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**Quiz 1**

1. Installations under the exclusive control of an electric utility \_\_\_\_\_.
  - Consist of service drops
  - Are service laterals
  - Have associated metering
  - All of the answers provided
2. On property owned or leased by the electric utility for the purpose of \_\_\_\_\_ are not covered by the NEC.
  - Metering
  - Generation
  - Control
  - All of the answers provided and more
3. Some of the installations shall be limited to \_\_\_\_\_.
  - Shopping malls
  - Military bases
  - Weight stations
  - Grocery stores
4. Explanatory materials such as references to \_\_\_\_\_ are included in this Code in the form of informational notes.
  - other standards
  - related sections of this Code
  - information related to a Code rule
  - all of the answers provided
  - none of the answers provided
5. Informative annexes \_\_\_\_\_ part of the enforceable requirements of the NEC, but are included for information purposes only.
  - are
  - may be
  - are not
  - are not adopted in 2011 NEC

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6. An arc-fault interrupter (AFCI) is a device intended to provide protection from the effects of arc faults by \_\_\_\_\_ characteristics unique to arcing and by functioning to de-energize the circuit when an arc fault is detected.
  - constructing
  - recognizing
  - changing
  - welding
7. These installations under the exclusive control of an electric utility are on property owned or leased by the electric utility for the purpose of \_\_\_\_\_.
  - communications
  - metering
  - generation
  - control
  - all of the answers provided and more
8. Some of the installations under the exclusive control of an electric utility shall be limited to \_\_\_\_\_ when legal rights-of-way cannot be obtained.
  - shopping malls
  - military bases
  - office buildings
  - grocery stores
9. An area including a basin with \_\_\_\_\_ or more of the following: a toilet, a urinal, a tub, a shower, a bidet, or similar plumbing fixtures is considered a bathroom.
  - none
  - one
  - two
  - three
10. A bonding jumper is the connection between the \_\_\_\_\_, at a separately derived system.
  - grounded circuit conductor
  - supply-side bonding jumper
  - equipment grounding conductor
  - all of the answers provided
11. An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the \_\_\_\_\_ is known as a ground fault.
  - normally non-current-carrying conductors
  - metallic raceways
- earth
- all of the answers provided and more
12. An Arc-Fault Circuit Interrupter (AFCI) is a device intended to provide protection from the effects of arc faults by \_\_\_\_\_ characteristics unique to arcing and by functioning to de-energize the circuit when an arc fault is detected.
  - constructing
  - recognizing
  - changing
  - welding
13. Automatic means \_\_\_\_\_.
  - performing a function with the necessity of human intervention
  - changing a function with the necessity of human intervention
  - performing a function without the necessity of human intervention
  - none of the answers provided
14. Non-automatic means \_\_\_\_\_.
  - does Not require human intervention to perform a function
  - performs a function without the necessity of human intervention
  - requires human intervention to perform a function
  - none of the answers provided
15. A bathroom is an area including a basin with \_\_\_\_\_ or more of the following: a toilet, a urinal, a tub, a shower, a bidet, or similar plumbing fixtures.
  - none
  - one
  - two
  - three
16. A Bonding jumper is the connection between \_\_\_\_\_ and the supply-side bonding jumper.
  - the ground circuit conductor
  - the secondary side bonding jumper
  - the equipment grounding conductor
  - all of the answers provided

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17. An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the \_\_\_\_\_.
- normally non-current-carrying conductors
  - metallic raceways
  - earth
  - all of the answers provided and more
18. The name of the device that provides a means for connecting bonding conductors for communications systems to the grounding electrode system is called a(n) \_\_\_\_\_.
- bonding System
  - ground Electrode System
  - power System
  - intersystem Bonding Termination
19. A kitchen must have \_\_\_\_\_.
- a stove
  - a refrigerator
  - a sink
  - food preparation areas
20. A premises wiring system whose power is derived from a source of electrical energy or equipment other than a service is known as a \_\_\_\_\_.
- separately derived system
  - inclusively derived system
  - co-existent system
  - dual powered system
21. The service-drop conductors connect to the service point at the service entrance cap. The conductors between the entrance cap and the service entrance conductors are called \_\_\_\_\_.
- overhead service conductors
  - side wall service conductors
  - dual purpose service conductors
  - multiple usage conductors
22. The underground conductors located between the service point and the first points of connection to the service-entrance conductors are called \_\_\_\_\_.
- buried cables
  - sub-terrarium conductors
  - underground service conductors
  - sub-grade conductors
23. Where there is no terminal box, meter, or other enclosure, the point of connection between the service point and the service entrance conductors is considered to be \_\_\_\_\_.
- the point of exit of the enclosure service conductors into the building
  - the point of the service drop into the building
  - the point of entrance of the service conductors into the building
  - the area of spaces for the service drop to reach the building
24. The overhead conductors between the utility electric supply system and the service point are known as \_\_\_\_\_.
- service drops
  - conductor drops
  - service entrances
  - power conductor cables
25. An uninterruptible power supply is designed to \_\_\_\_\_.
- provide more constant voltage and frequency supply to the load
  - reduce the effects of voltage and frequency variations
  - provide alternating current power to a load for some time period in the event of a power failure
  - none of the answers provided
26. Special conditions of use or other limitations and other pertinent information may be \_\_\_\_\_.
- marked on the equipment
  - included in the product instructions
  - included in the appropriate listing and labeling information
  - all of the answers provided
27. \_\_\_\_\_ shall be identified for the material of the conductor and shall be properly installed and used.
- Pressure terminals
  - Pressure splicing connectors
  - Soldering lugs
  - All the answers provided

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28. Conductors of dissimilar metals shall not \_\_\_\_\_ unless the device is identified for the purpose and conditions of use.
- be intermixed in a terminal
  - have splicing connectors where physical contact occurs between dissimilar conductors
  - both of the answers provided
  - none of the answers provided
29. Materials such as solder, fluxes, inhibitors, and compounds shall be of a type that will not adversely affect the \_\_\_\_\_.
- conductors
  - installation
  - equipment
  - all of the answers provided

## Quiz 2

1. The Arc-Flash Hazard Warning markings shall be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.
- a. True
  - b. False
2. The following field marking information should be provided on service equipment:
- a. Maximum available fault current with the date the calculation was performed.
  - b. Field markings are not required.
  - c. "WARNING: HIGH VOLTAGE".
  - d. Field tested Line voltage.
3. If modifications are made, then the required field marking(s) in \_\_\_\_\_ shall be adjusted to reflect the new level of maximum available fault current.
- a. 110.24(A)
  - b. 210.24(A)
  - c. 310.24(A)
  - d. 410.24(A)
4. If modifications are made that affect the available fault current, modified field markings are not required when the installation is \_\_\_\_\_.
- a. in a private residence
  - b. in a public building
  - c. in an industrial setting where conditions of maintenance and supervision insure that only qualified persons service the equipment
  - d. field markings are always required
  - e. none of the above
5. The work space shall be clear and extend from the grade, floor, or platform to a height of \_\_\_\_\_ or the height of the equipment, whichever is greater.
- a. 0.5 m
  - b. 1.0 m
  - c. 1.5 m
  - d. 2.0 m
6. In existing dwelling units, service equipment or panel boards that do not exceed \_\_\_\_\_ amperes shall be permitted in spaces where the height of the working space is less than 2.0 m.
- a. 50
  - b. 100
  - c. 150
  - d. 200
7. Illumination shall be provided for all working spaces for \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, or \_\_\_\_\_ and shall not be controlled by automatic means only.
- a. jumper cables, ovens, electrical wire, outdoor lighting
  - b. light sources, dwelling units, motors, control boards
  - c. switch receptacles, dwelling units, water heaters, service equipment
  - d. service equipment, switchboards, panel boards, motor control centers installed indoors
8. Electrical enclosures rated not over 600 volts shall be marked with an enclosure type as shown in Table \_\_\_\_\_.
- a. 110.28
  - b. 316.1
  - c. 431.0
  - d. 435.5
9. Many enclosures not exceeding \_\_\_\_\_, shall be marked.
- a. 200 volts
  - b. 400 volts
  - c. 600 volts
  - d. 800 volts

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10. What table is used for selecting these enclosures for use in specific locations other than hazardous locations?

