# 2020 Code Practice Exam - 300 Questions

1. In a Motor Fuel Dispensing Facility, underground wiring shall be installed in threaded rigid metal conduit or _____.

    A. electrical metallic tubing
    B. auxiliary gutter
    C. threaded steel intermediate metal conduit
    D. rigid poly-vinyl chloride conduit

2. Type MV cable (Medium Voltage) shall be permitted for use on power systems rated up to and including 35,000 volts, nominal, in which of these circumstances:

    A. In wet or dry locations
    B. direct buried
    C. in messenger-supported wire
    D. all of the above

3. Ground clamps or other fittings exposed to physical damage shall be enclosed in _____.

    A. metal, wood, or equivalent protective covering.
    B. moisture resistant thermoplastic
    C. non-conductive thermoplastic
    D. aluminum foil

4. A surge protective device (SPD) shall be marked with a short-circuit current rating and shall not be installed at a point on the system where the available fault current in excess of that rating. This marking requirement shall not apply to _____.

    A. Lighting
    B. GFCI circuits
    C. AFCI circuits
    D. Receptacles

5. Using the Standard Method, what is the calculated service rating for a 1500 square feet dwelling with the following:

    (2) 20-A small appliance circuits
    (1) 20-A laundry circuit
    (2) 4-kW wall-mounted ovens
    (1) 5.1-kW counter-mounted cooking unit
    (1) 4.5-kW water heater, a 1.2 kW dishwasher

(1) 5-kW clothes washer and dryer
(6) 7-A, 230-V room air-conditioning units
(1) 1.5-KW permanently installed bathroom space heater

**Note - use the column C method, rather than the column A method for this specific problem**

A. 115A
B. 153A
C. 162A
D. 175A

6. A 3000 square foot retail store has 30 ft of show windows. There are a total of 100 duplex receptacles and the service is 120/240V, single-phase 3-wire. Calculate the minimum size overcurrent protection for the service.

A. 100A
B. 125A
C. 200A
D. 225A

7. For a solidly grounded wye service the ground fault protection system shall operate to cause the service disconnect to open all ungrounded conductors of the fault circuit. The maximum setting of the ground-fault protection shall be_____ amperes, and the maximum time delay shall be one second for ground-fault currents equal to or greater than _____ amperes.

A. 800A / 1,000A
B. 1,000A / 800A
C. 1,000A / 1,200A
D. 1,200A / 3,000A

8. Type S fuse-holders and adaptors shall be _____ so that either the fuse-holder itself or the fuse-holder with a Type S adaptor inserted cannot be used for any fuse other than a Type S fuse.

A. designed
B. installed
C. labeled
D. registered

9. Where CNG or LNG dispensers are installed beneath a canopy or enclosure, all electrical equipment installed beneath the canopy or enclosure shall be suitable for _____ hazardous (classified) locations.

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

10. The demand load for (5) dryers in a single family dwelling unit, rated at 6,000 VA each, is _____.

    A. 22,500VA
    B. 24,000VA
    C. 25,500VA
    D. 30,000VA

11. In a commercial garage, where an EV charging cord is suspended from overhead, it shall be arranged so that the lowest point of sag is at least _____ above the floor.

    A. 6 inches
    B. 12 inches
    C. 30 inches
    D. 60 inches

12. Conductor ampacity for Alternating Current adjustable voltage motors shall be based on the _____ marked on the motor nameplate.

    A. SSCR rating
    B. frequency
    C. voltage
    D. maximum operating current

13. The total A/C and heating load for a single-family dwelling unit with a 240-V, 18,000 VA heating load and a 240-V 12,000 VA A/C load is _____.

    A. 12,600 VA
    B. 18,000 VA
    C. 21,000 VA
    D. 30,000 VA

14. The ampacity of the supply conductors for an individual resistance welder that can be operated at different times at different values of primary current or duty cycle shall not be less than _____ of the rated primary current for seam and automatically fed welders.

    A. 80%
    B. 75%
    C. 70%
    D. 25%

15. In an ungrounded 240-volt 3-phase system, an equipment grounding conductor shall be installed with the supply conductors and be connected to the building or structure disconnecting means and to the grounding electrode(s). The grounding electrode(s) shall also be connected to _____.

    A. the building or structure disconnecting means
    B. the steel of the building
    C. the concrete slab under the building

D. the grounded high-leg of the system

16. Where _____transfer equipment is used, an optional standby system shall have adequate capacity and rating for the supply of all equipment intended to be operated at one time.

    A. automatic
    B. dedicated
    C. portable
    D. manual

17. Where heating equipment is supplied by more than one source, feeder, or branch circuit, the disconnecting means shall be _____.

    A. located within 10 ft of equipment
    B. grouped and identified as having multiple disconnecting means
    C. terminated to an equipment grounding conductor originating at the service
    D. all of these

18. Equipment intended to interrupt current at fault levels shall have an interrupting rating at nominal circuit voltage _____ the current that is available at the line terminals of the equipment.

    A. ten times
    B. less than
    C. more than
    D. at least equal to

19. A box containing pendant- or flush-mounted receptacles attached to a multiconductor cable via strain relief or a multipole connector is:

    A. a drop box
    B. a junction box
    C. a 1900 box
    D. a joint box

20. Service conductors installed as open conductors or multi conductor cable without an overall outer jacket shall have a clearance of _____ from windows that are designed to be opened, doors, porches, balconies, ladders, stairs, fire escapes, or similar locations.

    A. not more than 4 feet
    B. not more than 3 feet not
    C. not less than 3 feet
    D. not less than 4 feet

21. A disconnecting means shall be provided for all _____ derived from a stationary battery system with a voltage over 60-volts DC.

    A. ungrounded conductors
    B. grounding conductors

C. ungrounded and grounded conductors
D. grounded conductors

22. Fire-resistive cable system cables and conductors shall be surface marked with the suffix _____.

A. FRCS
B. FRR
C. FRS
D. FRC

23. The connection of an Energy Storage System (ESS) that operates in parallel with other ac sources shall use inverters that are listed and identified as interactive.

A. active
B. interactive
C. reactive
D. non-active

24. An installation consists of 15 electric ranges, each rated at 12 kW. According to Table 220.55, what is the maximum demand load for this installation?

A. 25.2kW
B. 57.6kW
C. 30kW
D. 72kW

25. In a major repair garage where natural gas vehicles are repaired, the area within 18 inches of the ceiling is considered what classification?

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

26. Calculate the maximum demand load for a single branch circuit supplying a counter-mounted cooking unit and two wall-mounted ovens, all located in the same room. The counter-mounted unit has a nameplate rating of 6 kW, and each wall-mounted oven has a rating of 4 kW.

A. 7.7kW
B. 8.8kW
C. 11kW
D. 14kW

27. In a patient Care Area, metal enclosures containing a receptacle must be connected to a(n) _____.

A. insulated copper equipment grounding conductor
B. isolated copper bonding jumper

C. copper grounding electrode conductor
D. copper grounded conductor

28. Panelboard cabinets and panelboard frames, if of metal, shall be in physical contact with each other and shall be connected to a(n) _____.

    A. branch circuit neutral
    B. isolated terminal bar
    C. equipment grounding conductor
    D. ground ring

29. Metal Cable tray can be used as an equipment grounding conductor where _____.

    A. where installed under engineer supervision
    B. continuous maintenance and supervision ensure that qualified persons service the installed cable tray system
    C. the total length of the installed cable tray does not exceed 150 ft
    D. installed in dry indoor environments above 8 ft 6 in from the floor

30. A bank has a total square footage of 25,000 sq-ft, and there are 250 receptacles installed. Determine the largest receptacle load to be applied to the total demand load.

    A. 55,000VA
    B. 50,000VA
    C. 46,000VA
    D. 45,000VA

31. A restaurant has all electric appliances, a connected lighting load that includes a sign, totaling 50,000 VA.

    The electrical service is rated at 120/208V, three-phase.
    The restaurant contains the following loads:
    120-volt loads
    60 duplex receptacles
    100 ft multi-outlet assembly (simultaneous rated)
    1 broiler 5 kW
    2 deep fryers 5.5 kW
    1 freezer 3,400 VA
    1 booster heater 1,500 VA
    1 coffee service machine 3,500 VA
    1 dishwasher 3,500 VA
    208-volt loads
    1 walk-in cooler 6,400 VA
    1 water heater 4,800 VA
    1 oven 20 kW
    1 range 15 kW
    2 convection ovens 8kW
    15kW electric heater

14 kW AC
3 exhaust fans 2.4 ampere
s 1 cooktop 10kW
2 10kw heating units.

What is the total demand load for the restaurant?

A. 214,550VA
B. 162,940VA
C. 160,000VA
D. 122,700VA

32. Where buried in masonry or concrete, threadless couplings shall be _____.

A. the concrete tight type
B. the weatherproof type
C. the liquid tight type
D. direct-burial rated c

33. In Cellular Metal Floor Raceways, junction boxes used with these raceways shall be of metal and shall be _____.

A. secured with listed straps or supports from the bottom of the enclosure only
B. secured with listed straps or support from the sides of the enclosure only
C. protected with a raintight sealing ring, silicone compound, or similar approved means
D. electrically continuous with the raceway

34. Audio system equipment supplied by branch-circuit power shall not be placed horizontally within _____ of the inside wall of a pool.

