Electrical Wiring Commercial 18th Edition by Phil Simmons

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Solution and Answer Guide

SIMMONS/ODE, ELECTRICAL WIRING COMMERCIAL, 18E © 2024, 9780357767115; CHAPTER 1: COMMERCIAL BUILDING PLANS AND SPECIFICATIONS

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Note to instructor: It is recommended that students be required to respond, where appropriate, with answers that are complete sentences.

REVIEW

Refer to the *National Electrical Code* or the working drawings when necessary. Where applicable, responses should be written in complete sentences.

1. What section of a commercial building's specification contains a list of contract documents?

   Answer: A list of the contract documents is contained in General Clauses and Conditions. A listing of the Commercial Building contract documents is presented in this chapter under the heading "Commercial Building Plans." The instructor may wish to have the students check over this listing and compare it with the plans provided.

2. The requirement for temporary light and power at the job site will be found in what portion of a commercial building's specification?

   Answer: The Supplementary General Conditions specifies the job site requirements for temporary light and power. In some contracts, this electrical system becomes the responsibility of the general contractor; in other contracts, it is the electrical contractor's responsibility to install and maintain the temporary electrical system. The instructor may wish to refer the student to *NEC Article 590* and discuss the requirements in detail.

3. The electrician uses the Schedule of Working Drawings for what purpose?

   Answer: The electrician uses the Schedule of Working Drawings to determine whether all of the drawings are at hand. The information on "the other sheets" may be very important, especially in coordinating with other contractors.

4. Complete the following items by indicating the letter(s) designating the correct source(s) of information:

No.	Answer	Item	Information
4.	Sections	Ceiling height	Sections, Sheet A6
5.	Electrical symbol schedule	Electrical receptacle style	Electrical symbol schedule, Chapter 2, Figure 2–6
6.	Electrical layout drawings	Electrical outlet location	Electrical layout drawings, Sheets El, E2, and E3
7.	Elevations	Exterior wall finishes	Elevations, Sheets A4 and A5
8.	Site plan	Grading elevations	Site plan, Sheet A4
9.	Electrical layout drawings	Panelboard schedules	Electrical layout drawings, Sheet E4
10.	Architectural floor plan	Room width	Architectural floor plan, Sheets Al, A2, and A3
11.	Architectural floor plan	Swing of door	Architectural floor plan, Sheets Al, A2, and A3
12.	Sections	View of interior wall	Sections, Sheet A6

Match the items on the left with those on the right by writing the letter designation of the appropriate organization from the list on the right.

13.	*NEC*	Electrical *Code*	*National Electrical Code* (*NEC)*
14.	IAEI	Electrical inspectors	International Association of Electrical Inspectors (IAEI)

15.	NFPA	Fire codes	National Fire Protection Association (NFPA)
16.	IESNA	Lighting information	Illuminating Engineering Society of North America (IESNA)
17.	UL	Listing service	Underwriters Laboratories, Inc. (UL)
18.	NEMA	Manufacturers' standards	National Electrical Manufacturers Association (NEMA)
19.	PE	Seal	Professional Engineer (PE)

Match the items on the left with those on the right by writing the letter designation of the proper level of NEC interpretation from the list on the right.

20.	with special permission	Allowed by the *Code*	Shall be permitted, or Shall not be required, *NEC*
21.	with special permission	May be done	Shall be permitted, or Shall not be required, *NEC*
22.	shall	Must be done	Shall, *National Electrical Code*
23.	shall	Required by the *Code*	Shall, *National Electrical Code*
24.	never	Up to the electrician	Shall be permitted, or Shall not be required, *NEC*

25. Find *NEC 250.52(A)(5)* and record the first four words.

    Answer: The first four words of *NEC 250.52(A)(5)* are Rod and pipe electrodes.

Show required conversion calculations for problem 26 and problem 27.

26. Luminaire style F is four feet long. The length in SI units, as specified by the *NEC*, is

    Answer: The length in SI units is 1.22 m; 4 ft × 0.3048 m/ft = 1.2192 m. As will be discussed later, this luminaire is now called a *4 by 2* or the equivalent *1200 by 600* in metric terms. This question assumes that the luminaire is exactly 4 ft long.

27. The gross area of the drugstore basement is 1395 square feet. The area in square meters is

    Answer: The area in SI units is 129.7 sq. m; 1395 sq. ft × 0.093 sq. m/sq. ft = 129.7 sq. m.

To answer Questions 28–31, refer to the Plans included with this book. Determine the Following dimensions. Write the dimensions using unit names, not symbols (for example, 1 foot, not 1'), and indicate the source of the information.

28. What is the inside clear distance of the interior stairway to the drugstore basement?

    Answer: The inside clear distance of the interior stairway to the Drugstore basement is 4 ft 0 in. (1.22 m), as scaled from Sheet A2.

29. What is the gross square footage of each floor of the building?

    Answer: The gross area of each floor of the building is 60 ft × 43 ft = 2580 sq. ft (18.82 m × 13.1 m = 246.5 sq. m), as taken from Sheets Al, A2, and A3.