- a. 90.53
- b. 99.32
- c. 100.28
- d. 110.28

11. Electrical vaults above \_\_\_\_\_ have numerous design requirements.

- a. 100 volts
- b. 200 volts
- c. 400 volts
- d. 600 volts

12. All electrical vault doorways shall be provided with a tight-fitting door that has a min. fire rate of \_\_\_\_\_.

- a. 1 hour
- b. 2 hours
- c. 3 hours
- d. 4 hours

13. All electrical vaults should be \_\_\_\_\_.

- a. monitored daily
- b. locked
- c. left unlocked
- d. open to public

14. Transformers installed in a vault shall be constructed according to the requirements of Part III of Article 450.

- a. True
- b. False

15. Conductors installed in \_\_\_\_\_ shall be cabled, racked up, or arranged in an approved manner that provides access for persons to enter for installation and maintenance.

- a. manholes
- b. enclosures
- c. both of the answers provided
- d. none of the answers provided

16. Wire bending space for conductors operating \_\_\_\_\_ shall be provided in accordance with the requirements of 314.28.

- a. over 500 volts
- b. over 600 volts
- c. 500 volts or less
- d. 600 volts or less

17. Conductors operating \_\_\_\_\_ shall be provided with bending space in accordance with 314.71(A) and (B).

- a. over 500 volts
- b. over 600 volts
- c. 500 volts or less
- d. 600 volts or less

## Quiz 3

1. Neutral conductors shall not be used for more than \_\_\_\_\_ unless specifically permitted elsewhere in this code.

- one branch circuit
- one multi-wire branch circuit
- one set of ungrounded feeder conductors
- all of the answers provided

2. If branch circuits are supplied from more than one nominal voltage system, then each ungrounded conductor of a branch circuit shall be identified by phase or line and system at \_\_\_\_\_.

- all terminations
- all connections
- all splice points
- all of the answers provided

3. The means of identification shall be permitted to be by separate color coding, marking tape, tagging or other approved means.

- True
- False

4. The identification method utilized for conductors originating within each branch-circuit panel board shall be \_\_\_\_\_ in a manner that is readily available.

- documented
- permanently posted at each branch-circuit panel board
- both answers given are correct
- neither answer is correct

5. Where \_\_\_\_\_ or more branch circuits supply devices or equipment on the same yoke shall be provided at the point at which the branch circuits originate.

- a. one
- b. two
- c. three

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6. Garages, service bays, and similar areas where \_\_\_\_\_ are to be used, shall have a GFCI protector installed.
  - electrical diagnostic equipment
  - electrical hand tools
  - portable lighting equipment
  - all of the answers provided
7. Receptacles installed for countertop surfaces as specified in 210.52(C) shall not be considered as the receptacles required by 210.52(A).
  - True
  - False
8. Receptacle outlets shall be located on or above, but not more than \_\_\_\_\_ above the countertop.
  - 200 mm
  - 10 inches
  - 15 inches
  - 20 inches
9. Receptacle outlet assemblies listed for the application \_\_\_\_\_ permitted to be installed in countertops.
  - shall be
  - shall not be
10. In what section is the requirement for installation of receptacles in countertops?
  - 206.5(E)
  - 306.5(E)
  - 406.5(E)
  - 506.5(E)
11. Foyers that are not part of a hallway in accordance with 210.52(H) and that have an area that is greater than \_\_\_\_\_ shall have a receptacle(s) located in each wall space 3 ft. or more in width and unbroken by doorways, floor-to-ceiling windows, or similar openings.
  - 50 ft.
  - 60 ft.
  - 80 ft.
  - 100 ft.
12. For track lighting in other than dwelling units, guest rooms, or guest suites of hotels or motels, an additional load of \_\_\_\_\_ shall be included for every 2 ft. of track lighting or fraction thereof.
  - 50 volt-amperes
  - 100 volt-amperes
  - 150 volt-amperes
  - 200 volt-amperes
13. If the track lighting is supplied through a device that limits the current to the track, the load shall be permitted to be \_\_\_\_\_ based on the rating of the device used to limit the current.
  - calculated
  - installed
  - programed
  - plugged in
14. Circuits exceeding \_\_\_\_\_ between conductors and not exceeding \_\_\_\_\_ to ground shall be permitted to supply luminaires for illumination of outdoor areas of industrial establishments, office buildings, schools, stores, and other commercial or public buildings.
  - 100 volts, 200 volts
  - 110 volts, 250 volts
  - 120 volts, 277 volts
  - 130 volts, 300 volts
15. Where a raceway enters a building or structure from an underground distribution system, it shall be sealed in accordance with \_\_\_\_\_.
  - 100
  - 502.26
  - 300.4(G)
  - 300.5(G)
16. Sealants shall be identified for use with the \_\_\_\_\_.
  - cable insulation
  - shield
  - other components
  - all of the answers provided
17. A disconnecting means shall be capable of being locked in the open position.
  - True
  - False
18. \_\_\_\_\_ consists of fused cutouts, suitable enclosure, and sized to contain all cutout fuse holders.
  - A multi disconnecting means
  - A manual disconnecting mean
  - An individual disconnecting means
  - all of the answers provided

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19. A permanent, legible warning notice contain the words \_\_\_\_\_.
- "DANGER – HIGH VOLTAGE"
  - "WARNING – HIGH VOLTAGE"
  - DANGER – LOW VOLTAGE"
  - "WARNING – LOW VOLTAGE"
20. The warning notice shall be placed \_\_\_\_\_.
- at all entrances
  - at points of access
  - on all cable trays
  - all of the answers provided
5. If the number of service disconnect locations exceeds \_\_\_\_\_ for any given supply classification, it shall be clearly described using suitable graphics, text, or both on one or more plaques located near each service drop.
- two
  - four
  - six
  - ten
6. A single-family dwelling unit and its accessory structures shall be permitted to have one \_\_\_\_\_.
- set of overhead service conductors
  - service lateral
  - both of the answers provided
  - none of the answers provided

## Quiz 4

1. Conductors shall be installed under not less than \_\_\_\_\_ of concrete beneath a building or other structure.
- 20 mm
  - 30 mm
  - 40 mm
  - 50 mm (2 in)
  - 60 mm
2. Conductors shall be installed within a building or other structure in a raceway that is encased in concrete or brick not less than \_\_\_\_\_ thick.
- 20 mm
  - 30 mm
  - 40 mm
  - 50 mm
  - 60 mm
3. Where the voltage between conductors does not exceed \_\_\_\_\_ and the roof has a slope of 4 in. in 12 in. or greater, a reduction in clearance to 3ft. shall be permitted.
- 100 volts
  - 200 volts
  - 300 volts
  - 400 volts
4. The requirement for maintaining the vertical clearance of \_\_\_\_\_ from the edge of the roof shall not apply to the final conductor span where the service drop is attached to the side of a building.
- 3 ft.
  - 4 ft.
  - 5 ft.
  - 8 ft.
7. For installations of equipment by the serving electric utility, a disconnecting means is not required if \_\_\_\_\_ and access can only be gained with the meter removed.
- the supply is not installed as part of a meter socket
  - the supply is installed as part of a meter socket
  - the supply is installed but can't access the meter socket
  - none of the answers provided
8. For either overhead or underground primary distribution systems on private property, the service disconnect shall \_\_\_\_\_ to be located in a location that is not readily accessible.
- be permitted
  - not be permitted
  - not be adopted
  - none of the answers provided
9. An individual breaker rated \_\_\_\_\_ shall be permitted as the protection for each ungrounded conductor for line-to-line connected loads for 3-wire.
- 125/250 volts dc
  - 250/125 volts dc
  - 125/125 volts dc
  - 250/250 volts dc

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10. If the tap conductors leave the enclosure or vault in which the tap is made, the ampacity of the tap conductors is not less than \_\_\_\_\_ of the rating of the overcurrent device protecting the feeder conductors.
  - one-tenth
  - one-fifth
  - one-third
  - one-half
11. Where an ac system operating at less than 1000 volts is grounded, the grounded conductors \_\_\_\_\_ be connected to each disconnecting means grounded conductor terminal or bus.
  - shall
  - shall NOT
  - are not required to
12. What type of jumper shall connect the grounded conductor(s) to each service disconnecting means enclosure?
  - supply-side
  - bonding
  - negative
  - positive
13. A \_\_\_\_\_ bonding jumper shall not be required to be larger than the derived ungrounded conductors.
  - supply-side
  - neutral
  - negative
  - positive
14. A supply-side bonding jumper of the wire type shall comply with 250.102(C), based on \_\_\_\_\_.
  - the shape of the derived ungrounded conductors
  - the weight of the derived ungrounded conductors
  - the height of the derived ungrounded conductors
  - the size of the derived ungrounded conductors
15. A metal underground water pipe in direct contact with the earth for \_\_\_\_\_ or more and electrically continuous to the points of connection of the grounding electrode conductor and the bonding conductor(s) or jumper(s), is permitted as a grounding electrode.
  - 1 ft.
- 2 ft.
- 5 ft.
- 10 ft.
16. The metal frame of a structure can be permitted as a grounding electrode if \_\_\_\_\_ secure(s) the structural steel columns that are connected to a concrete-encased electrode that complies with 250.52(A) (3) and is located in the support footing or foundation.
  - hold-down bolts
  - metal screws
  - barbwire
  - doesn't need to be secured down
17. A concrete-encased electrode is permitted if the bare copper conductor is not smaller than \_\_\_\_\_.
  - 2 AWG
  - 4 AWG
  - 6 AWG
  - 8 AWG
18. Interior metal water piping located not more than \_\_\_\_\_ from the point of entrance to the building shall be permitted to be used as a conductor to interconnect electrodes that are part of the grounding electrode system.
  - 1 ft.
  - 2 ft.
  - 5 ft.
  - 10 ft.
19. \_\_\_\_\_ lock-nuts shall be permitted to be installed to make a mechanical connection of the raceway.
  - Standard
  - Stainless steel
  - Brass
  - All of the answers provided
20. Bonding jumper(s) for exposed structural metal that could become energized shall be sized in accordance with \_\_\_\_\_.
  - Table 403.1
  - Table 250.66
  - Table 625.5 (A)
  - None of the tables provided