A. 25 ft
B. 10 ft
C. 7 ft
D. 5 ft

35. A single-phase motor is using a Dual Element (Time-Delay) Fuse as it's short-circuit and ground-fault protection means. This Dual Element fuse's rating must not-exceed _____ of the motor's Full-Load Current.

A. 300%
B. 250%
C. 175%
D. 150%

36. What is the minimum size Flexible Metal Conduit ( FMC) that can be used to house the following conductors: (1) 1 AWG THHN (2) 2 AWG THHN (2) 4 AWG THHN

A. 1 inch

B. 1 1/14 inch
C. 1 1/2 inch
D. 2 inch

37. Electrical continuity at service equipment, service raceways, and service conductor enclosures shall be ensured by one of the following methods:

    A. Bonding equipment to the grounded service conductor
    B. Connections using threaded couplings or listed threaded hubs on enclosures if made up wrench tight
    C. Threadless couplings and connectors if made up tight for metal raceways and metal-clad cables
    D. Other listed devices, such as bonding-type lock nuts, bushings, or bushings with bonding jumpers
    E. all of these

38. In an outside branch circuit, open conductors shall be separated from open conductors of other circuits or systems by not less than _____.

    A. 4 in
    B. 6 in
    C. 8 in
    D. 10 in

39. In dormitories overcurrent devices, other than supplementary overcurrent protection, ___ be permitted to be located in bathrooms.

    A. shall
    B. shall not
    C. may
    D. should

40. What's the ampacity of 4 current carrying #8 THHN conductors installed in an ambient temperature of 90°F?

    A. 22.32A
    B. 42.25A
    C. 48.75A
    D. 65.25A

41. What is the minimum size RHW copper tap conductor required to supply a 50A load, if the tap is 9ft from the load.

    A. 4 AWG
    B. 6 AWG
    C. 8 AWG
    D. 10 AWG

42. What are the primary and secondary overcurrent protection devices for a 75kVA three-phase, 480V/208Y transformer?

    A. 350A primary, 320A secondary
    B. 225A primary /300A secondary
    C. 150A primary, 300A secondary
    D. 125A primary /300A secondary

43. Transformers who's disconnecting means are located in a remote location, shall be _____.

    A. lockable in the open position
    B. lockable in the closed position
    C. no farther than 125 ft length total from the transformer
    D. fused

44. A phase converter with a nameplate single-phase input rating of 100 FLA, protecting variable loads, shall have overcurrent protection set at not more than _____.

    A. 100A
    B. 125A
    C. 150A
    D. 225A

45. _____ is NOT permitted to be installed in ducts specifically fabricated to transport environmental air.

    A. Flexible Metallic Tubing Type
    B. Electrical Metallic Tubing
    C. MI Cable
    D. Liquid-Tight Flexible Metal Conduit

46. What is the maximum size overcurrent protection device required to protect 14 AWG copper conductors used for a pump motor control-circuit that is protected by a motor branch circuit protection device and extends beyond the enclosure?

    A. 100A
    B. 45A
    C. 20A
    D. 15A

47. Snap switches, dimmers, control switches, and metal faceplates shall be connected to an equipment grounding conductor by _____.

    A. connected to the intersystem bonding termination
    B. mounting with metal screws to a metal box or a metal cover that's connected to an equipment grounding conductor
    C. an equipment grounding conductor or equipment bonding jumper that is connected to an equipment grounding termination of the snap switch
    D. termination of two separable equipment grounding terminals.

E. B or C

48. The Full-Load Current (FLC) of a 100-HP 500 volt DC motor is _____.

    A. 123 A
    B. 148 A
    C. 164 A
    D. 205 A

49. Aircraft energizers shall be designed and mounted such that all electrical equipment and fixed wiring will be at least _____ above floor level.

    A. 24 inches
    B. 18 inches
    C. 12 inches
    D. 6 inches

50. spray paint equipment within the classified areas of membrane enclosures during spray painting, shall be _____.

    A. grounded
    B. guarded
    C. GFCI-protected
    D. AFCI-protected

51. Where more than one piece of X-Ray equipment is operated from the same high-voltage circuit, each piece or each group of equipment as a unit shall be provided with a(n) _____.

    A. high-voltage switch or equivalent disconnecting means
    B. low voltage disconnect switch
    C. ground-fault detector
    D. lockable disconnect rated at not more than 125% of the equipment FLA rating

52. Swimming pool electrical equipment shall be permitted to be installed in rooms or pits that do not have drainage that prevents water accumulation during normal operation or filter maintenance.

    A. TRUE
    B. FALSE

53. For a storage warehouse, what portion of the lighting load does a 50% demand factor apply to?

    A. First 10,000 VA
    B. First 12,500 VA
    C. Remainder over 10,000 VA
    D. Remainder over 12,500VA

54. Permanently attached power supply cable(s) for overhead gantries shall be provided with _____ upon exposure to strain that could result in either cable damage or separation from the power delivery device and exposure of live parts.

    A. arc-fault protection
    B. a means to energize the cable conductors and power service delivery device
    C. a means to de-energize the cable conductors and power service delivery device
    D. ground-fault interrupter protection

55. How many 1/0 AWG XHHW-2 conductors shall be permitted to be installed in a run of 2" EMT?

    A. 4
    B. 5
    C. 6
    D. 7

56. A mobile home floor is 70 ft by 10 ft and has two small appliance circuits; a 1000-VA, 240-V heater; a 200-VA, 120-V exhaust fan; a 400-VA, 120-V dishwasher; and a 7000-VA electric range.

    A. 30A
    B. 40A
    C. 50A
    D. 60A

57. Each conductor of a lead-in from an outdoor antenna shall be provided with a(n)____.

    A. listed antenna discharge unit
    B. grounding electrode
    C. listed disconnecting means
    D. equipment grounding conductor

58. An energy management system shall not override the load shedding controls for the following:

    A. Fire Pumps
    B. Emergency Systems
    C. Legally Required Standby Systems
    D. All of these

59. What are the minimum size THWN conductors required to feed the primary side of a 112.5kVA three-phase 480V/208V transformer?

    A. 1/0 THWN Primary, 400 kcmil THWN Secondary
    B. 2/0 THWN Primary, 500 kcmil THWN Secondary
    C. 3/0 THWN Primary, 550 kcmil THWN Secondary
    D. 4/0 THWN Primary, 600 kcmil THWN Secondary

60. On a property where flammable liquids are received by a pipeline and are blended in bulk and stored, the area within 3 ft of the edge of outdoor equipment, extending in all directions, shall be considered a _____ environment

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

61. A building or other structure that is served by a branch circuit or feeder on the load side of a service disconnecting means shall be supplied by only one feeder or branch circuit unless:

A. fed from a fire pump disconnecting means
B. supplying multiple-occupancy buildings where there is no space available for supply equipment accessible to all occupants
C. where the capacity requirements are in excess of 600A at a supply voltage of 250V or less
D. the building is zoned as dual-purpose or mixed-occupancy

62. What is the allowable ampacity for (6) 1/0 AWG THW copper conductors in a raceway inside of a 104°F room?

A. 96.5A
B. 102.5A
C. 105.6A
D. 124.4A

63. The minimum sized TW copper branch-circuit conductors feeding a 35A continuous load shall be:

A. 6 AWG
B. 8 AWG
C. 10 AWG
D. 12 AWG

64. The locked-rotor current of each single-phase hermetic refrigerant motor-compressor having a rated-load current of more than 9 amperes at 115 volts, or more than 4.5 amperes at 230 volts, and each polyphase motor-compressor shall _____.

A. have conductors sized no less than 125% of it's locked-rotor current
B. have conductors sized no less than 100% of it's locked-rotor current
C. be used to calculate it's disconnecting means ampere rating
D. be marked on the motor-compressor nameplate

65. At a high school, the general lighting load shall be calculated at _____ VA per square foot.

A. 2
B. 2 ½
C. 3
D. 3 ½

66. The output circuits of the power supply feeding low voltage lighting systems shall be rated for _____ maximum under all load conditions.

A. 30A
B. 25A
C. 20A
D. 15A

67. The minimum cover for a 2" Rigid Nonmetallic Conduit approved for direct burial under an airport runway is _____.

A. 6 inches
B. 12 inches
C. 18 inches
D. 24 inches

68. The full-load current of a 3-phase 230V, 5HP AC wound-rotor motor is _____.

A. 22A
B. 15.2A
C. 9.6A
D. 7.6A

69. Electrical wiring for lighting, where installed inside of tents and concessions, shall be securely installed and, where subject to physical damage, shall be provided with _____.