30. What is the distance in the drugstore from the exterior block wall to the block wall separating the drugstore from the bakery?

    Answer: The distance from the exterior block wall in the Drugstore to the block wall separating the Drugstore from the Bakery is 21 ft 7 in. (6.58 m), as shown on Sheet A2.

31. What is the finished floor to finished ceiling height on the second floor?

    Answer: The finished floor to finished ceiling height on the second floor is 8 ft 6 in. (2.59 m), as available from East and West Elevations A41–2, and Sheet A6, Cross Sections A–A and B–B.

For problems 32–34, cite the *NEC* source. We will show the method of using the NEC Index for the first two questions in Chapter 1 and will provide this same method of locating requirements in other chapters of this book.

32. The standard ampere ratings for fuses and fixed trip circuit breakers.

    Answer: The standard ampere rating for fuses and fixed trip circuit breakers is given in *NEC Table 240.6(A)*.

To find this information in the Index of the NEC, locate "Circuit breakers, Article 240, and locate Rating and under that locate Fixed-Trip circuit breakers, 240.6(A)..." This will provide the Section number for the ratings.

33. The minimum bending radius for metal-clad cable with a smooth sheath with an external diameter of 1 in.

    Answer: The minimum bending radius for metal clad cable with a smooth sheath with an external diameter of 1 in. (size 1) is given in *NEC 330.24(A)(2)* as 12 times the diameter.

To find this information in the Index of the NEC, locate "Metal-clad Cable, Article 330, and under that locate "Bends, 330.24." 330.24(A)(2).

34. The permission to use splices in busbars as grounding electrode conductors.

    Answer: The permission to use splices in busbars as a grounding electrode conductor is given in *NEC 250.64(C)(2)*.

35. a) Where is the sump pump in the Commercial Building located? _____

    b) To what branch circuit is the sump pump connected? _____

    Answer:

    a. The sump pump is located in the Owner's space in the floor of the basement.

    b. The sump pump is connected to circuit 11 in the Owner's panelboard.

36. Write a letter to one of the organizations listed in this unit requesting information about the organization and the services it provides.

    Answer: Write a letter to one of the organizations listed in Chapter 1, requesting information about the organization and the services it provides.

    It is suggested that the instructor assign each student an organization to contact to provide the class with information about several organizations. Students should be encouraged to investigate the proper form of a business letter. They should be alerted that a poorly written letter is unlikely to get a response. If possible, the letter should be on business letterhead stationery. One alternative is for the students to make arrangements with employers to send the letters on company stationery.

37. The temperatures from an arc flash can reach approximately _____°F.

    Answer: The temperatures from an arc flash can reach approximately 35,000°F.

38. The Occupational Safety and Health Act (OSHA) Code of Federal Regulations (CFR) Number 29, Subpart S, in paragraph _____ discusses the training needed for those who face the risk of electrical injury.

    Answer: The Occupational Safety and Health Act (OSHA) Code of Federal Regulations (CFR) Number 29, Subpart S, in paragraph 1910.332, discusses the training needed for those who face the risk of electrical injury.

39. The *NEC* defines a *qualified person* as _____

    Answer: The *NEC* defines a *Qualified Person* as One who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved, Article 100.*

40. According to *NFPA 70E Article 110*, an electrician is qualified to do any and all electrical wiring tasks. True _____ False _____

    Answer: According to *NFPA 70E Article 110,* an electrician is qualified to do any and all electrical wiring tasks. False.

41. Live parts to which an employee may be exposed are required to be de-energized before the employee works on or near them unless _____.

    Answer: Live parts to which an employee may be exposed are required to be de-energized before the employee works on or near them, unless the employer can demonstrate that de-energizing introduces additional or increased hazards.

42. The OSHA regulations provide rules regarding _____ to make sure that the electrical equipment being worked on will not inadvertently be turned on while someone is working on the supposedly dead equipment.

    Answer: The OSHA regulations provide rules regarding lockout and tagout (LOTO) to make sure that the electrical equipment being worked on will not inadvertently be turned on while someone is working on the supposedly dead equipment.

43. Nearly _____ % of the electrocutions each year are from 120-volt systems.

    Answer: Nearly 50% of the electrocutions each year are from 120-volt systems.

44. *NEC 590.6(A)* and *(B)* require that ground-fault, circuit-interrupter protection for personnel be provided for all 125-volt, single-phase, _____-ampere receptacle outlets used for temporary wiring.

    Answer: *NEC 590.6(A)* and *(B)* require that ground-fault circuit-interrupter protection for personnel be provided for all 125-V, single-phase, 15-, 20- and 30-A receptacle outlets used for temporary wiring.

45. *Section* _____ of the *NEC* contains important rules on the arrangement of the *NEC*.

    Answer: Section 90.3 of the *NEC* contains important rules on the arrangement of the *NEC*.

46. The *National Electrical Code* is updated on a _____ -year cycle. At the first meeting of the revision cycle, the Code Panel considers the _____ _____ that were submitted. At the second meeting, _____ _____ are considered.

    Answer: 3, Public, Inputs, Public, Comments

    *Source NFPA 70-2023 .