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21. Ungrounded supply conductors and supply-side bonding jumpers are of what different materials?
  - copper
  - aluminum
  - steel
  - only a and b
  - only b and c
22. The length of the bonding jumper or conductor or equipment bonding jumper shall not exceed 1.8 m by being installed where?
  - Inside
  - Outside
  - Above the roof
  - Under the concrete
23. A grounding electrode conductor shall be smaller than 6 AWG copper or 4 AWG aluminum.
  - True
  - False
24. Equipment grounding conductors that are not an integral part of a cable assembly shall not be smaller than \_\_\_\_\_ copper or \_\_\_\_\_ aluminum.
  - 5 AWG – 4 AWG
  - 6 AWG – 5 AWG
  - 4 AWG – 6 AWG
  - 6 AWG – 4 AWG
25. The \_\_\_\_\_ insulation shield and drain wire insulation shield shall not be used as an equipment grounding conductor for solidly grounded systems.
  - metallic
  - duct tape
  - scotch tape
  - electrical tape
2. A listed \_\_\_\_\_ or shall be used where a raceway crosses a structural joint intended for expansion, contraction or deflection, used in buildings, bridges, parking garages, or other structures.
  - expansion/deflection fitting
  - other approved means
  - both of the answers provided
  - none of the answers provided
3. An underground cable which is not MC that is installed under a building will need to be installed in a/an \_\_\_\_\_.
  - ditch
  - ABS pipe
  - approved raceway
  - All of the answers provided
4. Conductors of the same circuit including the grounded conductor and grounding conductors shall be permitted to be installed in \_\_\_\_\_.
  - parallel in raceways
  - multi-conductor cables
  - direct-buried single conductor cables
  - all of the answers provided
5. Where independent support wires are connected in a non-fire rated assembly, the support wires need to be \_\_\_\_\_.
  - rewired
  - distinguishable by color or tagging
  - sorted by size
  - code is not adopted
6. Electrical installations in hollow spaces, vertical shafts, and ventilation or air-handling ducts shall be made so that the potential spread of fire or products of combustion will not be substantially increased.
  - True
  - False

## Quiz 5

1. A cable, raceway, or box, installed in exposed or concealed locations under metal-corrugated sheet roof decking, shall be installed and supported so that there is not less than \_\_\_\_\_ measured from the lowest surface of the roof decking to the top of the cable, raceway, or box.
  - 1 in.
  - 1-1/2 in.
  - 2 in.
  - 3 in.
7. What section is not applied to habitable rooms or areas of buildings?
  - 100.2
  - 450.25 (B)
  - 300.22 (C)
  - 281.54 (1) (2)

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8. What phrase is used to correlate with the term "plenum" in NFPA 90A2009 and other mechanical codes?
- The more space, the more you can work
  - Other spaces used for environmental air
  - Other spaces left for environmental air
  - None of the answers provided
9. Electrical \_\_\_\_\_ are round in cross section and can be installed underground or embedded concrete.
- ducts
  - cambers
  - vaults
  - path ways
10. If the maximum phase-to-phase voltage is 5000 volts from a non-shielded ozone-resistant insulated conductor, what type of cable is required?
- Type L
  - Type ML
  - Type AWG
  - Type MC
11. The table(s) to be used to determine the ampacities for conductors rated 0 to 2000 volts is (are) \_\_\_\_\_.
- Allowable Ampacity Table 310.15(B)(16) through Table 310.15(B)(19)
  - Ampacity Table 310.15(B)(20)
  - Table 310.15(B)(21)
  - All of the answers provided
12. The wiring space of enclosures for switches feeding through other enclosures is permitted provided that the total of all conductors installed at any cross section of the wiring space should not exceed \_\_\_\_\_ of the cross-sectional area of that space.
- 10 percent
  - 30 percent
  - 40 percent
  - 60 percent
13. The wiring space of enclosures for switches feeding through other enclosures is permitted provided that \_\_\_\_\_ is applied to the enclosure that identifies the closest disconnecting means for any feed through conductors.
- a high voltage sticker
  - a warning label
  - a do not enter sign
  - all of the answers provided
14. Outlet boxes that do not enclose devices or utilization equipment shall have a minimum internal depth of \_\_\_\_\_.
- 1 inch
  - 16 cm
  - 12.7 mm
  - 5.7 mm
15. Boxes used to support a luminaire or lamp holder outlets in a wall shall be \_\_\_\_\_ on the interior of the box to indicate the maximum weight of the luminaire that is permitted to be supported by the box in the wall if other than 50 lbs.
- marked
  - replaced
  - rewired
  - code not adopted
16. Power distribution blocks shall be permitted in pull and junction boxes over \_\_\_\_\_ for connections of conductors.
- 100 inches
  - 200 inches
  - 500 inches
  - 1000 inches
17. When handhold enclosures are used on systems over 600 volts the installation shall comply with provisions \_\_\_\_\_.
- Part I
  - Part II
  - Part III
  - Part IV
  - Part V
- Quiz 6**
1. Pull and junction boxes and hand hole enclosures shall provide adequate space and dimensions for the installation of \_\_\_\_\_.
- switch boxes
  - conductors
  - circuit breakers
  - a power switch

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2. If the dimensional requirements for boxes are met, are conduit bodies allowed?

- Yes
- No

3. Only qualified persons are allowed to \_\_\_\_\_ type MV cables.

- install
- terminate
- test
- all of the answers provided

4. Where installed in thermal insulation, the ampacity shall be in accordance with the \_\_\_\_\_ conductor temperature rating.

- 100°F
- 120°F
- 140°F
- 160°F

5. 348.30 Securing and Supporting. (A) Securely Fastened. Exception No. 1 is where FMC is fished between access points through concealed spaces in finished buildings or structures and supporting is \_\_\_\_\_.

- done the right way
- done by a professional
- impracticable
- finished

6. Where flexibility is necessary after installation, lengths from the last point where the raceway is securely fastened shall not exceed the following \_\_\_\_\_.

- 900 mm (3 ft.) for metric designators 16 through 35
- 1200 mm (4ft.) for metric designators 41 through 53
- 1500 mm (5 ft.) for metric designators 63
- all of the answers provided

7. A/an \_\_\_\_\_ can be installed if flexibility is necessary to connect equipment and minimize the transmission of vibration from equipment or to provide flexibility for equipment that requires movement after installation.

- panel box
- equipment grounding conductor
- switchboard
- underground conductor

8. \_\_\_\_\_ shall be permitted to be installed in PVC conduit rated at a temperature higher than the listed temperature rated for PVC conduit.

- Conductors
- Cables
- Both of the answers provided
- None of the answers provided

9. Conductors or cables rated at a temperature higher than the listed temperature rating of \_\_\_\_\_ conduits shall be permitted to be installed.

- PCV
- HDPE
- RTRC
- ENT

10. When making bends to conduit, what can't be damaged?

- The conduit
- The internal diameter
- Both of the answers provided
- None of the answers provided

11. Bends shall be permitted to be made manually without auxiliary equipment.

- True
- False

12. For conduits of metric designators \_\_\_\_\_, the allowable radii of bends shall be in accordance with specifications provided by the manufacturer.

- 129 – 150
- 155 – 120
- 129 – 155
- 120 – 155

13. Conductors or cables rated at a temperature higher than the listed temperature rating of \_\_\_\_\_ conduit shall be permitted to be installed.