A. mechanical protection
B. a means of disconnection within 5 feet of the entrance
C. steel or rigid PVC conduit protecting conductors
D. a lockable enclosure for devices controlling illumination

70. Type AC cable shall be permitted to be _____.

A. installed in damp or wet locations
B. to be run or fished in the air voids of masonry block or tile walls where such walls are exposed or subject to excessive moisture or dampness
C. installed where subject to physical damage
D. embedded in plaster finish or brick or other masonry except in wet locations

71. A dead end of a busway shall be _____.

A. accessible
B. inaccessible
C. open
D. closed

72. The rating of the overcurrent protective device for the circuit supplying the industrial control panel shall not be greater than the sum of the largest rating of the branch-circuit short-circuit and ground-fault protective device provided with the industrial control panel, _____, plus the

sum of the full-load currents of all other motors and apparatus that could be in operation at the same time.

A. plus 80% of the FLA rating of all resistance heating loads
B. plus 125% of the FLA rating of all resistance heating loads
C. plus 150% of the FLA rating of all resistance heating loads
D. plus 100% of the FLA rating of all resistance heating loads

73. Double-throw knife switches shall be permitted to be mounted so that the throw is _____.

A. vertical
B. horizontal
C. either vertical or horizontal
D. lockable

74. For permanently connected appliances rated over 300VA, the circuit breaker shall be permitted to serve as the disconnecting means where the switch or circuit breaker _____from the appliance or be capable of being locked in the open position.

A. is within sight
B. is accessible
C. is remote
D. is inaccessible

75. Fire alarm circuits shall be identified at terminal and junction locations in a manner that _____ during testing and servicing of other systems.

A. allows emergency workers to easily find the means of disconnection
B. identifies the nominal voltage rating of the system
C. is legible
D. helps to prevent unintentional signals on fire alarm circuit(s)

76. Underground wiring in motor fuel dispensing facilities shall be installed in threaded rigid metal conduit, or threaded steel intermediate metal conduit, or where buried under not less than _____ of cover, shall be permitted to be installed in Type PVC, Type RTRC, or Type HDPE conduit.

A. 6 feet
B. 3 feet
C. 2 feet
D. 1 foot

77. A unit that is built on a single chassis mounted on wheels and has a gross trailer area not exceeding 400 ft^2 in the set-up mode is considered a(n):

A. Recreational Vehicle
B. Park Trailer
C. Mobile Home

D. Portable Trailer

78. The total marked rating of a cord- and attachment-plug-connected room air conditioner shall not exceed _____ of the rating of a branch circuit where no other loads are supplied.

A. 125%
B. 90%
C. 80%
D. 75%

79. A thermal barrier shall be required if the space between the resistors and reactors and any combustible material is less than_____.

A. 24 inches
B. 18 inches
C. 12 inches
D. 6 inches

80. As a fixed wiring method encased in _____ inch(es) of concrete, nonmetallic raceways shall be permitted to be used where installed in an occupancy where 100 or more people gather or assemble.

A. 3
B. 2
C. 1
D. ½

81. If FMC is used to connect equipment where flexibility is necessary to minimize the transmission of vibration from equipment or to provide flexibility for equipment that requires movement after installation, a(n) _____ shall be installed.

A. equipment grounding conductor
B. bonding bushing
C. a grounding electrode conductor
D. a bonding jumper

82. A multioutlet assembly shall be permitted to be installed _____.

A. where subject to severe physical damage
B. where the voltage is 300 volts or more between conductors
C. in hoistways
D. in dry locations

83. In ferrous metal enclosures all phase conductors and, where used, the grounded conductor and all equipment grounding conductors shall be _____.

A. grouped together
B. spaced evenly

C. bundled in groups of three
D. kept separate

84. Type ITC cable shall not be installed on circuits operating at more than_____.

A. 1,000V or more than 10A
B. 600V or more than 10A
C. 250V or more than 5A
D. 150V or more than 5A

85. Power-limited control power sources, other than transformers, shall be protected by overcurrent devices rated at not more than _____ of the VA rating of the source divided by the rated voltage.

A. 200%
B. 167%
C. 125%
D. 100%

86. Receptacle outlets of park trailers shall be installed at wall spaces _____ wide or more so that no point along the floor line is more than 6 ft, measured horizontally, from an outlet in that space.

A. 2 ft
B. 3 ft
C. 4 ft
D. 6 ft

87. Vegetation such as trees _____be used for support of overhead service conductors or service equipment.

A. shall
B. shall be permitted to
C. shall not
D. and bushes shall be permitted to be

88. Select the ampacity for (3) 6 AWG THWN conductors installed in a 2" EMT raceway inside a building with an ambient temperature of 57°F.

A. 55A
B. 60A
C. 65A
D. 75A

89. Where capacitors are installed in motor circuits, conductors shall not be less than _____ of the rated current of the capacitor.

A. 135%

B. 125%
C. 115%
D. 80%

90. A three-phase 230V wound-rotor motor rated at 15HP requires short-circuit and ground-fault protection. The manufacturer calls for a non time delay fuse to protect the motor. What size fuse shall be selected?

    A. 40A
    B. 45A
    C. 50A
    D. 60A

91. An industrial machine's name plate shall be attached to the control equipment enclosure or machine and shall be plainly visible after installation. The nameplate shall include:

    A. supply voltage, number of phases, frequency, and FLA
    B. minimum ampere rating of the short-circuit and ground-fault protective device
    C. efficiency and power factor rating
    D. ampere rating of largest motor, from the motor nameplate, or load

92. Fire alarm circuits shall be identified _____ in a manner that helps prevent unintentional signals on fire alarm system circuit(s) during testing and servicing of other systems.

    A. at terminal and junction locations
    B. at the entry point to the Fire System controller
    C. as power-limited circuits near all pull-stations and alarms
    D. on every floor of an assembly occupancy

93. Where the outer sheath of a mineral-insulated, metal-sheathed cable is made of _____, it shall provide an adequate path to serve as an equipment grounding conductor.

    A. aluminum
    B. nickel
    C. copper
    D. steel

94. Where installed for the reduction of electromagnetic interference on the equipment grounding conductor, an isolated ground receptacle's grounding terminal shall be connected to a(n) _____ run with the circuit conductors.

    A. bare equipment grounding conductor
    B. insulated equipment grounding conductor
    C. bonded grounded conductor
    D. insulated ungrounded conductor

95. The use of strut-type channel raceways shall not be permitted _____.

A. in locations subject to corrosive vapors where not protected by finishes approved for the condition
B. in dry locations
C. as power poles
D. where concealed

96. All 15- and 20- ampere, 125 and 250-volt non locking-type receptacles in childcare facilities shall be listed tamper resistant receptacles, except in which of the following instances:

A. receptacles located more than 5 1/2 ft above the floor
B. where located in preschools and elementary education facilities
C. where located in business offices, corridors, waiting room and the like
D. where located in dwelling patient care areas

97. Luminaires shall be constructed, installed, or equipped with shades or guards so that combustible material is not subjected to temperatures in excess of _____.

A. 200°F
B. 194°F
C. 104°F
D. 90°F

98. Luminaires shall be wired so that the screw shells of lamp holders are connected to the same luminaire or circuit conductor or terminal. The _____, where connected to a screw shell lampholder, shall be connected to the screw shell.

A. ungrounded conductor
B. equipment grounding conductor
C. bonding jumper
D. grounded conductor

99. Receptacles rated _____ and designed for the direct connection of aluminum conductors shall be marked CO/ALR.

A. 30 amperes or less
B. 20 amperes or more
C. 20 amperes or less
D. 15 amperes or more

100. Collector rings on electrically driven irrigation machines, where used for control and signal purposes, shall have a current rating not less than _____ of the full-load current of the largest device served plus the full-load current of all other devices served.

A. 100%
B. 125%
C. 175%
D. 200%

101. All electric pool water heaters shall have the heating elements subdivided into loads not exceeding _____ and protected at not over 60A.

    A. 30A
    B. 48A
    C. 50A
    D. 100A

102. The ampacity of electric pool water heaters shall not be less than _____ of the total nameplate rated load.

    A. 125%
    B. 115%
    C. 100%
    D. 83%

103. Temporary holiday decorative lighting shall be permitted for a period not to exceed _____ days.

    A. 30
    B. 60
    C. 90
    D. 120

104. What is the maximum allowed 1/0 AWG THHN conductors that can fit in a 1 1/2" EMT conduit?

    A. 3
    B. 4
    C. 5
    D. 7

105. Which of the following outdoor enclosure types are approved for wind-blown dust applications?

    A. 3RX
    B. 3R
    C. 3X
    D. 2

106. The ampacity of UF cable shall be that of _____.

    A. 30°C (86°F)
    B. 40°C (104°F)
    C. 60°C (140°F)
    D. 75°C (167°F)

107. A conductor installed on the supply side of a service that ensures the required electrical conductivity between metal parts required to be electrically connected is a:

    A. Supply-side Grounding Conductor

B. Bonding Conductor
C. Grounding Electrode Conductor
D. Supply-Side Bonding Jumper

108. The connection of a grounding electrode conductor or bonding jumper to a grounding electrode shall be made in a manner that will ensure _____.

