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Article 220 Branch-Circuit, Feeder and Service Calculations 6 hour test

1. For other than dwelling occupancies, each receptacle outlet shall be computed at not less than ____ volt amperes for each single or each multiple receptacle on one yoke.

- (a) 1,500 (b) 180 (c) 20 (d) 3

2. The 3 VA per-square-foot general lighting load for dwelling units includes general use receptacles and lighting outlets and no additional load calculations are required for these.

- (a) True (b) False

3. The feeder and service conductors for motors shall be computed in accordance with Article ____.

- (a) 450 (b) 240 (c) 430 (d) 100

4. The feeder and service load for fixed electric space heating shall be computed at ____ percent of the total connected load.

- (a) 125 (b) 100 (c) 80 (d) 200

5. The load for electric clothes dryers in a dwelling unit shall be ____ watts or the nameplate rating, whichever is larger, per dryer.

- (a) 1500 (b)4500 (c) 5000 (d)8000

6. The feeder demand load for nine 12 kW ranges is ____.

- (a) 13,000W (b) 14,700W (c) 24,000W (d) 16,000W

7. For identically sized ranges rated more than 12 kW but not more than 27 kW, the maximum demand in column C shall be increased by ____ percent of the column C value for each additional kilowatt that the individual ranges exceed 12 kW.

- (a) 125 (b) 10 (c) 5 (d) 80

8. The feeder demand load for nine 16 kW ranges is ____.

- (a) 15,000W (b) 28,800W (c) 20,000W (d) 26,000W

9. The feeder demand load for ranges individually rated more than $8\frac{3}{4}$ kW and of different ratings, but none exceeding 27 kW is calculated by adding all of the ranges together and dividing by the total number of ranges to find an average value. The column C value for the number of ranges is then increased by ____ percent for each kW or major fraction that the average value exceeds 12 kW.

- (a) 125 (b) 10 (c) 5 (d) 80

10. Table 220.20 may be applied to compute the load for thermostatically controlled or intermittently used _____ and other kitchen equipment in a commercial kitchen.

- (a) commercial electric cooking equipment (b) dishwasher booster heaters
(c) water heaters (d) all of these

11. When applying the demand factors of Table 220.20, in no case shall the feeder or service demand load be less than the sum of _____.

- (a) the total number of receptacles at 180 va per receptacle outlet
(b) the va rating of all of the small appliance circuits combined
(c) the largest two kitchen equipment loads
(d) the kitchen heating and air conditioning loads

Article 225 Outside Branch Circuits and Feeders

12. Vegetation such as trees shall not be used for support of _____.

- (a) overhead conductor spans (b) surface wiring methods
(c) luminaires (d) electrical equipment

Article 230 Services

13. Additional services shall be permitted for different voltages, frequencies, or phases, or for different uses such as for _____.

- (a) gymnasiums (b) different rate schedules
(c) flea markets (d) special entertainment events

14. Where a building or structure is supplied by more than one service, or a combination of branch circuits, feeders, and services, a permanent plaque or directory shall be installed at each service disconnect location denoting all other _____ supplying that building or structure and the area served by each.

- (a) services (b) feeders (c) branch circuits (d) all of these

15. Where a service raceway enters a building or structure from a(n) _____ it shall be sealed in accordance with 300.5(G).

- (a) transformer vault (b) underground distribution system
(c) cable tray (d) overhead rack

Article 240 Overcurrent Protection

16. 240.4(E) allows tap conductors to be protected against overcurrent in accordance with other specific articles that deal with the specific situation, outside Article 240.

- (a) True (b) False

17. Supplementary overcurrent devices used in luminaires or appliances shall not be required to be readily accessible.

- (a) True (b) False

18. A feeder tap of 10 feet or less can be made without overcurrent protection at the tap when the rating of the overcurrent device on the line side of the tap conductors does not exceed _____ times the ampacity of the tap conductor.

- (a) 10 (b) 5 (c) 125 (d) 25

19. Circuit breakers shall be capable of being closed and opened by manual operation. Their normal method of operation by other means, such as electrical or pneumatic shall be permitted if means for _____ operation are also provided.