- PVC
- HDPE
- RTRC
- ENT

14. Conductors or cables rated at a temperature higher than the listed temperature rating of \_\_\_\_\_ shall be permitted to be installed.

- PVC
- HDPE
- RTRC
- ENT

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15. Splices and taps shall be made only in \_\_\_\_\_.

- header access units
- junction boxes
- both of the answers provided
- none of the answers provided

16. When transposing cable size into raceway size, the minimum metric designator raceway required for the number and size of \_\_\_\_\_ in the cable shall be used.

- Conductors
- switch boxes
- power switches
- none of the answers provided

17. Cables and electrical conductors being installed under floors are intended to have \_\_\_\_\_ to supporting them.

- a raceway
- PVC pipes
- metal straps
- none of the answered provided

18. If the cable trays contain conductors rated over 600 volts, what permanent and legible warning note is going to be shown?

- WARNING – KEEP AWAY
- WARNING – LOW VOLTAGE – KEEP AWAY
- DANGER – LOW VOLTAGE – KEEP AWAY
- DANGER – HIGH VOLTAGE – KEEP AWAY

19. What article covers the use and installation for outdoor overhead conductors over 600 volts, nominal?

- 299
- 390
- 399
- 499

20. An outdoor overhead conductor is \_\_\_\_\_.

- a single conductor, insulate, covered, or bare, installed outdoors on support structures
- a single conductor, insulate, tided, or bare, installed indoors on support structures
- a single conductor, insulate, covered, or bare, installed indoors on support structures

- a single conductor, insulate, covered, or bare, installed outdoors by support structures

## Quiz 7

1. Where switches control lighting loads supplied by a grounding general purpose branch circuit, the grounded circuit conductor for the controlled lighting circuit shall be located at the \_\_\_\_\_.
  - panel location
  - conductor location
  - switch location
  - controller
2. A snap switch without a connection to an equipment grounding conductor shall be permitted for what purposes only?
  - exchange
  - replacement
  - maintenance
  - none of the answers provided
3. A snap switch wired under the provisions of this exception and located within \_\_\_\_\_ vertically of a grounded metal object shall be provided with a faceplate of non-conducting non-combustible material with nonmetallic attachment screws.
  - 5 ft.
  - 6 ft.
  - 8 ft.
  - 10 ft.
4. If all of the conditions are met, then a snap switch with integral nonmetallic enclosure complying with 300.15(E) shall be permitted without a connection to an (a) \_\_\_\_\_.
  - equipment grounding conductor
  - outlet
  - panel board
  - switch board
5. Where a snap switch is used to control cord-and-plug-connected equipment on a general-purpose branch circuit, it shall be rated at not less than the \_\_\_\_\_ as provided in 210.21 (B).
  - Rating of the maximum permitted ampere rating
  - Setting of the over current device protecting the receptacles
  - Cord connectors
  - All of the answers provided

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6. A child care facility provides services for more than \_\_\_\_\_ children 7 years old or less.

- one
- two
- three
- four
- five

7. If a receptacle outlet is supplied by a branch circuit that requires arc-fault circuit interrupter protection, a replacement receptacle shall be:

- a listed outlet branch circuit type arc-fault circuit interrupter receptacle.
- a receptacle that is protected by a listed outlet branch circuit type arc-fault circuit interrupter type receptacle
- receptacle protected by a listed combination type arc-fault circuit interrupter type circuit breaker
- Any one of the answers provided

8. The arc-fault circuit-interrupter protection replacement code shall become effective on \_\_\_\_\_.

- January 1, 2012
- January 1, 2013
- January 1, 2014
- January 1, 2015

9. \_\_\_\_\_ receptacles shall be provided where replacements are made at receptacle outlets that are required to be protected elsewhere in this code.

- Gas-resistant
- Hazard-resistant
- Weather-resistant
- Fire-resistant

10. A tamper-resistant receptacles is not required if \_\_\_\_\_.

- it is located more than 5-1/2 ft. above the floor.
- it is part of a luminaire or appliance child-resistant.
- that is a single or duplex receptacle for two appliances, each being normal use, not cord-and-plug.
- a non-grounding receptacle is used for as a replacement.
- All of the answers provided.

11. Generally speaking, all non-locking-type 125 volt, 15- and 20-amp receptacles shall be listed as tamper-resistant receptacles.

- True
- False

12. If receptacles in the following locations located more than 1.7m above the floor, part of a luminaire or appliance, single or duplex receptacle for two appliance each being normal use not cord-and-plug, and nongrounding receptacles used for replacement.

- tamper-resistant
- child-resistant
- weather-resistant
- fire-resistant

13. All nonlocking-type, 125-volt, 15- and 20-ampere receptacles located in \_\_\_\_\_ shall be listed tamper-resistant receptacles.

- guest rooms
- guest suites
- both of the answers provided
- none of the answers provided

14. In guest rooms and guest suites, all non-locking-type, 125-volt, 15- and 20-ampere receptacles shall be \_\_\_\_\_ receptacles.

- tamper-resistant
- Gas-resistant
- Hazard-resistant
- Weather-resistant
- Fire-resistant

15. A \_\_\_\_\_ containing an ungrounded electrical system as permitted in 250.21 shall be legibly and permanently field marked as follows: "Caution Ungrounded System Operating -- XXX Volts Between Conductors".

- switchboard
- panel board
- both of the answers provided
- none of the answers provided

16. All switchboards and panel boards supplied by a feeder in other than \_\_\_\_\_ family dwellings shall be marked to indicate the device or equipment where the power supply originates.

- one- or two-
- two- or three-
- three- or five-
- one- or four-

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17. An \_\_\_\_\_ shall not be installed where the available fault current exceeds its short-circuit current rating as marked in accordance with 409.110(4).

- Industrial control panel
- Industrial switch panel
- Industrial control box
- Industrial power switch

18. Luminaires made of insulating material that is directly sired or attached to outlets supplied by a wiring method that does not provide a ready means for grounding attachment to an equipment grounding conductor, shall \_\_\_\_\_.

- be made of insulating material
- have no exposed conductive parts
- both of the answers provided
- none of the answers provided

19. Luminaires that do not comply with 410.64(A), (B), or (C), cannot be used as a raceway for \_\_\_\_\_.

- **circuit conductors**
- panel boards
- switchboards
- power supplies

20. Lamp holders installed in what locations shall be listed for that location?

- dry
- hot
- cold
- **wet**

21. Lamp holders shall be \_\_\_\_\_ so that combustible material is not subjected to temperatures in excess of 194°F.

- constructed
- installed
- equipped with shades or guards
- **all of the answers provided**

## Quiz 8

1. Indoor locations other than dwellings and associated accessory structures shall have a disconnecting means \_\_\_\_\_ to each luminaire.

- a. internal
- b. external
- c. both of the answers provided
- d. none of the answers provided

2. A vending machine \_\_\_\_\_

- is a self-service device
- dispenses products or merchandise

- is designed to require insertion of coin, paper currency, token, card, key, or receipt of payment by other means
- all of the answers provided

3. For permanently connected motor-operated appliances with motors rated over \_\_\_\_\_ horsepower, the on and off switch needs to be within sight of the appliance.

- 1/2
- 1/4
- 1/6
- 1/8

4. A heater containing a motor or motors rated over 1/8 horsepower will require \_\_\_\_\_.

- a. the on and off switch to be in sight of the motor controller(s) and the heater
- b. the motor(s) of more than 1/8 hp and the heater to be provided with a single unit switch
- c. any of the answers provided
- d. none of the answers provided

5. Ground-fault circuit-interrupter protection for personnel shall be provided for cables installed in electrically heated floors of \_\_\_\_\_.