A. an effective grounding path
B. an effective bonding path
C. all ungrounded conductors open simultaneously
D. a separately derived system remains isolated

109. The width of working space in front of electrical equipment shall be the width of the equipment or _____ inches, whichever is greater

A. 30
B. 36
C. 42
D. 48

110. Where not allowed through special conditions, a building or other structure that is served by a branch circuit or feeder on the load side of a service disconnecting means shall be supplied by _____.

A. two or less feeders or branch circuits
B. multiple feeders or branch circuits
C. only one feeder or branch circuit
D. none of the above

111. A(n) _____ is a conducting object through which a direct connection to earth is established.

A. Equipment grounding electrode conductor
B. Grounded Conductor
C. Ground Bus Bar
D. Grounding Electrode

112. The branch-circuit rating for an appliance that is a continuous load shall not be less than _____ of the marked rating.

A. 125%
B. 100%
C. 83%
D. 75%

113. _____ protection shall be provided for outlets that supply dishwashers installed within 6 ft of a sink in dwelling unit kitchens.

A. AFCI

B. GFCI
C. Surge
D. Lightning

114. Screws used for the purpose of attaching receptacles to a box shall be machine screws having _____ threads per inch.

A. 18
B. 21
C. 30
D. 32

115. The frames of ranges, wall-mounted ovens, counter-mounted cooking units, and _____ shall be permitted for existing installations to be connected to the grounded circuit conductor.

A. Refrigerators
B. dishwashers
C. clothes dryers
D. washing machines

116. Underground raceways and cable assemblies entering a hand-hole enclosure shall extend into the enclosure, but they shall not be required to be _____ to the enclosure.

A. electrically connected
B. mechanically connected
C. pneumatically connected
D. tightly connected

117. Raceways shall be used only as a means of support for other raceways where the raceway _____.

A. is identified as a means of support
B. is installed as a complete assembly
C. contains only 600V conductors
D. is installed above a grid ceiling

118. On a 4-wire, delta-connected system where the midpoint of one phase winding is grounded, only the conductor or busbar having the higher phase voltage to ground shall be durably and permanently marked by an outer finish that is _____ in color or by other effective means.

A. yellow
B. purple
C. orange
D. white

119. Nonmetallic-sheathed cable shall be supported and secured by staples, cable ties listed and identified for securement and support, or straps, hangers, or similar fittings designed and installed

so as not to damage the cable, at intervals not exceeding 4 1/2 ft and within _____ inches of every cable entry into enclosures.

A. 12
B. 18
C. 24
D. 30

120. All 15- and 20A, 125- and 250V non-locking type receptacles in dwelling units shall be listed_____receptacles.

A. isolated
B. bonded
C. vertically mounted
D. tamper-resistant

121. Exposed structural metal that is interconnected to form a metal building frame and is not intentionally grounded or bonded and is likely to become energized shall be bonded to a(n) _____.

A. nonmetallic underground pipe
B. grounded conductor at the service
C. aluminum busbar attached to wall
D. ungrounded conductor

122. What is the allowable ampacity for a flexible 3-conductor Type SO-cord with three current-carrying 12 AWG conductors?

A. 18A
B. 20A
C. 25A
D. 30A

123. Heat-resistant thermoplastic-insulation covering 8 AWG conductors are listed for use in _____ locations.

A. dry and damp
B. wet
C. outdoor
D. Indoor

124. Where PV source and output circuits operating at voltages greater than 30 volts are installed in readily accessible locations, circuit conductors shall be guarded or installed in _____ or in raceway.

A. Type MC cable
B. pairs
C. parallel
D. perpendicular lines to the structure

125. For cord-connected equipment a separable connector or a(n) _____ shall be permitted to serve as the disconnecting means.

    A. weatherproof cord cap
    B. toggle switch
    C. attachment plug and receptacle
    D. none of these

126. No parts of cord-connected luminaires shall be located within a zone measuring horizontally _____ feet and 8 feet vertically from the top of the bathtub rim or shower stall threshold.

    A. 3
    B. 4
    C. 5
    D. 6

127. In a dwelling unit, receptacles installed in _____ must be protected by a GFCI receptacle.

    A. bedrooms
    B. bathrooms
    C. attics
    D. dining rooms

128. In dwellings, a receptacle outlet shall be installed so that no point along the wall line is more than _____ inches measured horizontally from a receptacle outlet in that space.

    A. 12
    B. 18
    C. 48
    D. 24

129. Switches or circuit breakers _____ disconnect the grounded conductor of a circuit where all circuit conductors are not disconnected simultaneously.

    A. shall not
    B. shall
    C. 1000 volts or more shall be permitted to
    D. shall be permitted to

130. Multi-wire branch circuits that supply two pieces of utilization equipment, and are not protected by an overcurrent device which opens all ungrounded conductors simultaneously, shall supply only _____.

    A. Line-to-ground loads
    B. Line-to-line loads
    C. Line-to-neutral loads

D. Three-phase loads

131. In a dwelling unit which of the following areas are not required to be AFCI protected?

A. Garages
B. Bedrooms
C. Laundry areas
D. Hallways

132. An intersystem bonding termination for connecting intersystem bonding conductors shall be provided_____enclosures at the service equipment or metering equipment enclosure and at the disconnecting means for any additional buildings or structures.

A. internal to
B. external to
C. no closer than 6 ft apart near
D. inside each

133. Splicing of the wire-type grounding electrode conductor shall be permitted only by _____ listed as grounding and bonding equipment or by the exothermic welding process.

A. a bolt-and-nut termination block
B. heat treating fittings
C. soldered bolt-and-nut fasteners
D. irreversible compression-type connectors

134. In which area shall all 120V, single-phase, 15-and-20A dwelling branch circuits supplying outlets or devices, be protected by an AFCI device?

A. kitchens, libraries, bathrooms
B. family rooms, living rooms, bedrooms
C. kitchens, dining rooms, garages
D. recreation rooms, closets, exterior patios

135. In damp or wet locations, surface-type meter sockets shall be mounted so as to prevent moisture or water from entering and accumulating within the cabinet or cutout box, and shall be mounted so there is at least _____ inch(es) of airspace between the enclosure and the wall or other supporting surface.

A. ⅛
B. ¼
C. ½
D. 2

136. A pool panel requires (3) 6 AWG THHN conductors to feed it, what is the minimum sized schedule 40 PVC conduit that can be used as a raceway for these conductors?

A. ½ inch
B. ¾ inch

C. 1 inch
D. 1 ¼ inch

137. Overhead conductors for festoon lighting shall not be smaller than 12 AWG unless the conductors are _____.

A. listed for use in damp locations
B. of the type THWN, THHN, or XHHW
C. supported by messenger wires
D. no longer than 50 feet in length

138. Tap conductors not over _____ feet long and do not extend beyond the switchboard, switchgear, panelboard, disconnecting means, or control devices they supply shall be permitted to be tapped without overcurrent protection at the tap.

A. 5
B. 10
C. 15
D. 25

139. Where tap conductors supply a transformer and the total length of one primary plus one secondary conductor, excluding any portion of the primary conductor that is protected at its ampacity, is not over 25ft, conductors shall _____.

A. be tapped without overcurrent protection at the tap
B. shall be protected at 200% the ampacity of the feeder being tapped.
C. be protected at 125% the ampacity of the feeder being tapped
D. be permitted to be tapped, without overcurrent protection at the tap

140. A device that, by insertion in a receptacle, establishes a connection between the conductors of the attached flexible cord and the conductors connected permanently to the receptacle is a(n):

A. attachment plug
B. attachment fitting
C. charge controller
D. controller

141. GFCI protection for personnel shall be installed in the branch circuit supplying underwater luminaires operating at _____.

A. voltages greater than the low-voltage contact limit
B. currents greater than the low-voltage contact limit
C. voltages lower than the low-voltage contact limit
D. currents lower than the low-voltage contact limit

142. The minimum overhead clearance from water level to an insulated overhead 240-volt feeder traveling over a pool and supported on a steel messenger cable is _____ feet.

A. 14.5

B. 22.5
C. 25
D. 27

143. A Single-Phase, 3-wire 240V service has 2/0 copper ungrounded service entrance conductors, what is the minimum size grounding electrode conductor that must be installed?

A. 1/0 copper
B. 2 AWG copper
C. 4 AWG Copper
D. 6 AWG copper

144. Copper conductors, for each phase, polarity, neutral, or grounded circuit shall be permitted to be connected in parallel only in sizes _____.

A. 250 Kcmil and larger
B. 1 AWG and larger
C. 2/0 AWG and larger
D. 1/0 AWG and larger

145. An incandescent lamp for general use on lighting branch circuits shall not be equipped with a mogul base if rated over _____ watts.

A. 300
B. 1000
C. 1200
D. 1500

146. The total rating of utilization equipment fastened in place, other than luminaires, shall not exceed _____ of the branch-circuit ampere rating where lighting units, cord-and-plug-connected utilization equipment not fastened in place, or both, are also supplied.

A. 50%
B. 80%
C. 100%
D. 125%

147. Ceiling outlets, where used exclusively for lighting, shall be required to support a luminaire weighing a minimum of _____ lb.

