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**O5necquiz35**

1. What is the maximum number of 15 or 20A, 125V receptacle outlets permitted on a 20A, 120V general-purpose branch circuit in a commercial occupancy?

For commercial occupancies, the NEC requires each receptacle outlet to be calculated at 180 VA [220.14(D)]. Therefore, the maximum number on a 20A circuit would be 15.

Circuit VA = Volts x Amperes

Circuit VA = 120V x 20A

Circuit VA = 2,400 VA

Number of Receptacles = 2,400 VA/180 VA

Number of Receptacles = 15

**Note:** According to the NEC Handbook, published by the NFPA, general-purpose receptacles aren't considered a continuous load.

- a. true
- b. false

2. What is the maximum number of 15 or 20A, 125V receptacle and lighting outlets permitted on a 15A, 120V general-purpose branch circuit in a dwelling unit?

The NEC doesn't limit the number of receptacle and lighting outlets on a general-purpose branch circuit in a dwelling unit. See the NFPA's NEC Handbook for more information.

Although there's no limit on the number of lighting and/or receptacle outlets on dwelling general-purpose branch circuits, the NEC does require a minimum number of circuits to be installed for general-purpose receptacles and lighting outlets [210.11(A)]. In addition, the receptacle and lighting loads must be evenly distributed among the required circuits [210.11(B)].

**Caution:** Not likely, but there might be a local electrical requirement that limits the number of receptacles and lighting outlets on a general-purpose branch circuit.

- a. true
- b. false

3. What outlets in a dwelling unit are required to be AFCI protected (disregard Comm 16 for this question)?

All 15 or 20A, 120V branch circuits that supply outlets in dwelling unit bedrooms, including those of mobile and manufactured homes [550.25] must be protected by a listed AFCI device [210.12(B)].

According to Article 100, an outlet is a point in the wiring system where electric current is taken to supply a load. This would include receptacle outlets, lighting outlets, as well as outlets for paddle fans and smoke detectors.

**Note:** The 120V circuit limitation means that AFCI protection isn't required for equipment rated 230V, such as a baseboard heater or room air-conditioner equipment.

- a. true
- b. false

4. What are the requirements for installing 15 or 20A receptacles in wet locations?

All 15 and 20A receptacles in a wet location must be within an enclosure that is damp-proof only when an attachment plug is inserted [406.8(B)].

According to Article 100, a wet location would be an area subject to saturation with water, and unprotected locations exposed to weather.

- a. true
- b. false

5. What are the Code limitations on using service entrance cable as a feeder or branch circuit?

According to 338.10, all circuit conductors must be insulated, including the grounded neutral conductor. However, a bare conductor can be used for the grounded neutral conductor when the cable is used as a feeder to a remote building in accordance with 250.32.

Service-entrance cable used for interior branch circuits or feeders must be installed in accordance with Parts I and II of Article 334, excluding 334.80. Basically this means that Type SE cable must be installed as if it were nonmetallic-sheath cable, with the exclusion on conductor sizing as it relates to 60°C terminals.

**Caution:** Underground service-entrance cable (Type USE) cannot be used for interior wiring because it doesn't have flame-retardant insulation.

- a. true
- b. false

6. Is metal siding and metal framing members required to be grounded?

The NEC does not specifically require metal siding or metal framing members to be bonded (not grounded) to an effective ground-fault current path [250.4(A)(4)]. However, exposed structural metal that forms a metal building frame must be bonded to one of the following (effective ground-fault path):

- Service equipment enclosure
- Grounded neutral service conductor
- Equipment Grounding electrode conductor where sized in accordance with Table 250.66
- One of the electrodes of the grounding electrode system

- a. true
- b. false

7. The bonding jumper for structural metal is sized to the conductors that supply the building or structure, in accordance with Table 250.66. In addition, the bonding jumper must be:

- Copper where within 18 in. of earth [250.64(A)].
- Securely fastened and not exposed to physical damage [250.64(B)].
- Installed without a splice or joint, unless spliced by compression connectors or by the exothermic welding process [250.64(C)].

- a. true
- b. false

8. What are the installation requirements for dwelling unit lighting outlets and switches?

According to 210.70, at least one wall switch-controlled lighting outlet must be installed in every habitable room and bathroom of a dwelling unit. In other than kitchens and bathrooms, a receptacle controlled by a wall switch can be used instead of a lighting outlet. Lighting outlets can be controlled by occupancy sensors equipped with a manual override that permits the sensor to function as a wall switch.

- a. true
- b. false

9. In addition to question 8 above, not less than one wall switch-controlled lighting outlet must be installed in hallways, stairways, attached garages, and detached garages with electric power. And at

least one wall switch-controlled lighting outlet must provide illumination on the exterior side of outdoor entrances or exits with grade level access.

