
C (correct). 65%
D. 100%

Rationale: NEC Table 220.56 lists 65% demand factor for 6 commercial cooking units.
Code: NEC Table 220.56

25. Under the Texas Electricians Act, which of the following work is exempt from the licensed electrician requirement?

A. Industrial plant maintenance by unlicensed employees
B. HVAC contractor installing disconnect switches
C. Commercial tenant finish-out work
D (correct). Homeowner performing work on their own single-family residence

Rationale: Texas law includes a homeowner exemption allowing owners of single-family residences to perform electrical work on their own dwelling, provided the work meets code and passes inspection.
Code: TX Electricians Act

26. NEC 220.52(B) requires a laundry branch circuit load of how many VA to be added to a dwelling service calculation?

A. 0 VA — covered by general lighting load
B. 3,000 VA
C (correct). 1,500 VA
D. 900 VA

Rationale: NEC 220.52(B) adds 1,500 VA for the laundry branch circuit in dwelling unit service calculations.
Code: NEC 220.52

27. A 3-phase wye transformer has a secondary voltage of 208Y/120V. A single-phase load connected line-to-neutral operates at:

A. 277V
B. 208V
C (correct). 120V
D. 240V

Rationale: In a 208Y/120V wye system, line-to-neutral voltage is 120V — used for standard 120V single-phase loads.
Code: NEC 220

28. NEC 220.61 allows a neutral demand factor for 3-wire services. The 70% demand factor applies to the neutral load exceeding:

A (correct). 200A
B. 100A
C. 400A
D. 300A

Rationale: NEC 220.61(B)(1) permits 70% demand factor on the neutral load exceeding 200 amperes for 3-wire services and feeders.
Code: NEC 220.61

29. NEC Article 404 covers switches. In a three-way switch circuit, the traveler conductors:

A. Connect to opposite legs of a 240V circuit
B. Must be identified with white tape at each end
C. Are only energized when the switch is in the ON position
D (correct). Are always energized regardless of switch position

Rationale: Three-way switch traveler conductors remain continuously energized between switch common terminals regardless of switch position.
Code: NEC 404.2

30. NEC Article 376 covers metal wireways. What is the maximum conductor fill percentage at any cross section?

A. 60%
B. 40%
C (correct). 20%
D. 50%

Rationale: NEC 376.22(A) limits total conductor cross-sectional area in a metal wireway to not more than 20% of the wireway interior area.
Code: NEC 376.22

31. How many continuing education hours must a Texas Master Electrician complete per renewal period?

A. 4 hours
B. 12 hours
C. 16 hours
D (correct). 8 hours

Rationale: TDLR requires 8 hours of continuing education per two-year renewal period for Master Electricians.
Code: TX Electricians Act

32. According to NEC Article 334, NM cable is permitted to be installed in which of the following locations?

A (correct). One- and two-family dwellings
B. Commercial buildings over 3 stories
C. Ducts or plenums
D. Wet or damp locations

Rationale: NEC 334.10 permits NM cable in one- and two-family dwellings and other structures not exceeding 3 floors — not in commercial high-rises, wet locations, or plenums.
Code: NEC 334.10

33. Per NEC 342.30, rigid metal conduit (RMC) must be securely fastened within how many feet of each conduit termination?

A (correct). 3 feet
B. 5 feet
C. 2 feet
D. 10 feet

Rationale: NEC 342.30(A) requires RMC to be securely fastened within 3 feet of each outlet box, junction box, cabinet, or other termination.
Code: NEC 342.30

34. NEC 215.2 requires feeder conductors to supply continuous loads. For a continuous load of 160A, what is the minimum required conductor ampacity?

A. 225A
B (correct). 200A
C. 160A
D. 175A

Rationale: NEC 215.2(A)(1) requires feeders for continuous loads to be sized at 125%. 160A × 1.25 = 200A.
Code: NEC 215.2

35. Per NEC 314.28(A)(1), for conductors 4 AWG and larger making a straight pull, the minimum pull box length must be at least how many times the largest conduit trade size?