- a. bathrooms
- b. kitchens
- c. hydro massage bathtub locations
- d. all of the answers provided

6. Raceways being 1 in. to 6 in. of non-heating leads not having a grounding sheath shall be \_\_\_\_\_.

- enclosed in a rigid metal conduit
- electrical metallic tubing
- intermediate metal conduit
- other raceways within asphalt or masonry
- all of the answers provided

7. When provided for fixed outdoor electric de-icing and snow-melting, what equipment is required for this installation?

- a. ground fault switch of equipment
- b. ground fault protection of equipment
- c. ground fault wire of equipment

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8. For valve actuator motor assemblies, the rated current shall be the nameplate full-load current, and \_\_\_\_\_ the ampacity of the conductors.
  - a. this current shall be used to determine the maximum rating
  - b. setting of the motor branch-circuit short-circuit and ground-fault protective device
  - c. Both of the answers provided
  - d. None of the answers provided
9. A motor short-circuit protector shall be permitted in lieu of devices listed in \_\_\_\_\_.
  - a. Table 230.52
  - b. Table 330.52
  - c. Table 430.52
  - d. Table 530.52
10. A motor short-circuit protector is allowed to be the short-circuit protector if it is a listed combination motor controller...., it will open the circuit at currents exceeding \_\_\_\_\_ of motor for other than Design B energy-efficient motors.
  - a. 700 percent
  - b. 1100 percent
  - c. 1300 percent
  - d. 1700 percent
11. Two or more motors or one or more motors and other loads shall be permitted to be connected to the same branch circuit under conditions specified in 430.53(D) and in 430.53(A), (B), or (C).
  - a. True
  - b. False
12. Several motors or loads on one branch will have each motor controller \_\_\_\_\_.
  - a. as listed for group installation with a specified maximum rating of fuse, circuit breaker, or both
  - b. selected such that the ampere rating of the motor-branch short-circuit and ground-fault protective device does not exceed that permitted by 430.52 for that individual controller and corresponding motor load
  - c. all of the answers provided
  - d. none of the answers provided.
13. Several motors or loads on one branch will have each motor controller as either \_\_\_\_\_.
  - listed for group installation with a specified maximum rating of fuse, circuit breaker, or both
  - selected such that the ampere rating of the motor-branch short-circuit and ground-fault protective device does not exceed that permitted by 430.52 for that individual controller and corresponding motor load
  - all of the answers provided
  - none of the answers provided
14. When a feeder supplies a motor load or others, the device shall have a rating not less than that required for the sum of the other load(s) plus the following:
  - a. for a single motor
  - b. for a single hermetic refrigerant motor-compressor
  - c. for three or more motors
  - d. only a and b
  - e. only b and c
15. Constant-voltage generators shall be protected from overload by inherent design, circuit breakers, fuses, protective relays, or other identified over-current protective means suitable for the conditions of use except \_\_\_\_\_.
  - a. ac generator exciters
  - b. heat pump motors
  - c. venting exciters
  - d. ac motors
16. Transformers other than Class 2 or Class 3 shall have a disconnecting means located \_\_\_\_\_.
  - a. in sight of the transformer
  - b. in a remote location if lockable and location marked on the transformer
  - c. both of the answers provided
  - d. neither of the answers provided
17. A battery system \_\_\_\_\_.
  - a. is interconnected batter subsystems consisting of three or more storage batteries and battery chargers
  - b. can include inverters, converters, and associated electrical equipment
  - c. is interconnected battery subsystems consisting of one or more storage batteries and battery chargers
  - d. can only include associated electrical equipment
  - e. only b and c

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18. The most common nominal cell voltages are \_\_\_\_\_.

- 2 volts per cell for the lead-acid systems
- 1.2 volts per cell for alkali systems
- 4 volts per cell for Li-ion systems
- all of the answers provided

19. A cell or battery that has no provision for the routine addition of \_\_\_\_\_ might contain pressure relief venting.

- Water
- Electrolytes
- external measurement of electrolyte specific gravity
- all of the answers provided

20. Being in a readily accessible location at an elevation of not over two meters, what equipment should be available?

- push buttons
- controls
- instrumental transfer switch handles
- all of the answers provided

21. Infrequently operated devices on industrial control equipment such as \_\_\_\_\_ shall be located so they are safely operable and serviceable for a portable platform.

- a. draw-out fuses
- b. fused potential
- c. power switches
- d. ignition fuses
- e. only a and b

## Quiz 9

1. Combustible dust is any finely divided solid material \_\_\_\_\_ or smaller in diameter and presents a fire or explosion hazard when dispersed and ignited in air.
  - 1000 microns
  - 630 microns
  - 420 microns
  - 100 microns
2. Every unused opening will be closed with \_\_\_\_\_ and comply with 500.8(E) (1) or (E) (2).
  - duct tape
  - metal tape
  - a piece of sheet metal screwed down to close up the opening
  - a metal close-up plug
3. Flexible metal conduit and liquid tight flexible metal conduit shall include an equipment

bonding jumper of the wire type in compliance with \_\_\_\_\_.

- 150.102
- 250.102
- 350.102
- 450.102

4. The clearance between two terminals for connecting of field wiring of different intrinsically safe circuits shall be at least \_\_\_\_\_ inches.

- 0.10
- 0.15
- 0.20
- 0.25

5. Different intrinsically safe circuits shall be separated from each other by \_\_\_\_\_.

- the conductors of each circuit that are within a grounded metal shield
- the conductors of each circuit that have insulation with a minimum thickness of 0.25 mm
- both of the answers provided
- neither of the answers provided

6. Intrinsically safe circuits shall be identified at \_\_\_\_\_ in a manner that is intended to prevent unintentional interference with the circuits during testing and servicing.

- a. terminal locations
- b. junction locations
- c. conductor locations
- d. only a and b

7. Where \_\_\_\_\_ are or may be present at the same time, the simultaneous presence shall be considered during installation of the electrical equipment and their temperature.

- flammable gases
- combustible dusts
- fibers/flyings
- any of the answers provided

8. Conductors containing optical fiber cable with current shall not be installed in accordance with the requirements of the two articles.

- True
- False



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9. Combustible dust is any finely divided solid material \_\_\_\_\_ or smaller in diameter and presents a fire or explosion hazard when dispersed and ignited in air.

- .01 in.
- 200 microns
- 420 microns
- 7 microns

10. Each circuit leading to or through dispensing equipment shall be provided with a marked easy-access switch to disconnect all power to all \_\_\_\_\_.

- conductors of the circuits
- grounding conductors
- both of the answers provided
- neither of the answers provided

11. Each dispensing \_\_\_\_\_ shall be provided with a means to remove all external voltage sources, power, communications, data and video circuits.

- device
- piece of equipment
- circuit
- switch

12. The location of this means shall be permitted to be other than \_\_\_\_\_ or adjacent to the dispensing device.

- outdoors
- inside
- not having a location
- code was not adopted

13. Battery-powered lighting units have \_\_\_\_\_.

- rechargeable batteries
- battery-charging means
- provisions for one or more lamps mounted on the equipment
- a relaying device arranged to energize the lamps automatically upon failure of the supply to the unit equipment
- all of the answers provided

14. An isolation transformer \_\_\_\_\_.

- is the primary and secondary windings physically separated
- inductively couples its secondary winding(s) to circuit conductors connected to its primary winding(s)
- both of the answers provided
- neither of the answers provided

15. Receptacles with insulated grounding terminals described in \_\_\_\_\_ shall not be permitted.

- 150.146(D)
- 250.146(D)
- 350.146(D)
- 450.146(D)

## Quiz 10

1. In a hospital, each patient bed location shall at least \_\_\_\_\_ branch circuit(s).

- a. one
- b. two
- c. three
- d. four

2. The branch circuit serving patient bed locations shall be part of a multi-wire branch circuit.

- a. True
- b. False

3. Patient care areas shall be provided with special protection against electric shock by the following \_\_\_\_\_.

- a power distribution system that inherently limits the possible ground-fault current due to a first fault to a low value, without interrupting the power supply
- a power distribution system in which the power supply is interrupted if the ground-fault current does, in fact, exceed a value of 6 mA.
- both of the answers provided
- neither of the answers provided

4. Being permitted to be wired to the circuit in the area and connected ahead of any local switches, this equipment is \_\_\_\_\_.

- a battery-powered generator
- a battery-powered motor
- a battery-powered lighting units
- a battery-powered switch board

5. An isolated conductor No. 1 shall be Orange with at least one distinctive colored stripe other than \_\_\_\_\_ along the entire length of the conductor.

- a. white
- b. green
- c. gray
- d. any of the answers provided

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6. An isolated conductor No. 2 shall be Brown with at least one distinctive color stripe other than \_\_\_\_\_ along the entire length of the conductor.
- white
  - green
  - gray
  - any of the answers provided

7. \_\_\_\_\_ shall be permitted for temporary use outdoors.
- Stages
  - Studio lights
  - Portable power distribution
  - All the answers provided

8. Portable switchboards shall contain overcurrent protection from branch circuits.
- True
  - False

9. Lamps enclosed in \_\_\_\_\_ of combustible material shall be equipped with guards.
- lanterns
  - similar devices
  - Both of the answers provided
  - Neither of the answers provided

10. All \_\_\_\_\_ branch circuits that supply 15- and 20-ampere outlets installed in different rooms of mobile homes or manufactured homes shall comply with 210.12.
- 220-volt
  - 110-volt
  - 120-volt
  - 20-ampere

11. Branch circuit conductors shall be permitted within \_\_\_\_\_ identified in Table 400.4 for hard usage or extra-hard usage.
- cable assemblies
  - multi-conductor cords
  - multi-conductor cables of a type
  - any of the answers provided

12. What receptacles shall not be installed on any branch circuit that supplies temporary lighting?
- Office buildings
  - Construction sites
  - Homes
  - Hospitals

13. What requirements do you have to follow if temporary receptacle installations are used to

supply temporary power to equipment used by personnel?