- a. true
- b. false

10. Is a metallic tray required to be grounded?

Metallic cable trays must be effectively bonded to ensure electrical continuity and the capacity to conduct safely any fault current likely to be imposed on them [[250.96(A)]. This is accomplished by bonding the metal parts to an equipment grounding (bonding) conductor that is sized to the circuit protection device in accordance with 250.122 [392.7(A)]

**Note:** Metallic cable trays can serve as equipment grounding (bonding) conductors where continuous maintenance and supervision ensure that qualified persons service the installed cable tray system, and the [392.3(C) and 392.7(B)]:

- Cable tray sections and fittings are identified for grounding (bonding) purposes.
  - Cable tray sections, fittings, and connected raceways are bonded to each other in accordance with 250.96 using bolted mechanical connectors or bonding jumpers sized in accordance with 250.102.
- a. true
  - b. false

11. Does the NEC require the metal covers of handholes to be grounded? Could I use a ground rod for this purpose?

Metal covers and other exposed conductive surfaces of handholes must be effectively bonded to ensure electrical continuity and the capacity to conduct safely any fault current likely to be imposed on them [250.96(A)]. This is accomplished by bonding the metal parts to an equipment grounding (bonding) conductor that is sized to the circuit protection device in accordance with 250.122.

- a. true
- b. false

12. We have installed access and security control equipment in a factory. The power source is in a breaker panel and the employees have learned how to disable the system by turning the breaker off and waiting for the battery to discharge. Does the code permit the use of a padlock on the panel door to restrict access?

The NEC does prohibit the locking of panel doors or the placing of a padlock on a circuit breaker to restrict access.

- a. true
- b. false

13. If a generator provides a building with temporary power for construction, does the neutral have to be bonded to the case of the generator?

When a generator provides the sole power for a building or structure, it's a separately derived system, even though no transfer switch is present [Article 100, separately derived system]. A system bonding jumper must be used to bond metal parts of the generator to the grounded neutral conductor [250.30(A)(1)]. This ensures that dangerous voltage from a ground fault can be quickly removed by opening the generator's overcurrent protection device [250.2(A)(3)].

- a. true
- b. false

14. If the secondary conductors of a transformer are less than 25 feet in length, do the secondary conductors have to terminate in a main breaker?

Secondary conductors can be run up to 25 ft without overcurrent protection if they comply with 240.21(C)(2), but overcurrent protection is required for lighting and appliance branch-circuit panelboards, and this protection is required to be located on the secondary side of the transformer [408.36(D)].

- a. true
- b. false

15. How do we determine the maximum length of track lighting that can be installed on a 20A, 120V circuit?

The rule for circuiting track lighting simply prohibits the connected load on lighting track from exceeding the rating of the track [410.101(B)]. This means 15A lighting track cannot be connected to a 20A circuit. The rule that requires a calculation of 150 VA for every two feet of track applies only to service and feeder calculations, not branch circuits [220.43(B)]. So there is no calculation on the maximum length of track lighting on a circuit.

- a. true
- b. false

16. Do I have to bond a metal fence to the pool grounding grid if it's within 10 feet of an outdoor swimming pool?

All fixed metal parts located within 10 ft horizontally of the inside walls of a permanently installed pool, outdoor spa, or outdoor hot tub, and within 12 ft measured vertically above the maximum water level of a permanently installed pool, outdoor spa, or outdoor hot tub, or any observation stands, towers, platforms, or any diving structures must be bonded together and to the bonding grid [680.26(B)(5)].

- a. true
- b. false

17. Am I allowed to install 480V power conductors with 120V lighting conductors?

Power conductors of different systems can occupy the same raceway, cable, or enclosure if all conductors have an insulation voltage rating not less than the maximum circuit voltage [300.3(C)(1)].

- a. true
- b. false

18. Must I use a common trip breaker for all multiwire branch circuits to shut off all of the phase conductors?

Multiwire branch circuits that supply switches, receptacles, or equipment on the same yoke must be provided with a means to disconnect simultaneously all ungrounded conductors that supply those devices or equipment at the point where the branch circuit originates [210.4(B) and 210.7(B)]. This can be accomplished by single-pole circuit breakers with handle ties identified for the purpose or a 2- or 3-pole breaker with common internal trip [240.20(B)(1)].

- a. true
- b. false

19. GFCI type receptacles permitted on a circuit that has AFCI protection?

- a. true
- b. false

20. In industrial applications, is GFCI protection required for the outdoor 15A, 125V receptacles? All 15 and 20A, 125V receptacles installed outdoors in public spaces used by, or accessible to, the public must be GFCI protected. GFCI protection isn't required for receptacles where the general public doesn't have access [210.8(B)(4)].

- a. true
- b. false

21. Can electrical wires and pneumatic tubing be installed in the same raceway?

Raceways are designed for the exclusive use of electrical conductors and cables, and cannot contain nonelectrical components, such as pipes or tubes for steam, water, air, gas, drainage, etc [300.8].

- a. true
- b. false

22. Does the Code require bonding around raceway knockouts for 120V, 208V, or 240V feeders and branch circuits?

All metal parts intended to serve as the effective ground-fault current path, such as raceways, cables, equipment, and enclosures must be bonded together to ensure they have the capacity to conduct safely any fault current likely to be imposed on them [250.96(A)]. If the knockouts are damaged, the integrity of the fault current path is jeopardized and must be bonded around. If the knockouts are not damaged, extra bonding is required.