A. Four times the trade size of the largest conduit
B. Six times the trade size of the largest conduit
C (correct). Eight times the trade size of the largest conduit
D. Two times the trade size of the largest conduit

Rationale: NEC 314.28(A)(1) requires the box length to be at least 8 times the trade size of the largest conduit for straight pulls.
Code: NEC 314.28

36. Which electrical code does Texas adopt for construction?

A (correct). The NEC with Texas-specific amendments as adopted by TDLR
B. The International Electrical Code (IEC)
C. A Texas-specific electrical code developed by TDLR
D. The NEC without any state amendments

Rationale: Texas adopts the National Electrical Code (NFPA 70) with state-specific amendments through TDLR rulemaking. Local jurisdictions may also adopt additional amendments.
Code: TX Electricians Act

37. NEC Article 410 governs luminaires in clothes closets. A surface-mounted incandescent luminaire must maintain what minimum clearance from the nearest point of a storage area?

A. 6 inches
B. 18 inches
C (correct). 12 inches
D. 24 inches

Rationale: NEC 410.16(C)(1) requires surface-mounted incandescent luminaires in clothes closets to maintain at least 12 inches from storage areas.
Code: NEC 410.16

38. The concrete-encased electrode per NEC 250.52(A)(3) must use bare copper conductor not smaller than:

A (correct). 4 AWG
B. 1/0 AWG
C. 6 AWG
D. 2 AWG

Rationale: NEC 250.52(A)(3) requires at least 20 feet of bare copper conductor not smaller than 4 AWG for a concrete-encased electrode.
Code: NEC 250.52

39. Under NEC Article 225, what is the minimum height above a steeply sloped roof (4/12 or greater) for service conductors passing over no more than 6 feet of that roof?

A. 8 feet
B. 10 feet
C. 18 feet
D (correct). 3 feet

Rationale: NEC 225.19(A) Exception allows a 3-foot clearance above roof slopes of 4/12 or greater when conductors pass over no more than 6 feet horizontally.

Code: NEC 225.19

40. How often must a Texas Master Electrician license be renewed?

A. Every 1 year
B. Every 3 years
C. Every 4 years
D (correct). Every 2 years

Rationale: TDLR requires Master Electrician licenses to be renewed every two years.
Code: TX Electricians Act

41. Per NEC Table 220.42, what demand factor applies to the first 3,000 VA of combined lighting and small appliance load in a dwelling unit service calculation?

A (correct). 100%
B. 70%
C. 35%
D. 25%

Rationale: NEC Table 220.42 applies 100% demand factor to the first 3,000 VA of combined dwelling lighting and receptacle load.
Code: NEC Table 220.42

42. NEC Article 501 covers Class I hazardous locations. Seal fittings for conduit entering explosion-proof enclosures must be within how many inches of the enclosure?

A. 36 inches
B. 12 inches
C (correct). 18 inches
D. 24 inches

Rationale: NEC 501.15(A)(1) requires seals in conduit entering Class I, Division 1 enclosures for arcing devices to be within 18 inches of the enclosure.
Code: NEC 501.15

43. NEC 240.21 permits the 10-foot tap rule without overcurrent protection at the tap point. Which conditions must be met?

A (correct). Length "d 10 ft, enclosed in raceway, terminates in a single OCPD
B. The tap conductor is enclosed in EMT only
C. Conductor ampacity equals the upstream OCPD rating
D. The tap connects only to a subpanel

Rationale: NEC 240.21(B)(1): tap length "d 10 feet, ampacity "e 10% of upstream OCPD, enclosed in a raceway, terminates in a single OCPD.
Code: NEC 240.21

44. NEC 240.6 lists standard ampere ratings for fuses and fixed-trip breakers. Which of the following is NOT a standard rating?

A. 30A
B. 20A
C. 15A
D (correct). 25A

Rationale: NEC 240.6(A) lists standard ratings as 15, 20, 30, 40, 50, 60, 70, 80, 90, 100... 25A is not a standard listed rating.
Code: NEC 240.6

45. For a 3-phase 4-wire wye system with 277V line-to-neutral, what is the line-to-line voltage?

A. 208V
B (correct). 480V
C. 277V
D. 347V

Rationale: Line-to-line = 277V × " 3 = 277 × 1.732 "H 480V.
Code: NEC 220

46. NEC 220.60 permits only the larger of two loads that are unlikely to operate simultaneously to be used in a service calculation. What is this allowance called?

