

Chicago Supervising Electricians Licensure Examination Study Guide

This candidate guide should help you prepare for the Chicago Supervising Electricians licensure examinations. Part I contains general information about testing procedures. Part II describes the content of these examinations and recommends study materials. Part III presents a set of sample questions to help candidates prepare for these examinations.

Part I General Information

PURPOSE OF THE EXAMINATIONS

Candidates for licensure as Supervising Electrician and Supervising Low Voltage Electrician in the City of Chicago must pass the appropriate test.

TEST VALIDITY

The content of these examinations is based on recommendations from an expert panel of trainers, inspectors and licensed Supervising Electricians. All questions have been subjected to strict controls and reflect practices described by supervising electricians who are licensed in Chicago.

STUDY

MATERIALS

Study materials for these examinations are listed on page 3.

USE OF 2018 CODE BOOK DURING THE TEST

A clean, printed copy of the 2018 Chicago Electrical Code may be used during test. Tabs may mark sections of the Code, but notes, highlighting or other changes are prohibited. CTS also provides a reference document with changes since the Code was published. A copy of this document can be downloaded from the CTS website at www.continentaltesting.net. ***CTS also will provide candidates a copy of this document at the test.***

MISSING AN EXAMINATION

There are no "make-up" examinations. You may re-register for the next examination date. THERE ARE NO REFUNDS.

SUCCESS/ LICENSURE

Candidates who score 70 or higher will receive a PASS notice and an application for licensure.

FAILURE

Candidates who score below 70 will receive a FAILURE notice and an application for re-examination. Candidates are encouraged to retake the examination; many candidates who initially fail such an exam pass on subsequent attempts.

**WHAT YOU MUST
BRING TO THE
EXAMINATION**

Each candidate should bring two (2) sharpened Number 2 black lead pencils and a non-programmable, non-printing, solar- or battery-powered portable or pocket calculator. No power source will be available for calculators at the test site. No other types of calculators, markers or writing tools will be permitted at any time during this examination.

**LENGTH AND
TIME LIMITS
FOR EACH TEST**

The Supervising Electrician test has 150 questions with a four-hour time limit. Low Voltage Supervising Electrician has 100 questions with a three-hour time limit.

Part II Test Content and Study Materials

Supervising Electricians must demonstrate that they are familiar with safe practices and procedures in their profession. The distribution of questions by content area in the Supervising Electrician general test appears below.

Supervising Electrician Examination

150 Questions

I. Electrical Principles and Practices	25 questions
A. Fundamental concepts	3 to 4 questions
B. Electrical blueprint reading	3 to 4 questions
C. Conductors, conduit and grounding	3 to 5 questions
D. Transformers, delta and wye loads	3 to 5 questions
E. Power factor and volt-amps	3 to 5 questions
F. Service and voltage drops	3 to 4 questions
G. OSHA regulations and workplace safety	6 to 8 questions
II. Chicago Electrical Code	125 questions
Titles 2, 4 and Chapter 13 (<i>Code Supplement</i>)	8 to 10 questions
General Provisions (090-110s)	10 to 12 questions
Wiring and Protection (200s)	18 to 22 questions
Wiring Methods and Materials (300s)	22 to 25 questions
Equipment for General Use (400s)	12 to 14 questions
Special Occupancies (500s)	12 to 14 questions
Special Equipment (600s)	12 to 12 questions
Special Conditions (700s)	12 to 14 questions
Communication Systems (800s)	10 to 12 questions