- (a) automated (b) timed (c) manual (d) shunt trip

20. Circuit breakers shall clearly indicate whether they are in the open “off” or closed “on” position. Where the circuit breaker handles are operated vertically the “up” position of the handle shall be the _____.

- (a) “on” position (b) “off” position (c) tripped position (d) any of these

Article 250 Grounding

21. Temporary current flowing on the effective ground-fault current path during a ground fault condition is considered by the code to be objectionable current.

- (a) True (b) False

22. AC circuits of less than 50 volts shall be grounded if supplied by a transformer whose supply system exceeds 150 volts to ground.

- (a) True (b) False

23. AC systems of 50 to 1000 volts that supply premises wiring systems shall be grounded where the system can be grounded so that the maximum voltage to ground on the ungrounded conductors does not exceed _____.

- (a) 1000 volts (b) 300 volts (c) 150 volts (d) 50 volts

24. AC systems of 50 to 1000 volts that supply premises wiring systems shall be grounded where the system is 3-phase, 4-wire, wye connected in which the neutral is used as a circuit conductor.

- (a) True (b) False

25. AC systems of 50 to 1000 volts that supply premises wiring systems shall be grounded where the system is 3-phase, 4-wire, delta connected in which the midpoint of one phase winding is used as a circuit conductor.

- (a) True (b) False

26. An alternate ac power source such as an onsite generator is not a separately derived system if the _____ is solidly interconnected to a service-supplied system neutral.

- (a) ignition system (b) fuel cell (c) neutral (d) line conductor

27. The grounded conductor brought to service equipment shall be routed with the phase conductors and shall not be smaller than specified in Table _____ when the service-entrance conductors are not larger than 1100 kcmil copper.

- (a) 250.66 (b) 250.122 (c) 310.16 (d) 430.52

28. For a grounded system, an unspliced _____ shall be used to connect the equipment grounding conductor(s) and the service disconnect enclosure to the grounded conductor of the system within the enclosure for each service disconnect.

- (a) grounding electrode (b) main bonding jumper
(c) bus bar only (d) insulated copper conductor only

29. Where a main bonding jumper is a screw only, the screw shall be identified with _____ that shall be visible with the screw installed.

- (a) a silver or white finish (b) an etched ground symbol
(c) a green tag (d) a green finish

30. For a single separately derived system, the grounding electrode conductor connects the grounding electrode to the grounded conductor of the derived system at the same point on the separately derived system where the _____ is installed.

- (a) metering equipment (b) transfer switch (c) bonding jumper (d) largest circuit breaker

31. When supplying a grounded system at a separate building or structure, if the equipment grounding conductor is run with the supply conductors and connected to the building disconnecting means, there shall be no connection made between the grounded conductor and the equipment grounding conductor at the separate building.

- (a) True (b) False

32. When supplying a grounded system at a separate building or structure, if the equipment grounding conductor is not run with the supply conductors and there are no continuous metallic paths bonded to the grounding system in both buildings involved, then the grounded circuit conductor shall be connected to the building disconnecting means and the grounding electrode conductor and the equipment grounding conductor at the separate building.

- (a) True (b) False

33. The frame of a portable generator shall not be required to be grounded and shall be permitted to serve as the _____ for a system supplied by cord and plug using receptacles mounted on the generator with the grounding terminals of the receptacles bonded to the generator frame.

- (a) grounding electrode (b) grounded conductor
(c) ungrounded conductor (d) equipment grounding conductor

34. The frame of a vehicle mounted generator shall be permitted to serve as the _____ for a system supplied by cord and plug using receptacles mounted on the vehicle or the generator with the grounding terminals of the receptacles bonded to the generator frame and the generator frame bonded to the vehicle frame.

- (a) grounding electrode (b) grounded conductor
(c) ungrounded conductor (d) equipment grounding conductor

35. Where available on the premises, each item in the following list shall be bonded together to form the _____: 1. metal underground water pipe, 2. metal frame of the building, 3. concrete-encased electrode, 4. ground ring, 5. rod and pipe electrodes, 6. plate electrodes.