A. Optional calculation method
B. Standard calculation method
C (correct). Noncoincident load allowance
D. Demand factor method

Rationale: NEC 220.60 is the noncoincident load allowance — where loads like A/C and electric heat are unlikely to run simultaneously, only the larger need be included.
Code: NEC 220.60

47. NEC Article 700 covers emergency systems. What is the maximum time an emergency system generator must transfer power after normal power loss?

A. 30 seconds
B. 60 seconds
C (correct). 10 seconds
D. 90 seconds

Rationale: NEC 700.12 requires emergency systems to supply power within 10 seconds of normal power interruption.
Code: NEC 700.12

48. According to NEC Article 406, a receptacle in a wet location likely to have a cord connected while in use must be protected by:

A (correct). An in-use (extra-duty) weatherproof cover
B. A standard weatherproof cover
C. A basic weatherproof cover rated for wet locations
D. GFCI protection only, no cover required

Rationale: NEC 406.9(B)(1) requires an in-use (extra-duty) weatherproof cover for wet-location receptacles likely to have cords connected during use.
Code: NEC 406.9

49. NEC Article 430 requires motor overload protection for a motor with a temperature rise marked on the nameplate not over 40°C or a service factor of 1.15 or more to be set at no more than:

A (correct). 125% of nameplate FLC
B. 140% of nameplate FLC
C. 115% of nameplate FLC
D. 150% of nameplate FLC

Rationale: NEC 430.32(A)(1) requires overload protection for motors with SF "e 1.15 or temp rise "d 40°C to be set no higher than 125% of nameplate FLC.
Code: NEC 430.32

50. What is the minimum load per linear foot of show window lighting per NEC 220.14(G) in a commercial occupancy?

A. 150 VA per linear foot
B. 100 VA per linear foot
C. 250 VA per linear foot
D (correct). 200 VA per linear foot

Rationale: NEC 220.14(G) requires a minimum of 200 VA per linear foot for show window lighting in commercial occupancies.
Code: NEC 220.14

51. A motor nameplate reads 460V, 3-phase, 25 HP. Per NEC Table 430.250 the FLC is 34A. What is the minimum branch circuit conductor ampacity?

A. 40A
B (correct). 42.5A
C. 34A
D. 45A

Rationale: NEC 430.22 requires motor conductors at 125% of FLC. 34A × 1.25 = 42.5A minimum.
Code: NEC 430.22

52. NEC 110.9 requires overcurrent devices to have an interrupting rating sufficient for available fault current. This rating is commonly called:

A. Full-load current rating
B (correct). Ampere interrupting capacity (AIC)
C. Continuous current rating
D. Short-circuit withstand rating

Rationale: NEC 110.9 requires all overcurrent protective devices to have an interrupting rating sufficient for available fault current — known as the AIC rating.
Code: NEC 110.9

53. According to NEC Article 210, small appliance branch circuits in a dwelling unit kitchen must be rated at a minimum of:

A (correct). 20A, 120V
B. 15A, 120V
C. 20A, 240V
D. 30A, 120V

Rationale: NEC 210.11(C)(1) requires at least two 20-ampere small appliance branch circuits for kitchen, pantry, dining, and similar areas.
Code: NEC 210.11

54. NEC Article 500 classifies hazardous locations. A location where flammable gases are present only under abnormal conditions is classified as:

A. Class I, Division 1
B (correct). Class I, Division 2
C. Class II, Division 1
D. Class II, Division 2

Rationale: NEC 500.5(B)(2) defines Class I, Division 2 as locations where flammable gases would only be released under abnormal conditions.
Code: NEC 500.5

55. Per NEC 250.119, how must insulated equipment grounding conductors be identified?

A. White or gray insulation
B (correct). Green, or green with one or more yellow stripes, or bare
C. Red insulation
D. Orange insulation

Rationale: NEC 250.119 requires insulated EGCs to be green, or green with one or more yellow stripes.
Code: NEC 250.119

56. Per NEC 430.83, a motor controller must have a HP rating not less than the motor for motors rated at or above:

A. 1/2 HP
B (correct). 2 HP
C. 1/8 HP
D. 5 HP

Rationale: NEC 430.83(A)(1) requires HP-rated controllers for motors rated 2 HP or more over 300V or any voltage above 2 HP.
Code: NEC 430.83

57. NEC Article 625 covers EV charging. A Level 2 EVSE with a 32A continuous load must be connected to a circuit with minimum ampacity of:

A. 32A
B. 48A
C (correct). 40A
D. 50A

Rationale: NEC 625.41 and 210.19(A)(1) require continuous load circuits at 125%. 32A × 1.25 = 40A minimum.
Code: NEC 625.41

58. Per NEC 250.122(B), if ungrounded conductors are increased in size above the required minimum, the EGC must be:

A. Be doubled in size
B. Be sized at 50% of the phase conductor
C. Remain at the Table 250.122 minimum size
D (correct). Be increased proportionally in circular mil area

Rationale: NEC 250.122(B) requires the EGC to be increased proportionally in circular mil area when ungrounded conductors are upsized.
Code: NEC 250.122

59. A 460V, 3-phase, 10 HP motor has FLC = 14A. Using NEC Table 430.52 at 250% for Design B, what is the maximum standard inverse time breaker permitted?

A. 50A
B. 30A
C (correct). 35A
D. 40A

Rationale: 14A × 250% = 35A. Since 35A is a standard size per NEC 240.6, the maximum permitted breaker is 35A.
Code: NEC Table 430.52

60. NEC Article 760 covers fire alarm circuits. NPLFA conductors must maintain at least what separation from power conductors outside of a raceway?

A. 6 inches
B (correct). 2 inches
C. 1 inch
D. 12 inches

Rationale: NEC 760.136(G) requires NPLFA conductors to maintain at least 2 inches of separation from power conductors outside of raceways.
Code: NEC 760.136

61. NEC 250.52 lists acceptable grounding electrodes. Which of the following is specifically prohibited as a grounding electrode?

A. Metal underground water pipe
B. Metal frame of a building
C (correct). Metal underground gas piping
D. Concrete-encased electrode

Rationale: NEC 250.52(B) prohibits underground gas piping as a grounding electrode due to the risk of sparks igniting gas.
Code: NEC 250.52

62. What demand factor does NEC Table 220.42 apply to commercial lighting loads?

A. 50%
B (correct). 100%
C. 75%
D. 125%

Rationale: NEC Table 220.42 applies a 100% demand factor to all commercial lighting loads — no reduction is permitted for commercial occupancies.

Code: NEC Table 220.42

63. A residential electric range rated at 12 kW is connected to a 240V circuit. Using NEC Table 220.55, what demand load is used for service calculation?

A. 10 kW
B. 12 kW
C. 14 kW
D (correct). 8 kW

Rationale: NEC Table 220.55 Column C assigns an 8 kW demand load for a single household range rated between 8.75 and 12 kW.
Code: NEC Table 220.55

64. According to NEC Table 300.5, rigid PVC Schedule 80 conduit buried under a concrete slab at least 2 inches thick requires a minimum burial depth of:

A (correct). 0 inches — slab provides protection
B. 18 inches
C. 6 inches
D. 12 inches

Rationale: NEC Table 300.5 permits 0-inch burial depth for Schedule 80 PVC under a building or under concrete at least 2 inches thick.
Code: NEC Table 300.5

65. NEC 210.8 requires GFCI protection for receptacles in commercial bathrooms. This requirement applies to circuits rated:

A (correct). All 125V through 250V receptacles regardless of ampere rating
B. 20A circuits only
C. 15A and 20A circuits only
D. Any circuit within 6 feet of water

Rationale: NEC 210.8(B) requires GFCI protection for all 125V through 250V receptacles in commercial bathrooms regardless of ampere rating.
Code: NEC 210.8

66. Per NEC 250.97, bonding of metal raceways on the supply side of service is required to ensure:

A. The raceway is mechanically secured
B. The grounded conductor is not overloaded
C (correct). Electrical continuity and capacity to conduct fault current safely
D. Proper conduit fill is maintained

Rationale: NEC 250.97 requires supply-side bonding to ensure electrical continuity and capacity to safely conduct any fault current likely to be imposed.
Code: NEC 250.97

67. NEC Article 250 requires equipment grounding conductors sized per the overcurrent device. For a 400A breaker, what is the minimum size copper EGC required?