A. 23
B. 25
C. 50
D. 75

148. Receptacle outlets in or on floors shall not be counted as part of the required number of receptacle outlets unless located within _____ inches of the wall.

A. 6

B. 12
C. 18
D. 24

149. Type SE cable shall be permitted for use where the insulated conductors are used for circuit wiring and the uninsulated conductor is used only for _____ purposes.

A. supporting
B. equipment grounding
C. bonding
D. listed

150. Completed wiring installations shall be free from short circuits, ground faults, or _____ other than as required or permitted.

A. any arc faults
B. any debris
C. any interruption
D. any connections to ground

151. A 1/0 copper grounding electrode conductor is used for what size ungrounded service- entrance conductors?

A. Over 350 kcmil – 600 kcmil copper
B. 2/0 copper - 3/0 copper
C. Over 3/0 - 350 kcmil copper
D. Over 600 kcmil through 1100 kcmil

152. Conductors installed in RMC in a trench below 2 inches of thick concrete must have minimum cover of _____inches.

A. 6
B. 12
C. 18
D. 24

153. In grounded systems the earth _____ considered as an effective ground-fault current path.

A. shall be permitted to be
B. up to 5 feet from the service shall be permitted to be
C. up to 10 feet from the service shall be permitted to be
D. shall not be

154. The overhead conductors between the service point and the first point of connection to the service-entrance conductors at the building or other structure.

A. Service Lateral
B. Overhead Service Conductors

C. Service Drop
D. Feeders

155. In a grounded system, if the source of the separately derived system and the first disconnecting means are located in separate enclosures, a supply-side bonding jumper shall be installed with the circuit conductors from the source enclosure to the first disconnecting means enclosure. A supply-side bonding jumper shall not be required to be larger than the _____ conductors.

A. grounded
B. grounding
C. derived ungrounded
D. grounding electrode equipment

156. The service conductor ampacity for a single-phase 240/120V Single-Family Dwelling rated 100-400A shall be permitted to have an ampacity not less than _____ of the service rating.

A. 80%
B. 83%
C. 100%
D. 125%

157. Which of the following list all standard ampere ratings for fuses and inverse time circuit breakers?

A. 15A, 20A, 60A, 75A
B. 80A, 90A,350A, 110A
C. 20A, 25A, 115A, 155A
D. 300A, 400A, 550A, 1000A

158. At least one receptacle(s) outlet shall be installed in bathrooms within _____ feet of the outside edge of each basin.

A. 3
B. 4
C. 5
D. 6

159. Equipment intended to interrupt current at fault levels shall have an interrupting rating at nominal circuit voltage _____ the current that is available at the line terminals of the equipment.

A. less than
B. more than
C. at least 125% above
D. at least equal to

160. At all points where the armor of _____ cable terminates, a fitting shall be provided to protect wires from abrasion, unless the design of the outlet boxes or fittings is such as to afford equivalent protection, and, in addition, an insulating bushing or its equivalent protection shall be provided between the conductors and the armor.

A. MC
B. NM
C. UF
D. AC

161. An insulated grounded conductor of 4 AWG or larger shall be identified by which one of the following means:

A. A continuous black outer finish
B. Three continuous green stripes
C. A continuous white outer finish
D. None of the above

162. Direct-burial cables installed under a two-family driveway shall be buried at a depth of _____.

A. 24 inches
B. 18 inches
C. 12 inches
D. 6 inches

163. A _____ is an enclosure designed for surface mounting that has swinging doors or covers secured directly to and telescoping with the walls of the enclosure.

A. cutout box
B. panelboard
C. switchgear
D. cabinet

164. Where caution, warning, or danger signs or labels are required, the labels shall be _____.

A. affixed to the front face of the equipment they protect
B. red or yellow in color
C. permanently affixed to the equipment or wiring method and shall not be handwritten
D. permitted to be legibly marked with marker or similar means

165. Optional feeder and service load calculations shall be permitted for a dwelling unit having the total connected load served by a single 120/240-volt or 208Y/120-volt set of _____ service or feeder conductors with an ampacity of 100 or greater.

A. parallel
B. independent
C. 2-wire
D. 3-wire

166. Exposed runs of insulated wires and cables that have a bare lead sheath or a braided outer covering shall be _____ to prevent physical damage to the braid or sheath.

A. protected with conduit
B. supported in a manner designed
C. direct buried
D. covered with 1/8" of steel or similar protection

167. The rating of any one cord-and-plug-connected utilization equipment not fastened in place shall not exceed _____ percent of the branch-circuit ampere rating.

A. 80
B. 83
C. 100
D. 125

168. The minimum sized equipment grounding conductor (EGC) required to ground equipment served by a 40-ampere rated branch-circuit is _____AWG copper.

A. 8
B. 10
C. 12
D. 14

169. FMC shall not be used _____.

A. Underground
B. in dry locations
C. Within 6 ft of the outside edge of a water source
D. in dwelling unit attic

170. In _____ locations a flush-mounted switch or circuit breaker shall be equipped with a weather-proof cover.

A. wet,
B. dry
C. damp
D. isolated

171. When calculating a service load, a load of not less than_____ volt-amperes shall be included for each 2-wire laundry branch circuit installed.

A. 3000
B. 1500
C. 1200
D. 950

172. Receptacles installed in a kitchen to serve countertop surfaces shall be supplied by not fewer than _____ small-appliance branch circuit(s).

A. one

B. two
C. three
D. four

173. Conductors that supply one or more welders shall be protected by an overcurrent device rated or set at not more than _____ percent of the conductor ampacity.

A. 100
B. 125
C. 150
D. 200

174. Communications, radio, and television coaxial cables shall be permitted at a height of not less than _____ above swimming and wading pools, diving structures, and observation stands, towers, or platforms.

A. 10 ft
B. 12 ft
C. 18 ft
D. 25 ft

175. Two single-pole switches capable of individual operation shall be permitted on multiwire circuits provided they are equipped with identified handle ties to disconnect all ungrounded conductors _____.

A. So long as each multi-wire branch circuit is separately identified
B. In branch circuits with nominal voltage of under 600 volts between conductors
C. With a minimum of 2 grounded conductors supplying a branch circuit fed from the enclosure thereafter
D. With no more than 6 operations of the hand

176. A 4" x 2 1/8" x 2 1/8" metal square box, with no devices or clamps installed, shall be allowed to have a maximum of _____12 AWG conductors.

A. 5
B. 6
C. 7
D. 9

177. A 120-208V 3-phase panel with exposed live parts on one side, and no live or grounded parts on the other side of the working space, must have a minimum clear working distance of _____ in front of panel.

A. 3 feet
B. 3 feet 6 inches
C. 4 feet
D. 4 feet 6 inches

178. The total cross-sectional area of a 2 inch EMT conduit is 3.356 square inches and has (6) 12 AWG conductors inside it. What is the total area allowed to be taken up by all conductors in this conduit?

    A. 1.342 square inches
    B. 1.566 square inches
    C. 2.013 square inches
    D. 2.343 square inches

179. All pull boxes, junction boxes, and conduit bodies shall be provided with covers compatible with the box or conduit body construction and _____.

    A. be oversized 3/8 inches to allow for expansion
    B. be used on non-metallic conduit bodies of 2 inches or larger
    C. be listed for use in wet environments
    D. suitable for the conditions of use

180. Exposed, normally non-current-carrying metal parts of fixed equipment supplied by or enclosing conductors or components that are likely to become energized shall be connected to an equipment grounding conductor under which of the following conditions:

    A. Where supplied by a wiring method that provides an ungrounded conductor for short sections of metal enclosures
    B. Where within 9 ft horizontally of ground or grounded metal objects
    C. Where equipment operates with any terminal at over 150V to ground
    D. Where located in an isolated wet or damp location

181. A single-family dwelling has a single-phase 125A sub-panel in the garage with a 125A main breaker protecting it. What size equipment grounding conductor shall be used to feed the sub-panel?

    A. 2 AWG
    B. 4 AWG
    C. 6 AWG
    D. 8 AWG

182. In an electrical room with exposed 480/277V live parts on one side of the working space and grounded parts on the other side of the working space, the minimum depth of working space in front of this equipment shall be _____.

    A. 3 feet
    B. 3 feet 6 inches
    C. 4 feet
    D. 4 feet 6 inches

183. The supply-side bonding jumper for a 240V single phase service fed with (2) parallel 300 kcmil Aluminum ungrounded conductors is _____ aluminum.

    A. 2 AWG

B. 4AWG
C. 1/0
D. 3/0

184. An incandescent lamp for general use on lighting branch circuits shall not be equipped with a medium base if rating over _____ watts.

A. 150
B. 200
C. 300
D. 325

185. Snap switches directly connected to aluminum conductors and rated 20 amperes or less shall be marked _____.

A. ALM/CU
B. CO/ALR
C. as use with aluminum conductors only
D. for use in wet environments

186. A concrete-encased electrode shall consist of at least 20 feet of:

A. Bare copper conductor not smaller than 4 AWG
B. Insulated copper conductor not smaller than 4 AWG
C. Bare copper conductor not smaller than 6 AWG
D. Insulated copper conductor not smaller than 6 AWG

187. The branch-circuit conductors for fixed electric space-heating equipment and any associated motors shall be sized not smaller than _____ of the load.