- (a) electrical bonding structure (b) fault return path
(c) grounding electrode system (d) main bonding system

36. Where none of the items in 250.52(A)(1) through (A)(6) are available for use as a grounding electrode, one or more of the following shall be installed and used as the grounding electrode: _____.

- (a) a ground ring
(b) rod and pipe electrodes or plate electrodes
(c) local metal underground systems or structures
(d) any of these

37. Ground rod electrodes shall be installed so that at least _____ of length is in contact with the soil. Where rock bottom is encountered, the rod shall be driven at an angle not to exceed 45 degrees.

- (a) 8 feet (b) 5 feet (c) one half (d) 80 percent

38. When driving a ground rod electrode, if rock bottom is encountered, the rod shall be driven at an angle not to exceed 45 degrees. Where rock bottom is encountered when driving at an angle up to 45 degrees, the electrode shall be permitted to be buried in a trench that is at least _____ deep.

- (a) 4 feet (b) 30 inches (c) 8 feet (d) 18 inches

39. When driving a ground rod electrode, if rock bottom is encountered, the rod shall be allowed to be bent over in a trench and buried or shortened with a hack saw.

- (a) True (b) False

40. Grounding electrode conductors smaller than _____ shall be in rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, electrical metallic tubing, or cable armor.

- (a) 6 AWG (b) 8 AWG (c) 10 AWG (d) 4 AWG

41. Grounding electrode conductors _____ and larger that are not subject to physical damage shall be permitted to be run exposed along the surface if securely fastened to the construction.

- (a) 6 AWG (b) 8 AWG (c) 10 AWG (d) 4 AWG

42. The grounding electrode conductor shall be installed in one continuous length without a splice or joint, unless spliced only by _____.

- (a) qualified persons
(b) irreversible compression-type connectors listed for the purpose
(c) by the exothermic welding process
(d) either b or c

43. The grounding electrode conductor shall be permitted to be run to any convenient grounding electrode available in the grounding electrode system or to one or more grounding electrode(s) individually.

- (a) True (b) False

44. Metal enclosures and raceways for service conductors and equipment shall be _____.

- (a) isolated (b) insulated (c) grounded (d) grey

45. Metal enclosures and raceways for other than service conductors shall be grounded unless they fit the situation of one of the exceptions.

- (a) True (b) False

46. Bonding shall be provided where necessary to ensure _____ and the capacity to conduct safely any fault current likely to be imposed.

- (a) electrical continuity (b) fiduciary responsibility
(c) listing requirements (d) electrical demand

47. Service metal raceways and metal clad cables are considered effectively bonded when using threadless couplings and connectors that are _____.

- (a) nonmetallic (b) made up wrenchtight
(c) sealed (d) these are never allowed for bonding

48. Bonding jumpers shall be used around _____ knockouts that are punched or otherwise formed so as to impair the electrical connection to ground. Standard locknuts or bushings shall not be the sole means for this bonding.

- (a) concentric (b) eccentric (c) field punched (d) a or b

49. An accessible means external to enclosures for connecting intersystem _____ conductors shall be provided at the service equipment and at the disconnecting means.

- (a) bonding (b) grounding (c) secondary (d) a and b

50. When oversized, concentric, or eccentric knockouts are encountered on metal raceways and cables with metal sheaths for circuits of over 250 volts to ground that do not contain service conductors, the electrical continuity of the raceway or metal cable sheath must be ensured by bonding similar to the requirements for service raceways.

- (a) True (b) False

51. Equipment bonding jumpers shall be of copper or other corrosion-resistant material. A bonding jumper shall be a _____ or similar suitable conductor.

- (a) wire (b) bus (c) screw (d) any of these

52. Bonding jumpers for service raceways shall be sized based on the size of the ungrounded conductors within the service raceway in accordance with _____.

- (a) Table 250.66. (b) Table 250.122 (c) Table 310.16 (d) Table 310.15(B)(6)

53. Where service conductors are paralleled in two or more raceways or cables, the bonding jumper for each raceway or cable shall be based on the size of the _____ in each raceway or cable.

- (a) overcurrent protection for conductors (b) grounded conductors (c) service entrance conductors
(d) sum of all conductors in the raceway

54. The bonding jumper used to bond the metal water piping system to the service shall be sized in accordance with _____.

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