A. 1/0 AWG
B (correct). 2 AWG
C. 1 AWG
D. 3 AWG

Rationale: NEC Table 250.122 requires a minimum 2 AWG copper EGC for circuits protected by overcurrent devices up to 400A.
Code: NEC Table 250.122

68. NEC Article 356 covers LFNC. In general installations, LFNC is limited to a maximum length of:

A. 12 feet
B (correct). 6 feet
C. 3 feet
D. 8 feet

Rationale: NEC 356.12(2) restricts LFNC to lengths not exceeding 6 feet in general applications without a specific exception.
Code: NEC 356.12

69. NEC 220.52 requires two 20A small appliance circuits for a dwelling. What load is assigned to these circuits for service calculation?

A. 3,000 VA total before any demand factor
B. 2,400 VA total
C. 1,500 VA each with no demand factor applied
D (correct). 1,500 VA each, 3,000 VA total

Rationale: NEC 220.52(A) assigns 1,500 VA per circuit. Two circuits = 3,000 VA total, subject to Table 220.42 demand factors.
Code: NEC 220.52

70. NEC Article 100 defines a continuous load as one where maximum current is expected to continue for:

A. 8 hours or more
B (correct). 3 hours or more
C. 2 hours or more
D. 1 hour or more

Rationale: NEC Article 100 defines continuous load as one where maximum current continues for 3 hours or more, triggering the 125% sizing requirement.
Code: NEC Article 100

71. Per NEC 230.42, what is the minimum ampacity required for service entrance conductors with a calculated load of 220A?

A. 200A
B. 275A
C. 250A
D (correct). 220A

Rationale: NEC 230.42(A) requires service entrance conductors to have ampacity not less than the load to be served — 220A in this case.
Code: NEC 230.42

72. NEC Article 392 covers cable trays. Single conductors 1000 kcmil or larger in ladder-type cable trays must be installed:

A (correct). Single layer only — no stacking permitted
B. No fill limit for ladder trays
C. 50% of tray width
D. 40% of tray width

Rationale: NEC 392.22(B) restricts single conductors 1000 kcmil and larger in ladder cable trays to a single layer — stacking is not permitted.
Code: NEC 392.22

73. A balanced 3-phase delta system has a line current of 100A. What is the current flowing through each winding?

A. 66.7A
B (correct). 57.7A
C. 173.2A
D. 100A

Rationale: In a delta system, phase current = line current / " 3 = 100 / 1.732 "H 57.7A.

Code: NEC 220

74. Per NEC Article 430, the maximum inverse time circuit breaker rating for motor branch circuit protection on a Design B motor is:

A. 150% of FLC
B. 175% of FLC
C (correct). 250% of FLC
D. 400% of FLC

Rationale: NEC Table 430.52 allows inverse time circuit breakers for Design B motors to be rated up to 250% of the motor full-load current.
Code: NEC Table 430.52

75. Under NEC Article 310, what ampacity does a 4 AWG copper THWN conductor have in a conduit with 3 current-carrying conductors at 30°C?

A. 70A
B (correct). 85A
C. 95A
D. 105A

Rationale: NEC Table 310.16 lists 4 AWG THWN copper at 85A for 3 or fewer current-carrying conductors at 30°C.
Code: NEC Table 310.16

76. NEC Article 366 covers auxiliary gutters. The maximum conductor fill as a percentage of interior cross-sectional area is:

A. 40%
B. 75%
C (correct). 20%
D. 50%

Rationale: NEC 366.22(A) limits auxiliary gutter conductor fill to 20% of interior cross-sectional area.
Code: NEC 366.22

77. A 120/240V, single-phase, 3-wire service has a calculated load of 28,800 VA. What is the minimum service ampere rating needed?

A (correct). 120A
B. 100A
C. 200A
D. 150A

Rationale: I = VA / V = 28,800 / 240 = 120A. The minimum service rating that covers this load is 120A.
Code: NEC 230

78. What is the purpose of the system bonding jumper in a separately derived system per NEC 250.30?

A. Ground the secondary of a transformer directly to earth
B. Connect the transformer case to the grounding electrode
C (correct). Connect the neutral to the EGC establishing the ground reference
D. Provide overcurrent protection for the derived system

Rationale: NEC 250.30(A)(1) requires the system bonding jumper to connect the grounded conductor (neutral) to the EGC, establishing the ground reference for the derived system.
Code: NEC 250.30

79. NEC Article 440 covers A/C equipment. The maximum branch circuit OCPD for a hermetic refrigerant motor-compressor rated load current shall not exceed:

A. 150% of rated load current
B. 225% of rated load current
C. 250% of rated load current
D (correct). 175% of rated load current

Rationale: NEC 440.22(A) allows OCPD up to 175% of rated load current; if 175% does not correspond to a standard size, the next higher standard up to 225% is permitted.
Code: NEC 440.22

80. NEC Article 430 requires motor branch circuit conductors to be sized at a minimum of what percentage of the motor full-load current?