A. 83%
B. 100%
C. 125%
D. 250%

188. Overhead service conductors, where the voltage does not exceed 150 volts to ground, shall have a minimum clearance of _____ feet from final grade above pedestrian sidewalks.

A. 10
B. 12
C. 15
D. 18

189. _____ where the tubing is terminated in listed fittings and the circuit conductors contained in the tubing are protected by overcurrent devices rated at 20A or less are allowed to be considered an equipment grounding conductor.

A. Electrical Metallic Tubing
B. Flexible metallic tubing

C. Electrical Nonmetallic Tubing
D. Flexible Nonmetallic Tubing

190. For enclosures in wet locations, raceways entering above the level of uninsulated live parts shall use fittings listed for _____.

A. Weather-proof use
B. Outdoor use Damp
C. Locations
D. Wet locations

191. Type NM and Type NMC cables shall be permitted to be used in _____.

A. commercial kitchens
B. storage battery rooms
C. one-family dwelling units
D. truck refueling stations

192. A single-phase 3-wire 200A service is constructed at a residence with 3/0 service-entrance conductors. What size copper grounding electrode conductor needs to be installed on this service?

A. 2 AWG
B. 4 AWG
C. 6 AWG
D. 8 AWG

193. In a bathroom where receptacles are installed within 6 feet from the top inside edge of the _____, they must be GFCI protected.

A. bowl of the sink
B. counter top
C. toilet
D. sink faucet

194. The operating handle of a circuit breaker shall be permitted to be accessible _____ opening a door or cover.

A. without
B. while
C. after
D. before

195. Where connected to a branch circuit supplying two or more receptacles or outlets, a 30A receptacle shall not supply a total cord-and-plug connected load in excess of:

A. 16A
B. 24A
C. 25A

D. 30A

196. Type MC cable that contains a(n) _____ or uninsulated equipment grounding conductor can be used as an EGC.

A. steel
B. shielded
C. insulated
D. waterproof

197. In a(n) _____ system, electrical equipment, wiring, and other electrically conductive material likely to become energized shall be installed in a manner that creates a low-impedance circuit from any point on the wiring system to the electrical supply source to facilitate the operation of overcurrent devices should a second ground fault from a different phase occur on the wiring system.

A. grounded
B. ungrounded
C. 1-phase 3-wire
D. 3-phase 4-wire

198. _____ equipment utilizes electric energy for electronic, electromechanical, chemical, heating, lighting, or similar purposes.

A. Cord-and-plug connected
B. Heating
C. Signaling
D. Utilization

199. A branch-circuit OCPD is a device capable of providing protection for service, feeder, and branch circuits and equipment over the full range of over-currents between its _____ and its interrupting rating.

A. rated current
B. short-circuit
C. rated over-current rating
D. rated voltage

200. Where a branch circuit supplies continuous loads or any combination of continuous and noncontinuous loads, the rating of the overcurrent device shall not be less than the non-continuous load plus _____ percent of the continuous load.

A. 83
B. 100
C. 125
D. 200

201. Overcurrent protection for supply conductors as part of a Modular Data Center, shall:

A. consist of a single circuit breaker or set of fuses
B. at no point be considered either as feeders or as taps
C. be marked “OVERCURRENT PROTECTION PROVIDED AT MDC SUPPLY TERMINALS.”
D. not require supplementary overcurrent protection if below 150V to ground.
E. Both A and C

202. A dwelling has 9 ranges installed. Each range has a rating of 8 kW. What is the maximum demand load that should be used for calculating the service and feeder size?

A. 18.9kW
B. 24.5kW
C. 25.2 kW
D. 32.2kW

203. Determine the maximum size inverse-time breaker to be installed as motor short-circuit and ground-fault protection for a 25HP, 460V, 3-phase, squirrel-cage motor.

A. 70A
B. 85A
C. 90A
D. 110A

204. The conductor between the surge arrester and the line, and the surge arrester and the grounding connection shall not be smaller than _____.

A. 8 AWG Copper
B. 6 AWG Copper
C. 4 AWG Copper
D. 2 AWG Copper

205. Class 1 Power-Limited Circuits shall be supplied from a source that has a rated output of not more than _____ volts and 1000 volt-amperes.

A. 30
B. 40
C. 50
D. 75

206. The largest number of 4 AWG THWN conductors that can be installed in an 1 1/4" Type A Liquidtight Flexible Nonmetallic Conduit (LFNC-A), who's length is no more than 18" shall be:

A. 6
B. 7
C. 2
D. 9

207. Electrical wiring installed in rigid metal conduit (RMC) that is below the surface of a Class I, Division 1 location shall be sealed within _____ feet of the point of emergence above grade.

    A. 3
    B. 5
    C. 6
    D. 10

208. Determine the motor overload protection for a 25HP, 460V, 3-phase, squirrel-cage motor who's nameplate lists: 32 FLA, Design B, and Service Factor 1.15.

    A. 40A
    B. 50A
    C. 55A
    D. 65A

209. The service disconnecting means for each service shall consist of a combination of not more than _____ switches or sets of circuit breakers.

    A. 1
    B. 2
    C. 6
    D. 12

210. A 75 kVA 3-phase 480V transformer is fed from a 3-phase 200A fused disconnect. The transformer secondary feeds a 3-phase 120/208V panel less than 25 feet away from the transformer. Size the primary overcurrent protective device that must be installed at this panel, assuming no secondary overcurrent protection will be used.

    A. 200A
    B. 225A
    C. 300A
    D. 350A

211. Busway runs that have sections located both inside and outside of buildings shall have a(n) _____ at the building wall to prevent interchange of air between indoor and outdoor sections.

    A. 4 hour fire barrier
    B. vapor seal
    C. bushing
    D. bonding bushing

212. What is the minimum size equipment grounding conductor required for a feeder consisting of (2) 250kcmil THWN-2 conductors protected by a 250A OCPD?

    A. 2 AWG copper
    B. 3 AWG copper

C. 4 AWG copper
D. 6 AWG copper

213. When concealed knob-and-tube wiring is spliced, _____ or strain splices shall not be used.

A. constructed
B. separated
C. soldered
D. In-line

214. Intrinsically safe circuit conductors in grounded metal-sheathed cables shall _____.

A. not be installed with conductors of a non intrinsically safe circuit
B. be permitted to be installed with conductors of a non intrinsically safe circuit
C. be constructed of a moisture-resistant thermosetting
D. be constructed of a moisture- and heat-resistant thermoplastic

215. If the generator is installed as a non separately derived system, and overcurrent protection is not integral with the generator assembly, a(n) _____ shall be installed between the generator equipment grounding terminal and the equipment grounding terminal of the disconnecting mean(s).

A. supply-side bonding jumper
B. main bonding jumper
C. system bonding jumper
D. grounded conductor

216. The continuity of a _____ shall not depend on a connection to a metallic enclosure, raceway, or cable armor.

A. ungrounded conductor
B. bonding jumper
C. grounded conductor
D. equipment grounding conductor

217. Where grounded conductors of different systems are installed in the same raceway, cable, box, auxiliary gutter, or other type of enclosure, each grounded conductor shall be identified by _____.

A. temporary means
B. system
C. permanent means
D. distinctive separate colors

218. A 1000A service is being installed on a dwelling with a total calculated load of 1057A. Rather than installing (2) extremely large parallel conductors, it has been decided to run (4) smaller THWN conductors that, when combined, are equivalent to the total circular mil area of the larger conductors, for ease of install. What (4) conductors should be run for this service?

A. (4) 250 kcmil THWN
B. (4) 300 kcmil THWN
C. (4) 350 kcmil THWN
D. (4) 4/0 kcmil THWN

219. Any equipment used in the dc circuits of a dc microgrid shall be listed and labeled for _____.

A. ac to dc conversion
B. dc to ac inversion
C. use with ac circuits
D. dc use

220. Shore power for boats shall be provided by single receptacles rated not less than _____.

A. 15 A
B. 20 A
C. 30 A
D. 40 A

221. For battery chemistries with _____, the structure that supports the battery shall be resistant to deteriorating action by the electrolyte.

A. noncorrosive electrolyte
B. corrosive electrolyte
C. lead-core
D. acid-core

222. Where mating dissimilar metals, antioxidant material suitable for the battery connection shall be:

A. applied under engineer supervision
B. reapplied every 12 months where stored in corrosive environments
C. used when recommended by the battery or cell manufacturer
D. constructed with fire-retardant, moisture-resistant chemicals

223. Type 1 surge protection devices (SPDs) installed at services shall be connected to which of the following?

A. Grounded service conductor
B. Grounding electrode conductor
C. Equipment grounding terminal in the service equipment
D. All of these

224. Circuits exceeding 120 volts, nominal, between conductors but not exceeding 277 volts, nominal, to ground shall be permitted to supply _____.