- 390.6(A)(1) through (A)(3)
- 490.6(A)(1) through (A)(3)
- 590.6(A)(1) through (A)(3)
- 690.6(A)(1) through (A)(3)

14. Receptacle outlets not part of permanent wiring of the building or structure but only used for personnel, shall have a \_\_\_\_\_ for protection.

- panel box
- ground-fault circuit-interrupter
- switch board
- grounding wire

15. Listed cord sets or devices incorporating listed ground-fault circuit interrupter protection for personnel identified for portable use, shall be permitted.

- True
- False

16. All 15- and 20-ampere, 125- and 250-volt receptacles used in a damp or wet location shall comply with \_\_\_\_\_.

- 306.9(A) and (B)
- 406.9(A) and (B)
- 506.9(A) and (B)
- code has been deleted

17. To supply temporary power to equipment used by personnel during construction, remodeling, maintenance, and more, shall have protection with \_\_\_\_\_ or \_\_\_\_\_.

- 590.6(A)(1)
- 590.6(A)(3)
- 590.6(B)(1)
- 590.6(B)(2)
- Only c and d

## Quiz 11

1. The primary focus of Article 600 is \_\_\_\_\_.
- installation of conductors for signs
  - installation of signage equipment
  - field wiring for electric signs
  - field wiring for outdoor lighting
  - all of the answers provided

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2. A complete LED sign illumination system consists of the following: \_\_\_\_\_.
  - a light-emitting diode (LED)
  - a power supply
  - a wire
  - connectors
  - all of the answers provided
3. After installation, do the markings and listing labels need to be visible all the time?
  - yes
  - no
  - yes but only at night
  - no but must be accessible during servicing
4. All marking labels shall be \_\_\_\_\_.
  - permanent
  - durable
  - weatherproof
  - all the answers provided
5. Section signs shall be \_\_\_\_\_.
  - marked to indicate that field-wiring is required
  - installation instructions
  - both of the answers provided
  - neither of the answers provided
6. Branch circuits that supply signs shall be rated in accordance with \_\_\_\_\_ and shall be considered to be continuous loads for the purposes of calculations.
  - 600.5(A)(1)
  - 600.5(A)(2)
  - 600.5(B)(1)
  - 600.5(B)(2)
  - only c and d
7. Branch circuits that supply neon tubing installations shall not be rated in excess of \_\_\_\_\_ amperes.
  - 10
  - 20
  - 30
  - 40
8. All other signs and outline lighting systems supplied by the branch circuit shall be rated not to exceed \_\_\_\_\_ amperes.
  - 10
  - 20
  - 30
  - 40
9. A feeder circuit or branch circuit supplying a/an \_\_\_\_\_ shall be controlled by an externally operable switch or circuit breaker that opens all ungrounded conductors and controls no other load.
  - sign
  - outline lighting system
  - skeleton tubing
  - any of the answers provided
10. Signs and outline lighting systems located within fountains shall have the disconnect located in accordance with \_\_\_\_\_.
  - 580.12
  - 680.12
  - 780.12
  - 880.12
11. \_\_\_\_\_ that are equipped with secondary-circuit ground-fault protection shall be so marked.
  - Transformers
  - Electronic power supplies
  - Both of the answers provided
  - Neither of the answers provided
12. The wiring methods and materials shall be installed in accordance with the \_\_\_\_\_ using any applicable wiring methods from Chapter 3 and the requirements from Class 2.
  - Manager's instructions
  - Owner's instructions
  - manufacturer's installation instructions
  - sales provider's instructions
13. What cable should be identified for use in wet locations?
  - Class 1
  - Class 2
  - Class 3
  - Class 4
14. Connections in \_\_\_\_\_ shall be made with listed insulating devices and be accessible after installation. Where made in a wall, connections shall be enclosed in a listed box.
  - cable
  - conductors
  - both of the answers provided
  - neither of the answers provided

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15. When damage is referred to conductors, the protected and installed section is \_\_\_\_\_.

- 200.4
- 300.4
- 400.4
- 500.4

16. Festoon cable is \_\_\_\_\_.

- single- and multiple-conductor cable intended for use and installation in accordance with article 510 where flexibility is required.
- multiple- and single-conductor cables intended for use and installation in accordance with article 610 where flexibility is required.
- single-conductor cable intended for use and installation where flexibility is not required.
- multiple-conductor cable intended for use and installation where flexibility is not required

17. In an elevator car, where an individual branch circuit supplies \_\_\_\_\_, the disconnecting means are required, but 620.53 shall be permitted to comply with 430.109(C).

- car lighting
- a receptacle(s)
- a ventilation motor not exceeding 2 hp
- all of the answers provided

18. In an elevator car, the disconnecting means shall be listed and shall be capable of being \_\_\_\_\_ in the open position.

- closed
- open
- locked
- watch over

19. In an elevator car, the provision for \_\_\_\_\_ to the disconnecting means shall be installed at the switch or circuit breaker that is used as the disconnect.

- locking
- adding a lock
- both of the question provided
- neither of the questions provided

20. In an elevator car, portable means for adding a lock to the switch or circuit breaker shall not be permitted.

- True
- False

21. A plug-in hybrid electric vehicle PHEV \_\_\_\_\_.

- is an electric vehicle
- has the ability to store electrical energy
- has a second source of motive power
- is intended for on-road use
- all of the answers provided

22. Rechargeable energy storage system is \_\_\_\_\_.

- a power source
- capable of being charged
- capable of being discharged
- all of the answers provided

## Quiz 12

1. What is the maximum number of receptacles that can be installed at an electrified truck parking space?

- One
- Two
- Three
- Four

2. Article 645 covers equipment, power-supply wiring, equipment interconnecting wiring, and grounding of information technology \_\_\_\_\_ in an information technology equipment room.

- equipment
- systems
- broadcasting devices
- processing equipment
- only 2 of the answers given are correct

3. A Critical Operations Data System is \_\_\_\_\_ operation for reasons of public safety, emergency management, national security, or business continuity.

- a continuous
- a non-continuous
- an intermittent
- a standby
- a back up

4. Information technology equipment and systems rated 600 volts or less are regularly found where?

- Offices
- Hospitals
- Construction sites
- Store

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5. An Information Technology Equipment Room is a room within the information technology equipment area that contains the information technology equipment.

- True
- False

6. A remote disconnect control is an electric device and circuit that controls a disconnecting means through a relay or equipment device.

- True
- False

7. A zone \_\_\_\_\_.

- is a physically identifiable area within an information technology equipment room
- has its own dedicated power
- has its own cooling system for the information technology equipment or systems
- all of the answers provided

8. A separate heating/ventilating/air-conditioning system is provided that is dedicated for \_\_\_\_\_ use and is separated from other areas of occupancy.

- information technology equipment
- operation development equipment
- self-detection equipment
- automotive inspection equipment

9. Any \_\_\_\_\_ system that serves other occupancies shall be permitted to also serve the information technology equipment room if fire/smoke dampers are provided at the room boundary.

- venting
- heating
- air conditioning
- HVAC

10. The room is \_\_\_\_\_ only those personnel needed for the maintenance and functional operation of the installed information technology equipment.

- occupied by
- accessible to
- both of the answers provided
- neither of the answers provided

11. Only electrical equipment and wiring associated with the operation of the information technology room is installed in the room.

- True

- False

12. The branch-circuit conductors supplying one or more units of information technology equipment shall have an ampacity not less than \_\_\_\_\_ percent of the total connected load.

- 25
- 75
- 100
- 125
- 150

13. Information technology equipment shall be permitted to be connected to a \_\_\_\_\_ by a power-supply cord.

- control board
- power switch
- branch circuit
- power circuit

14. Separate information technology equipment units shall be permitted to be interconnected by means of listed cables and assemblies. The maximum \_\_\_\_\_ foot limitation of interconnecting cables \_\_\_\_\_ applies.

- 10, does not
- 15, does not
- 10, does
- 15, does not

15. When multiple zones are created in an Information Technology equipment room, each zone shall have an approved means to confine fire or products of combustion to within the zone.

- True
- False

16. \_\_\_\_\_ calculations for new or existing loads shall be permitted to be used if performed by qualified persons under engineering supervision.

- Feeder
- Service load
- Both of the answers provided
- Neither of the answers provided

17. Installations of digital/analog-sampled sound production technology and associated \_\_\_\_\_ installed as part of a pipe organ, shall be in accordance with article 640.