- a. true
- b. false

23. Does the Code require bonding around raceway knockouts for 277V or 480V feeders and branch circuits?

Metal raceways or cables, containing 277V or 480V circuits, terminating at ringed knockouts must be bonded to the metal enclosure [250.97] with a bonding jumper sized in accordance with Table 250.122, based on the rating of the circuit overcurrent protection device [250.102(D)]. A bonding jumper isn't required where ringed knockouts aren't encountered, or where the box is listed to provide a permanent and reliable electrical bond [250.97 Exception].

- a. true
- b. false

24. Does the NEC require GFCI protection for a drinking water cooler in an office break room that has a sink and a microwave?

GFCI protection is required for 15 and 20A, 125V receptacles in employee break rooms containing portable cooking appliances, because they are "kitchens", as defined in 210.8(B)(2). There are requirements for drinking water coolers, regardless of location.

- a. true
- b. false

25. What are the requirements for securing Type NM Cable?

Staples, straps, cable ties, hangers, or similar fittings must secure Type NM so that the cable will not be damaged. Type NM cable must be secured within 8 in. of every box, cabinet, enclosure, or termination fitting and at intervals not exceeding 4 ft. Two-wire (flat) NM cable is not permitted to be stapled on edge.

- a. true
- b. false

26. The metallic sheath of communications cable entering buildings shall be \_\_\_\_\_.  
A. grounded at the point of emergence through an exterior wall  
B. grounded at the point of emergence through a concrete floor slab  
C. interrupted as close to the point of entrance as practicable by an insulating joint  
D. any of these

800.93

27. Communications conductors and cables shall be separated by at least 2 in. from conductors of \_\_\_\_\_ circuits.  
A. power  
B. lighting  
C. Class 1  
D. any of these

800.133(A)(2)

28. Soft-drawn or medium-drawn copper lead-in conductors for receiving antenna systems are permitted where the maximum span between points of support is less than \_\_\_\_\_.  
A. 35 ft  
B. 30 ft  
C. 20 ft  
D. 10 ft

810.11 Ex

29. Indoor antenna and lead-in conductors for radio and television receiving equipment shall be separated by at least \_\_\_\_\_ from conductors of any electric light, power, or Class 1 circuit conductors.  
A. 6 ft  
B. 2 in.  
C. 12 in.  
D. 18 in.

810.18(B)

30. The grounding conductor for an antenna mast or antenna discharge unit shall not be smaller than 10 AWG copper.  
A. True  
B. False

810.21(H)

31. The coaxial cable for community antenna television and radio systems is permitted to deliver low-energy power to equipment that is directly associated with the radio frequency distribution system if voltage is not over \_\_\_\_\_ volts and if the current supply is from a transformer or other energy-limiting device.  
A. 600  
B. 120  
C. 60  
D. 1,000

820.15

32. In one- and two-family dwellings, the grounding conductor for CATV shall be as short as practicable, not to exceed \_\_\_\_\_ in length.

- A. 5 ft
- B. 8 ft
- C. 10 ft
- D. 20 ft

820.100(A)(4)

33. Coaxial cable is permitted to be placed in a raceway, compartment, outlet box, or junction box with the conductors of light or power circuits, or Class 1 circuits when \_\_\_\_\_.

- A. installed in rigid metal conduit
- B. separated by a permanent barrier
- C. insulated
- D. none of these

820.133(A)(1)(2) Ex 1

34. Exposed network-powered broadband cables shall be secured to structural components by straps, staples, hangers, or similar fittings designed and installed so as not to damage the cable.

- A. True
- B. False

830.24

35. Network-powered broadband communications system cables shall be separated at least 2 in. from conductors of \_\_\_\_\_ circuits.

- A. power
- B. electric light
- C. Class 1
- D. any of these

830.133(A)(2)

**05 Nec Quiz 35 Answer Sheet**

- |    |     |    |         |
|----|-----|----|---------|
| 1  | a b | 26 | a b c d |
| 2  | a b | 27 | a b c d |
| 3  | a b | 28 | a b c d |
| 4  | a b | 29 | a b c d |
| 5  | a b | 30 | a b c d |
| 6  | a b | 31 | a b c d |
| 7  | a b | 32 | a b c d |
| 8  | a b | 33 | a b c d |
| 9  | a b | 34 | a b c d |
| 10 | a b | 35 | a b c d |
| 11 | a b |    |         |
| 12 | a b |    |         |
| 13 | a b |    |         |
| 14 | a b |    |         |
| 15 | a b |    |         |
| 16 | a b |    |         |
| 17 | a b |    |         |
| 18 | a b |    |         |
| 19 | a b |    |         |
| 20 | a b |    |         |
| 21 | a b |    |         |
| 22 | a b |    |         |
| 23 | a b |    |         |
| 24 | a b |    |         |
| 25 | a b |    |         |



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