A. luminaires equipped with mogul-base screw shell lampholders
B. luminaires equipped with medium-base screw shell lampholders

C. magnetic low-voltage lighting
D. labeled electric-discharge lighting

225. Open outside branch circuit conductors shall be separated from open conductors of other circuits or systems by not less than:

A. 3 inches
B. 4 inches
C. 6 inches
D. 8 inches

226. Electrified truck parking space equipment provided from either overhead gantry or cable management systems shall _____ in electrified truck parking space supply equipment.

A. utilize a temporarily attached power supply cable utilize a twist
B. lock power supply cable
C. utilize a moisture-resistant power supply cable
D. utilize a permanently attached power supply cable

227. All electrically conductive objects that convey flammable or combustible liquids in spray applications _____.

A. shall be protected by a sealable glass or equivalent means that prevents inhalation or physical damage
B. shall be electrically grounded
C. shall be protected by a ground-fault circuit interrupter at the service equipment
D. shall be protected by an arc-fault circuit interrupter at the service equipment

228. In dwelling units and guest rooms or guest suites of hotels, motels, and similar occupancies, the voltage shall not exceed _____, nominal, between conductors that supply the terminals of luminaires

A. 120V
B. 130V
C. 240V
D. 277V

229. A(n) _____ shall be permitted to be used in lieu of a box at the end of a rigid metal conduit where the raceway terminates at unenclosed controls or equipment.

A. connector
B. coupling
C. bushing
D. elbow

230. Equipment intended to interrupt current at other than fault levels shall have an interrupting rating at nominal circuit voltage _____ the current that must be interrupted.

A. at least greater than
B. at most, less than
C. matching
D. at least equal to

231. Infrared industrial process heating equipment lampholders shall be permitted to be operated in series on circuits of _____, provided the voltage rating of the lampholders is not less than the circuit voltage.

A. over 150V to ground
B. over 50V to ground
C. over 120V to ground
D. over 300V to ground

232. Legally required standby system wiring shall be permitted to occupy _____ raceways, cables, boxes, and cabinets with other general wiring.

A. separate
B. the same
C. only two
D. nonmetallic

233. In generator sets driven by a prime mover, a time-delay feature permitting a minimum _____ setting shall be provided to avoid retransfer in case of short-time reestablishment of the normal source.

A. 15-minute
B. 20-minute
C. 30-minute
D. 60-minute

234. There is a set of 3 overhead 7200V conductors supported on a solidly grounded messenger wire that runs over the pool, and over the diving platform. What is the minimum clearance these conductors must be from the diving platform?

A. 14.5 feet
B. 17 feet
C. 18 feet
D. 22.5 feet

235. Lamps located in cellulose nitrate film vaults shall be installed in rigid luminaires of the _____ type.

A. vapor-proof
B. explosion proof
C. polyvinyl-enclosed and gasketed
D. glass-enclosed and gasketed

236. For an Energy Storage System (ESS), the disconnecting means for all ungrounded conductors derived from the ESS shall be _____.

    A. guarded
    B. accessible
    C. readily accessible
    D. protected from physical damage

237. A generator is fed with 250 kcmil copper ungrounded conductors. This generator shall have what sized minimum system bonding jumper?

    A. 1/0 AWG copper
    B. 2 AWG copper
    C. 4 AWG copper
    D. 6 AWG copper

238. For field installed neon secondary conductors over 1000 volts, the length of the secondary circuit conductors from the transformer leads to the first neon tubing electrode shall not exceed _____ where installed in metal conduit or tubing.

    A. 10 feet
    B. 20 feet
    C. 50 feet
    D. 100 feet

239. Conductors shall be considered outside the building when installed in conduit and under not less than _____ of earth beneath a building or other structure.

    A. 6 inches
    B. 12 inches
    C. 18 inches
    D. 24 inches

240. The short-circuit and ground-fault protection for a hermetic motor-compressor shall have a rating NOT exceeding _____ of the motor-compressor rated-load current.

    A. 125 %
    B. 150 %
    C. 175 %
    D. 225 %

241. In instances of areas within the same facility classified separately, Class I, Zone 2 locations shall be permitted to _____ Class I, Division 2 locations.

    A. overlap
    B. be installed above
    C. be installed below
    D. abut, but not overlap

242. Fixed equipment above class I locations that may produce arcs or sparks shall be of the _____ type.

A. totally enclosed
B. partially enclosed
C. explosion-proof
D. weather-proof

243. In a studio stage set lighting and effects system, if contactors are used as the disconnecting means for fuses, what is the maximum allowable distance for an individual externally operable switch controlling each contactor?

A. 3 feet
B. 5 feet
C. 6 feet
D. 7 feet

244. Up to three sets of 3-wire feeders or _____sets of 4-wire or 5-wire feeders shall be permitted to utilize a common neutral.

A. one
B. two
C. three
D. four

245. The radius of the curve of the inner edge of any bend of Type SE cable, during or after installation, shall not be less than _____ the diameter of the cable.

A. five times
B. six times
C. seven times
D. eight times

246. Sheet metal auxiliary gutters shall be supported and secured throughout their entire length at intervals not exceeding _____.

A. 3 feet
B. 5 feet
C. 6 feet
D. 10 feet

247. In no case shall a service point of attachment be less than _____ above finished grade.

A. 9 feet
B. 10 feet
C. 12 feet
D. 12 ft 6 in

248. Where supplementary overcurrent protection is used for appliances, it _____ as a substitute for required branch-circuit overcurrent devices.

A. shall be used
B. is required
C. is optional
D. shall not be used

249. A 3-phase 240V service fed with 2/0 aluminum conductors shall have a minimum size main bonding jumper of what size?

A. 2 AWG aluminum
B. 4 AWG copper
C. 6 AWG copper
D. 6 AWG aluminum

250. Where used at a point on a circuit, the surge-protective device SPD shall be connected to _____.

A. each ungrounded conductor
B. the circuit's grounded conductor
C. an equipment grounding conductor
D. the grounding electrode conductor

251. A receptacle outlet is not required at one- and two-family dwellings for the service of _____.

A. pool equipment
B. evaporative coolers
C. AC condensers
D. hot water heaters

252. Conductors that supply one or more resistance welders shall be protected by an overcurrent device rated or set at not more than _____ of the conductor ampacity.

A. 80%
B. 125%
C. 200%
D. 300%

253. Intermediate Metal Conduit (IMC) shall be permitted to be installed in or under cinder fill where subject to permanent moisture where protected on all sides by a layer of non cinder concrete not less than _____ thick

A. 2 inches
B. 4 inches
C. 6 inches
D. 12 inches

254. A bare 4 AWG compact copper conductor has a diameter of _____.

A. 0.169 inches
B. 0.213 inches
C. 0.268 inches
D. 0.312 inches

255. In a building in which critical operations power systems (COPS) are present with other types of power systems described in other sections in this article, the cover plates for the receptacles or the receptacles themselves supplied from the COPS shall _____.

A. be bonded to the building grounding electrode conductor in a manner that establishes a low-impedance ground-fault path
B. be labeled with its circuit number and panel it's supplied from
C. have a distinctive color or marking so as to be readily identifiable
D. be labeled with its supplied voltage rating

256. Any combustible wall exposed between the edge of a luminaire canopy and an outlet box having a surface area of _____ shall be covered with noncombustible material.

A. 90 sq-in or more
B. 120 sq-in or more
C. 180 sq-in or more
D. 240 sq-in or more

257. A sign shall be placed at the _____ for commercial and industrial installations that indicates the type and location of each on-site optional standby power source.

A. nearest building entrance
B. nearest building exit
C. top and bottom of common area stairways
D. service-entrance equipment

258. Low-voltage suspended ceiling power distribution systems shall be permanently connected and shall be permitted for listed utilization equipment capable of operation at a maximum of _____.

A. 24.8V AC
B. 30V AC
C. 60V AC
D. 42.4V AC

259. The working clearance for a park trailer panelboard shall be not less than _____ inches wide and 30 inches deep.

A. 24
B. 30
C. 36
D. 42

260. Receptacles shall be mounted not less than _____ above the deck surface of the pier and not below the electrical datum plane on a fixed pier.

    A. 12 inches
    B. 18 inches
    C. 24 inches
    D. 30 inches

261. Where the AHJ can satisfactorily determine that flammable liquids having a flash point below _____ , will not be handled, such location shall not be required to be classified.

    A. 212°F
    B. 121°F
    C. 104°F
    D. 100°F

262. Resistors and reactors shall have a clearance of not less than _____ from combustible materials.

    A. 6 inches
    B. 12 inches
    C. 18 inches
    D. 24 inches

263. Electrical service and feeders shall be calculated on the basis of not less than _____ per electrified truck parking space.

    A. 5 kVA
    B. 8 kVA
    C. 11 kVA
    D. 12 kVA

264. Where the secondary resistor of a wound-rotor AC motor is separate from the controller, and the motor is rated for light intermittent duty, the ampacity of the conductors between controller and resistor shall not be less than:

    A. 55%
    B. 65%
    C. 75%
    D. 85%

265. Where a controller is built in as an integral part of a(n) _____, individual marking of the controller shall not be required if the necessary data are on the nameplate.