A (correct). 125%
B. 150%
C. 100%
D. 115%

Rationale: NEC 430.22 requires motor branch circuit conductors to have an ampacity of not less than 125% of the motor's full-load current rating.
Code: NEC 430.22

81. What is the power factor of a circuit where 10 kW of real power is drawn at 12.5 kVA apparent power?

A. 0.6
B. 0.7
C. 0.9
D (correct). 0.8

Rationale: Power factor = Real Power / Apparent Power = 10 / 12.5 = 0.8 (80%).
Code: NEC 220

82. In Texas, vehicles used by an electrical contracting business must display which of the following?

A. Only on vehicles used for commercial work
B. Vehicle display is optional in Texas
C (correct). On all vehicles used in connection with the electrical contracting business
D. On vehicles parked at job sites only

Rationale: Texas Occupations Code requires the name and license number of the responsible master electrician to be displayed on all vehicles used in connection with the electrical contracting business.
Code: TX Electricians Act

83. NEC Article 358 covers EMT. What is the maximum total degrees of bends permitted in a single EMT run between pull points?

A. 450 degrees (five 90° bends)
B. 180 degrees (two 90° bends)
C. 270 degrees (three 90° bends)
D (correct). 360 degrees (four 90° bends)

Rationale: NEC 358.26 limits conduit runs to a maximum of 360 degrees total bends between pull points.
Code: NEC 358.26

84. A commercial occupancy has 50 duplex receptacles. Using NEC 220.14(I), what is the calculated load per duplex receptacle?

A. 360 VA
B. 120 VA
C (correct). 180 VA
D. 90 VA

Rationale: NEC 220.14(I) assigns 180 VA per duplex receptacle outlet for non-dwelling occupancies.
Code: NEC 220.14

85. Under NEC Article 300, conductors of different systems may share a raceway only if:

A. The raceway is metallic conduit
B. The systems have the same phase configuration
C. Conductors are separated by insulating barriers
D (correct). All conductors are insulated for the highest voltage present

Rationale: NEC 300.3(C)(1) permits conductors of different systems in a raceway provided all conductors are insulated for the highest voltage present.
Code: NEC 300.3

86. What is the minimum journeyman experience required to qualify for the Texas Master Electrician examination?

A. 5 years as a licensed journeyman
B (correct). 4 years as a licensed journeyman
C. 2 years as a licensed journeyman
D. 3 years as a licensed journeyman

Rationale: TDLR requires applicants to have at least 4 years (8,000 hours) of experience as a licensed journeyman electrician before sitting for the Master exam.
Code: TX Electricians Act

87. Using the optional calculation method for a single-family dwelling per NEC 220.82, what percentage is applied to the remainder of all other loads after the first 10 kVA?

A. 25%
B (correct). 40%
C. 70%
D. 100%

Rationale: NEC 220.82(B) applies 100% to the first 10 kVA of all other loads, then 40% to the remainder.
Code: NEC 220.82

88. NEC 250.64(B) restricts aluminum grounding electrode conductors from being used where they would be in contact with masonry or earth within:

A. 24 inches
B. 12 inches
C. 6 inches
D (correct). 18 inches

Rationale: NEC 250.64(B) prohibits aluminum GECs within 18 inches of contact with masonry, earth, or where subject to corrosive conditions.
Code: NEC 250.64

89. NEC Article 348 covers flexible metal conduit (FMC). What is the maximum length of FMC permitted as a luminaire whip in a lay-in ceiling?