- audio signal processing
- amplification
- reproduction equipment
- wiring

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- all of the answers provided
18. Abandoned cables that are not terminated at equipment shall be identified with a tag.
- True
  - False
19. If industrial machinery doesn't need to be installed where the available fault current exceeds its short-circuit current rating, what section would this be marked in?
- 370.3(A)(4)
  - 470.3(A)(4)
  - 570.3(A)(4)
  - 670.3(A)(4)
20. A Dry-Niche luminaire is intended for installation in the floor or wall of a \_\_\_\_\_ in a niche that is sealed against the entry of water.
- pool
  - spa
  - fountain
  - all of the answers provided
21. Low voltage is defined as a voltage not exceeding \_\_\_\_\_.
- 15 volts (RMS) for sinusoidal ac
  - 21.2 volts peak for non-sinusoidal ac
  - 30 volts for continuous dc
  - 12.4 volts peak for dc that is interrupted at a rate of 10 to 200 Hz
  - All of the answers provided
22. Outlets supplying pool pump motors connected to \_\_\_\_\_ shall be provided with ground-fault circuit-interrupter protection for personnel.
- single-phase 120V - 15-20 amp
  - single phase 240V - 15-20 amp
  - single phase 120V - 240V - 15-20 amp
  - none of the answers provided
2. \_\_\_\_\_ conduit shall not be permitted in the pool area where subject to corrosion.
- aluminum
  - steel
  - copper
  - galvanized
3. The equipotential bonding requirements for perimeter surfaces in 680.26(B) (2) shall not apply to a listed self-contained \_\_\_\_\_ installed above a finished floor.
- spa
  - hot tub
  - either of the answers provided
  - neither of the answers provided
4. Small conductive surfaces not likely to become energized, such as \_\_\_\_\_ not connected to metallic piping shall not be required to be bonded.
- air
  - water jets
  - drain fittings
  - all of the answers provided
5. Hydro massage bathtub electrical equipment shall be accessible without damaging the \_\_\_\_\_.
- building structure
  - building finish
  - both of the answers provided
  - neither of the answers provided
6. The cord for the hydro massage bathtub is located; the receptacle shall be installed so that its face is within direct view and not more than \_\_\_\_\_ from the opening.
- 100mm
  - 200mm
  - 300mm
  - 400mm
7. The \_\_\_\_\_ or larger solid copper bonding jumper shall be long enough to terminate on a replacement non-double-insulated pump motor.
- 2 AWG
  - 4 AWG
  - 6 AWG
  - 8 AWG

## Quiz 13

1. Compliance for underwater luminaires installed in swimming pools and similar installations shall be obtained by the use of a listed underwater luminaire and by \_\_\_\_\_ for luminaries operating at low voltage contact limits.
- installation of a listed ground-fault circuit interrupter in the branch circuit
  - a listed transformer
  - a power supply

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8. A PV Monopole sub-array has two conductors in the output circuit, one positive and one negative.

- True
- False

9. Photovoltaic system conductors shall be identified and grouped as required by \_\_\_\_\_.

- 590.4(B)(1) through (4)
- 690.4(B)(1) through (4)
- 790.4(B)(1) through (4)
- 990.4(B)(1) through (4)

10. If the conductors of more than one PV system occupy the same \_\_\_\_\_ then they shall be identified at all termination, connection, and splice points.

- equipment
- raceway
- junction box
- conductors
- all the answers provided

11. The equipment and systems in 690.4(A) through (D) and all associated wiring and interconnections shall be installed only by \_\_\_\_\_.

- the owner
- the sales provider
- qualified persons
- anyone who thinks they can do it

12. Photovoltaic source and PV output conductors, in and out of conduit, and inside of a building or structure, shall be routed along the building structure as \_\_\_\_\_.

- beams
- trusses
- columns
- all of the answers provided

13. All conductors from each separate monopole sub-array shall be routed in \_\_\_\_\_.

- the same raceway
- a different raceway
- doesn't matter if together or not

14. A PV system shall be permitted to not have multiple utility-interactive inverters installed in or on a single building or structure.

- True
- False

15. Circuit breakers that are marked "line" and "load" shall not be back fed.

- True
- False

16. The system shall disable or disconnect one of the following:

- Inverters or charge controllers connected to the fault circuit when the fault is detected
- System components within the arcing circuit
- Both of the answers provided
- neither of the answers provided

17. Means shall be provided to disconnect all current-carrying dc conductors of a photovoltaic system from all other conductors in a \_\_\_\_\_ or other structure.

- boat
- building
- car
- motor home

18. Where the disconnecting means are located more than \_\_\_\_\_ from the over current device, a directory showing the location of each disconnect shall be installed at the over current device location.

- 100 inches
- 10 ft.
- 20 ft.
- 6 feet

19. Non-load-break-rated disconnecting means shall be marked with \_\_\_\_\_.

- "Do open under load"
- "Do no touch under load"
- "Do not open under load"
- "Do not open – HIGH VOLTAGE"

## Quiz 14

1. Where dc photovoltaic source or output circuits from a building-integrated or other system are run inside a building or structure, they should be \_\_\_\_\_,

- contained in metal raceways
- type MC metal-clad cable that complies with 250.118(10)
- metal enclosures from the point of penetration of the surface of the building or structure to the first readily accessible disconnecting means
- all of the answers provided

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2. Circuits shall be run perpendicular to the roof penetration point to supports a minimum of \_\_\_\_\_ below the roof decking.

- 5 cm
- 10 cm
- 15 cm
- 20 cm
- 25 cm

3. Wiring methods shall \_\_\_\_\_ by an approved means.

- closely follow the building surface
- be protected from physical damage
- both of the answers provided
- neither of the answers provided

4. Spacing between labels or markings, or between a label and a marking, shall not be more than \_\_\_\_\_.

- 1 m
- 5 ft.
- 100 cm
- 10 ft.

5. Exposed non- current- carrying metal parts of \_\_\_\_\_ shall be grounded in accordance with 250.134 or 250.136(A), regardless of voltage.

- PV module frames
- electrical equipment
- conductor enclosures
- all of the answers provided

6. Systems used for mounting PV modules and to provide grounding of the module frames shall be identified.

- True
- False

7. Section 690.47 Grounding Electrode System (C) Systems with AC and DC grounding requirements do not apply to ac PV modules.

- True
- False

8. This dc grounding electrode conductor \_\_\_\_\_ be used as a substitute for any required ac equipment grounding conductors.

- shall
- shall not

9. A small wind electric system(s) can be used to supply a building in addition to any services of another electricity supply system.

- True
- False

10. \_\_\_\_\_ feeders shall be permitted as more than one power source if such feeders are connected to, or derived from, separate utility services.

- One or more
- Two or more
- Three or more
- Four or more

11. What feeders shall meet the requirements of 695.4(B)?

- Connection(s)
- Over current protective device(s)
- Disconnecting means
- All of the answers provided

12. A phase converters can be used for fire pump service.

- True
- False

13. A single disconnecting means and associated over current protective device(s) shall be permitted to be installed between the fire pump power source(s) and \_\_\_\_\_.

- a listed fire pump controller
- a listed fire pump power transfer switch
- a listed combination fire pump controller and power transfer switch
- any one of the answers provided

14. For systems installed under the provisions of \_\_\_\_\_ only, additional disconnecting means and the associated over current protective device(s) shall be permitted as required to comply with other provisions of this code.

- 495.3(C)
- 595.3(C)
- 695.3(C)
- 895.3(C)

15. Where an on-site standby \_\_\_\_\_ is used to supply a fire pump, an associated over current protective device(s) shall be permitted.

- motor
- generator
- heater
- freezer



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16. If provided, what equipment shall not serve any load other than the fire pump for which it is intended?

- Fire pump controller
- Fire pump power transfer switch
- Both of the answers provided
- Neither of the answers provided

17. Where raceways are terminated at a fire pump controller, what requirements should be met?

- Listed conduit hubs shall be used.
- The type rating of the conduit hub(s) shall be at least equal to that of the fire pump controller.
- The installation instructions of the manufacturer of the fire pump controller shall be followed.
- Alterations to the fire pump controller shall be approved by the authority having jurisdiction.
- All of the answers provided

## Quiz 15

1. An emergency system is \_\_\_\_\_.

- legally required
- classed as emergency by municipal, state, federal, or other codes
- required by any governmental agency having jurisdiction
- all of the answers provided

2. Emergency systems are intended to automatically supply \_\_\_\_\_ to designated areas and equipment if the normal supply fails.