    A. motor
    B. x-ray machine
    C. elevator
    D. appliance

266. Where _____ service disconnecting means in separate enclosures are grouped at one location and supply separate loads from one service drop, one set of service-entrance conductors shall be permitted to supply each or several such service equipment enclosures.

    A. one to five
    B. one to six
    C. two to six
    D. three to six

267. A space not less than _____ shall be provided between the top of a switchboard and any combustible ceiling.

    A. 3 feet
    B. 4 feet
    C. 5 feet
    D. 6 feet

268. The sum of cross-sectional areas of all contained conductors or cables at any cross section of a nonmetallic wireway shall not exceed _____ of the interior cross-sectional area of the nonmetallic wireway.

    A. 60%
    B. 40%
    C. 30%
    D. 20%

269. For permanently connected appliances rated at not over _____ or 1⁄8 hp, the branch-circuit overcurrent device shall be permitted to serve as the disconnecting means where the switch is within sight from the appliance.

    A. 150VA
    B. 180VA
    C. 250VA
    D. 300VA

270. Metallic structures of battery support systems shall be provided with _____ support members for the cells, or shall be constructed with a continuous insulating material.

    A. metallic
    B. nonconducting
    C. reinforced
    D. independent

271. Where insulated conductors 4 AWG or larger are pulled straight through a multioutlet assembly, the distance between raceway and cable entries enclosing the same conductor shall not be less than _____.

    A. eight times the metric designator (trade size) of the largest raceway.

B. six times the metric designator (trade size) of the largest raceway.
C. four times the metric designator (trade size) of the largest raceway.
D. two times the metric designator (trade size) of the largest raceway.

272. Each patient bed location shall be supplied by at least two branch circuits, one from the _____ and one from the normal system. All branch circuits from the normal system shall originate in the same panelboard.

A. emergency override
B. isolated grounding system
C. energy-storage system
D. critical branch

273. Where run across the top of floor joists, or within _____ of the floor or floor joists across the face of rafters or studding, the cable shall be protected by guard strips that are at least as high as the cable.

A. 3 feet
B. 5 feet
C. 6 feet
D. 7 feet

274. The radius of the curve of the inner edge of any bend in smooth MC cable shall not be less than _____ the external diameter of the metallic sheath for cables less than 3/4" in external diameter.

A. six times
B. eight times
C. ten times
D. twelve times

275. Restricted Access, as it applies to adjustable-trip circuit breakers, shall be defined as located behind:

A. located behind removable and sealable covers over the adjusting means
B. located behind bolted equipment enclosure doors
C. located behind locked doors accessible only to qualified personnel
D. Any of these

276. Power to the utilization equipment shall not be supplied until _____.

A. the rotary-phase converter has been started
B. the rotary-phase converter has be tested
C. the installation is inspected by an electrical engineer
D. the installation is inspected by an AHJ

277. All non-current-carrying metal parts of equipment and raceways that contain or support service conductors shall be _____.

A. grounded separately
B. bonded together
C. bonded separately
D. grounded together

278. The minimum bending radius for 1 inch nonmetallic underground conduit with conductors shall be no less than _____.

A. 6 inches
B. 12 inches
C. 14 inches
D. 18 inches

279. No conductor larger than _____ shall be installed, except by special permission, in Cellular Metal Floor Raceways

A. 1 AWG
B. 1/0 AWG
C. 2/0 AWG
D. 3/0 AWG

280. Where equipment is installed outdoors on a roof, an equipment grounding conductor of the wire type shall be installed in outdoor portions of metallic raceway systems that use _____.

A. threaded fittings
B. expansion fittings
C. non-threaded fittings
D. compression-type fittings

281. Where structural reinforcing steel is not available or encapsulated in a nonconductive compound, a copper conductor(s) shall be utilized where all of the following requirements are met, except:

A. The required conductor shall be secured within or under the perimeter surface 120 mm to 170 mm (6 in to 8 in) below the subgrade
B. At least one minimum 8 AWG bare solid copper conductor shall be provided
C. The conductors shall follow the contour of the perimeter surface
D. The required conductor shall be 450 to 600 mm (18 to 24 in) from the inside wall of the pool

282. Each branch-circuit disconnect rated _____ or more and installed on solidly grounded wye electrical systems of more than 150V to ground, but not exceeding 600V phase-to-phase, shall be provided with ground-fault protection of equipment.

A. 600A
B. 800A
C. 1000A
D. 1200A

283. Overhead spans of open conductors not over 1000V shall have a clearance of not less than _____ over public streets.

A. 12 feet
B. 15 feet
C. 18 feet
D. 24 ½ feet

284. A Class II or Class III, Division 1 or Division 2 location shall be permitted to be reclassified as a Zone 20, Zone 21, or Zone 22 location, provided that all of the space that is classified because of a single combustible dust, combustible fiber/flying, or ignitible fiber/flying source is _____ under the requirements of this article.

A. classified
B. identified
C. listed
D. reclassified

285. The entire space within and under a dispenser pit or containment in a motor fuel dispensing facility is classified as a(n):

A. Class I Division 1
B. Class II Division 1
C. Class I Division 2
D. Class II Division 2

286. Where Type PVC conduit, Type RTRC conduit, or cable with a nonmetallic sheath is used, an _____ shall be included to provide for electrical continuity of the raceway system and for grounding of non–current- carrying metal parts.

A. grounding electrode conductor main
B. equipment grounding conductor
C. bonding jumper
D. none of these

287. 22AWG control circuit conductors with 75°C insulation in a 30°C ambient environment shall have a maximum ampacity of _____ for permanent amusement attractions.

A. 2A
B. 3A
C. 4A
D. 5A

288. The capacity of the sum of all sources of the stand-alone supply shall be equal to or greater than the load posed by the _____ utilization equipment(s) connected to the stand-alone system.

A. largest single
B. smallest single

C. total combined load of all
D. largest two

289. Where cord and plug connection is provided to office lighting accessories, it shall comply with all of the following except:

A. Cords on the load side of a listed Class 2 power source are required to contain an equipment grounding conductor
B. The cord length shall be suitable for the intended application but shall not exceed 9 ft in length
C. The cord shall not be smaller than 18 AWG
D. The cord shall be of the hard usage type

290. The ampacity of the supply conductors for a resistance welder that may be operated at different times at different values of primary current or duty cycle shall not be less than _____of the rated primary current for seam and automatically fed welders, and _____of the rated primary current for manually operated nonautomatic welders.

A. 40% / 60%
B. 50% / 70%
C. 60% / 40%
D. 70% / 50%

291. The supply circuit to the mechanical ventilation equipment of charging equipment for an electric vehicle, shall be electrically _____ with the equipment and shall remain energized during the entire electric vehicle charging cycle.

A. neutral
B. locked out
C. isolated
D. interlocked

292. On switchgear and control panels exceeding _____in width, there shall be one entrance at each end of the equipment.

A. 4 feet
B. 4 ½ feet
C. 5 feet
D. 6 feet

293. Where _____ branch circuits supply devices on the same yoke, a means to simultaneously disconnect the ungrounded supply conductors shall be provided.

A. two or more
B. three or more
C. four or more
D. none of the above

294. Circuits exceeding 120V, nominal, between conductors and not exceeding _____, nominal, to ground shall be permitted to supply luminaires for illumination of outdoor areas of commercial buildings.

    A. 208V
    B. 240V
    C. 277V
    D. 480V

295. Cable trays used to support service-entrance conductors shall contain only service-entrance conductors and shall be limited to _____,

    A. Type UF
    B. Type MC
    C. Type SO
    D. Type EV

296. Type MV cable terminated in equipment shall be secured and supported at intervals not exceeding _____from terminations or a maximum of _____between supports.

    A. 4 ft, 5 ft
    B. 5 ft, 5 ft
    C. 5 ft, 6 ft
    D. 6 ft, 4 ft

297. All 15- and 20A, 125- and 250V non locking-type receptacles in corridors of dental offices shall be _____.

    A. listed tamper-resistant receptacles
    B. installed ground-up
    C. installed ground-down
    D. GFCI protected

298. Transformers insulated with listed less-flammable liquids that have a fire point of not less than 300°C shall be permitted to be installed in Type I or Type II buildings, in areas where the transformer is rated 45,000 volts or more.

    A. TRUE
    B. FALSE

299. Where dimmers are installed in ungrounded conductors, each dimmer shall have overcurrent protection not greater than _____of the dimmer rating and shall be disconnected from all ungrounded conductors when the master or individual switch or circuit breaker supplying such dimmer is in the open position.

    A. 110%
    B. 115%
    C. 120%

D. 125%

300. In agricultural buildings the bonding conductor used for equipotential planes shall be solid copper, insulated, covered or bare, and not smaller than _____.

A. 2 AWG
B. 4 AWG
C. 6 AWG
D. 8 AWG