A (correct). 6 feet
B. 4 feet
C. 8 feet
D. 12 feet

Rationale: NEC 348.20(A)(2) and 410.117(C) permit FMC luminaire whips in accessible ceilings up to 6 feet in length.
Code: NEC 348.20

90. NEC Article 110 applies to equipment over 1000V. The minimum working space width for high-voltage switchgear must be:

A. At least 36 inches wide
B (correct). The greater of 30 inches or the width of the equipment
C. At least 30 inches wide regardless of equipment size
D. Equal to the equipment width only

Rationale: NEC 110.26(A)(2) requires working space width to be the greater of 30 inches or the width

of the equipment.
Code: NEC 110.26

91. A Texas Master Electrician who allows their license to be used by an unlicensed person is subject to:

A. A verbal warning only
B (correct). License suspension or revocation
C. A civil fine with no license action
D. Mandatory continuing education only

Rationale: Texas Occupations Code and TDLR rules prohibit license lending. Violations can result in license suspension, revocation, and administrative penalties.
Code: TX Electricians Act

92. NEC Article 230 requires service entrance conductors to be protected from physical damage. What is the minimum burial depth for a 120/240V residential service lateral using rigid metal conduit?

A. 24 inches
B. 18 inches
C (correct). 12 inches
D. 6 inches

Rationale: NEC Table 300.5 specifies 12 inches minimum burial depth for rigid metal conduit regardless of voltage.
Code: NEC Table 300.5

93. A 2,400 sq ft dwelling requires a general lighting load calculated at 3 VA per square foot per NEC 220.12. What is the total general lighting load before demand factors?

A. 12,000 VA
B. 4,800 VA
C (correct). 7,200 VA
D. 9,600 VA

Rationale: NEC 220.12 specifies 3 VA/sq ft for dwelling units. 2,400 × 3 = 7,200 VA.
Code: NEC 220.12

94. Per NEC 250.104(A), the bonding jumper connecting interior metal water piping to the grounding system may be connected:

A (correct). At any accessible point on the interior piping
B. At the main panel only
C. At the water heater only
D. Within 5 feet of point of entrance

Rationale: NEC 250.104(A)(1) permits the bonding jumper to be connected at any accessible point on the interior metal water piping.
Code: NEC 250.104

95. NEC Article 362 covers ENT. ENT is NOT permitted in which of the following applications?

A. Above suspended ceilings in accessible spaces
B. Concealed in walls of residential buildings
C. Residential occupancies not exceeding 3 stories
D (correct). Areas subject to physical damage

Rationale: NEC 362.12 prohibits ENT where subject to physical damage, in direct sunlight unless listed, or in areas exceeding the conduit temperature rating.
Code: NEC 362.12

96. Per NEC Article 551, the standard electrical supply for recreational vehicle park sites must provide:

A (correct). 120/240V, single phase, 3-wire, 50A
B. 240V, single phase, 2-wire
C. 208Y/120V, three phase, 4-wire
D. 120V, single phase, 30A

Rationale: NEC 551.71 requires RV park sites to provide 120/240V, single-phase, 3-wire, 50A service as the standard site supply.
Code: NEC 551.71

97. According to NEC Article 680, what is the minimum horizontal distance a permanently installed swimming pool must be from overhead conductors operating at 0–750V?

A. 15 feet
B. 5 feet
C. 22.5 feet
D (correct). 10 feet

Rationale: NEC 680.8(A) requires a minimum 10-foot horizontal clearance from the water's edge and pool structures for conductors operating 0–750V.
Code: NEC 680.8

98. According to NEC Article 110, what is the minimum working space depth required in front of electrical equipment rated 601V to 2500V where there are exposed live parts on one side and grounded parts on the other?

A. 4 feet
B. 6 feet
C (correct). 5 feet
D. 3 feet

Rationale: NEC 110.26(A)(1) specifies that for voltage 601–2500V with live parts on one side and grounded parts on the other (Condition 2), minimum working space depth is 5 feet.
Code: NEC 110.26

99. NEC Article 690 covers solar PV systems. The maximum open circuit voltage for a PV system on a one- or two-family dwelling is:

A. 300V dc
B. 1000V dc
C (correct). 600V dc
D. 1500V dc

Rationale: NEC 690.7(A) limits maximum PV system voltage to 600V dc for systems on or in one- and two-family dwellings.
Code: NEC 690.7

100. A 200A panel has 2/0 AWG copper service entrance conductors. Per NEC Table 250.66, what is the minimum copper GEC size?

A (correct). 4 AWG
B. 8 AWG
C. 6 AWG
D. 2 AWG

Rationale: NEC Table 250.66 requires a 4 AWG copper GEC when the largest service entrance conductor is 2/0 AWG copper.
Code: NEC Table 250.66