- illumination
- power
- both of the answers provided
- neither of the answers provided

3. Relay, automatic load control is \_\_\_\_\_.

- a device used to energize switched off or normally-off lighting equipment from an emergency supply if the normal supply is lost
- to de-energize or return the equipment to normal status when the normal supply is restored
- both of the answers provided
- neither of the answers provided

4. A warning sign shall be installed at \_\_\_\_\_.

- the normal power source equipment

- the entrance of the equipment area
- the outer fence of the area
- none of the answers provided

5. Emergency wiring for a feeder-circuit will be installed in spaces or areas that are fully protected by an approved automatic \_\_\_\_\_.

- fire suppression system
- water suppression system
- heated suppression system
- electrical suppression system

6. Emergency wiring for a feeder-circuit will be installed in \_\_\_\_\_ that are fully protected by an approved automatic fire suppression system.

- spaces
- areas
- both of the answers provided
- none of the answers provided

7. Emergency wiring for a feeder-circuit will be a listed electrical circuit-protective system with a minimum \_\_\_\_\_ fire rating.

- 1 hour
- 2 hours
- 3 hours
- 4 hours

8. Emergency wiring for a feeder-circuit will be protected by a listed thermal barrier system for electrical system components with a minimum \_\_\_\_\_ fire rating.

- 1 hour
- 2 hours
- 3 hours
- 4 hours

9. Emergency wiring for a feeder-circuit will be protected by a listed fire-rated assembly that has a minimum fire rating of \_\_\_\_\_ and contains only emergency wiring circuits.

- 1 hour
- 2 hours
- 3 hours
- 4 hours

10. Emergency wiring for a feeder-circuit will be encased in a minimum of \_\_\_\_\_ concrete.

- 1 inch
- 2 inches
- 3 inches
- 5 inches

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11. If an emergency lighting load is automatically energized upon loss of the normal supply, a listed automatic load control relay shall be permitted to energize the load.

- True
- False

12. To indicate a ground fault in solidly grounded wye, legally required standby systems of more than \_\_\_\_\_ to ground a circuit-protective device rated 1000 amperes or more is required.

- 50 volts
- 100 volts
- 150 volts
- 200 volts

13. Instructions on the course of action to be taken in the event of an indicated ground fault shall be located at or near the \_\_\_\_\_.

- sensor location
- circuit breaker
- switch board
- none of the answers provided

14. Where power is needed for the operation of the fuel transfer pumps to deliver fuel to a generator set \_\_\_\_\_, the pumps shall be connected to the legally required standby power system.

- night tank
- day tank
- every other day tank
- none of the answers provided

15. Power production equipment \_\_\_\_\_.

- is generation source
- has distribution equipment associated with it
- generates electricity from a source
- all of the answers provided

16. Installation of \_\_\_\_ or more electrical power production source(s) operating in parallel with a primary source(s) of electricity shall be installed only by qualified persons.

- one
- two
- three
- four

17. An electric power production source shall be permitted to be connected to the supply side of the service disconnecting means as allowed in \_\_\_\_\_.

- 130.82(6)

- 230.82(6)
- 330.82(6)
- 430.82(6)

18. The sum of all ratings of all \_\_\_\_\_ devices connected to power production sources shall not exceed the rating of the service.

- over current
- undercurrent
- electrical
- production

19. In a building where \_\_\_\_\_ are present with other types of power systems, the cover plates for the receptacles or the receptacles themselves shall have a distinctive color or marking so as to be readily identifiable.

- doctors
- teachers
- cops
- people

20. All conductors or cables shall be installed in Critical Power Operation systems using any of the metal wiring methods permitted by \_\_\_\_\_ and in addition shall comply with 708.14(1) through (8), as applicable.

- 408.10(C)(1)
- 508.10(C)(1)
- 608.10(C)(1)
- 708.10(C)(1)

21. All cables for \_\_\_\_\_ shall be shielded twisted-pair cables.

- fire alarms
- security
- emergency communications
- all of the answers provided

22. Shield cables for \_\_\_\_\_ shall be continuous.

- fire alarms
- security
- emergency communications
- all of the answers provided

23. Optical fiber cables shall be used for connections between \_\_\_\_ or more buildings on the property and under single management.

- one
- two
- three
- four

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## Quiz 16

1. Conductors for all control circuits rated above 50 volts shall be rated not less than \_\_\_\_\_.

- 200 volts
- 400 volts
- 600 volts
- 800 volts

2. \_\_\_\_\_ shall use relays with contact ratings that exceed circuit voltage and current ratings in the controlled circuit.

- communications
- fire alarms
- signaling systems
- all of the answers provided

3. All cables for fire alarms, security, and signaling systems shall be riser-rated and shall be listed \_\_\_\_\_ electrical circuit protective systems.

- 1-hour
- 2-hour
- 3-hour
- 4-hour

4. \_\_\_\_\_ shall be a listed 2-hour electrical circuit protective system.

- Control
- Monitoring
- Power wiring to HVAC system
- all the answers provided

5. Vertical installations of \_\_\_\_\_ installed in a raceway, or conductors and cables of electrical circuit-protective systems, shall be installed in accordance with 300.19.

- circuit integrity cables
- conductors
- both of the answers provided
- none of the answers provided

6. A bushing shall be installed where cables emerge from a raceway used for mechanical support or protection in accordance with 300.15(C).

- True
- False

7. Vertical installations of circuit integrity (CI) cables and conductors installed in \_\_\_\_\_ shall be installed in accordance with 300.19.

- a raceway or conductors installed in a raceway

- cables of electrical circuit protective systems
- both of the answers provided
- neither of the answers provided

8. The branch circuit supplying the \_\_\_\_\_ shall supply no other loads.

- fire alarm equipment
- house alarm equipment
- store alarm equipment
- This was not addressed in the code.

9. The circuit disconnecting means shall have red identification, shall be accessible only to qualified personnel, and shall be identified as \_\_\_\_\_.

- WARNING – HIGH VOLTAGE
- FIRE ALARM – WARNING
- FIRE ALARM CIRCUIT
- KEEP OUT – FIRE ALARM

10. The \_\_\_\_\_ shall not damage the overcurrent protective devices or obscure the manufacturer's marking. This branch circuit shall not be supplied through ground-fault circuit interrupters or arc-fault circuit interrupters.

- White identification
- Blue identification
- Green identification
- Red identification

11. A single channel or connected multiple channel, as well as associated fittings forming a structural system that is used to support, route and protect high densities of wires and cables, typically communications wires and optical fiber cables, is known as a \_\_\_\_\_.

- cable routing assembly
- protective raceway assembly
- continuous cable barrier
- cable protective assembly

12. A factory assembly of one or more optical fibers having an overall covering and containing non-current-carrying conductive member(s) such as \_\_\_\_\_ is known as "Conductive Optical Fiber Cable."

- metallic strength member(s)
- metallic vapor barrier(s)
- metallic armory or metallic sheath
- All of the questions provided

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13. A factory assembly of \_\_\_\_\_ or more optical fibers having an overall covering and containing no electrically conductive materials is known as a "Nonconductive Optical Fiber Cable."

- one
- two
- three
- four

14. An enclosed channel of nonmetallic materials designed for holding optical fiber cables in a plenum, riser and for general purpose applications is referred to as a/an \_\_\_\_\_.

- fiber holding channel
- optical raceway
- fiber optical conduit path
- optical fiber raceway

15. Installation of \_\_\_\_\_ shall comply with 770.113(A) through (J).

- optical fiber cables
- raceways
- cable routing assemblies
- all of the answers provided

16. \_\_\_\_\_ applications of listed optical fiber cable and raceways, and cables routing assembly types shall be as indicated in table 770.154(a).

- Permitted
- Non-permitted
- both of the answers provided
- none of the answers provided

17. Communications raceways are \_\_\_\_\_.

- enclosed channels for nonmetallic materials

- holding communication wires and cables
- plenum, riser, and general-purpose applications
- all of the answers provided

18. Unlisted outside plant communication cables can be used in a building other than environment air when its length measured from the point of entrance, does not exceed \_\_\_\_\_.

- 5 m
- 10 m
- 15 m (50 ft.)
- 20 m

19. Communications wires and cables shall be permitted to be installed in any raceway in accordance with chapter \_\_\_\_\_.

- 1
- 2
- 3
- 4
- 5

20. Permitted and non-permitted applications of listed communications \_\_\_\_\_ shall be as indicated in table 800.154(a).

- communications wires
- cables
- raceways
- all of the answers provided

21. The coaxial cables shall be located below the \_\_\_\_\_.

- electric light
- power conductors
- both of the answers provided
- neither of the answers provide