Part II Test Content and Study Materials *(continued)*

Supervising Low Voltage Electrician Examination

100 questions

I. Electrical Principles and Practices	25 questions
A. Fundamental concepts	3 to 4 questions
B. Electrical blueprint reading	3 to 4 questions
C. Conductors, conduit and grounding	3 to 5 questions
D. Transformers, delta and wye loads	3 to 5 questions
E. Power factor and volt-amps	3 to 5 questions
F. Service and voltage drops	3 to 4 questions
G. OSHA regulations and workplace safety	6 to 8 questions
II. Chicago Electrical Code	75 questions
Titles 2, 4 and Chapter 13 (<i>Code Supplement</i>)	5 to 7 questions
General Provisions (090-110s)	6 to 8 questions
Wiring and Protection (200s)	10 to 12 questions
Wiring Methods and Materials (300s)	14 to 16 questions
Equipment for General Use (400s)	6 to 8 questions
Special Occupancies (500s)	6 to 8 questions
Special Equipment (600s)	6 to 8 questions
Special Conditions (700s)	6 to 8 questions
Communication Systems (800s)	10 to 12 questions

Recommended Study Materials

All candidates must respond to test questions that are based on information provided in the following sources.

- 2018 *Chicago Electrical Code*
National Fire Protection Association, 2018
A clean, printed copy of the 2018 Chicago Electrical Code may be used during the test. Tabs may mark sections of the Code, but notes, highlighting or other changes are prohibited.
- Croft, Terrell, & Sommers, Wilford. *American Electrician's Handbook*, 16th Ed. (2013). McGraw-Hill Publishing, Inc.
- Code of Federal Regulations, Title 29, Part 1926 (OSHA)*.
Occupational Health and Safety Administration (OSHA)
U.S. Department of Labor Website: <http://www.osha-slc.gov>
- Selected Provisions of Titles 2, 4 and 13 for the Supervising Electrician Examination.
City of Chicago Department of Buildings, 2018
Download a study copy from CTS website at www.continentaltesting.net. CTS will provide a clean copy for use during the test.

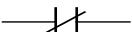
Part III Sample Questions

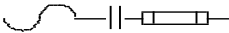
All questions are multiple choice with one correct answer and three incorrect choices. All questions are supported by one or more of the references listed on page 3 of this Study Guide. Questions may require referring to more than one section of the *Code*. **Select the best answer to each question after reviewing all information relevant to the question. Answers to over 75% of the questions in these examinations are documented in the 2018 Chicago Electrical Code.**

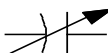
An expert panel of trainers, inspectors and licensed Supervising Electricians validated each sample question and every question in your examination. Answers to these sample questions are provided at the end of this test. The best way to prepare for these examinations is to answer the sample questions using the references listed on page 3 of this Study Guide.

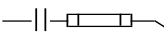
1. Which statement most accurately describes the skin effect?
 - A. It has the same value for all conductor and cable gauge sizes.
 - B. It indicates increased resistance of a circuit to alternating current.
 - C. It measures condensation of a moisture film on a conductor's surface.
 - D. It reduces the attraction of two wires with similarly directed DC currents.

2. Which of the following symbols represents an adjustable capacitor in an electrical diagram?

A. 

B. 

C. 

D. 

3. What electrical units are used to express the actual maximum load for lighting units that employ ballasts, transformers or auto-transformers?

A. Volts

B. Amperes

C. Watt-hours

D. Amps Volt-Amperes

4. What is the line current drawn to a 3Ø generator that is delta-connected to a balanced three-wire, 20 kVA, 240 V, 3Ø load with a power factor of one?

$$\text{Assume } I_L = \frac{W}{\sqrt{3}}$$

A. 48.1

B. 83.3

C. 104.3

D. 144.3

5. What is the voltage drop in volts across a 10-foot-long single conductor 3/0 RUH copper wire that carries a 300 A load?
 - A. 0.03 V
 - B. 0.04 V
 - C. 0.23 V
 - D. 0.24 V
6. Which of the following parts of electrical equipment must be enclosed or isolated for safe operation?
 - A. Parts operating at 600 volts or more during ordinary use
 - B. Parts that connect to more than two additional electrical units
 - C. Parts that require heavy-duty circuit breakers for safe operation
 - D. Parts producing arcs, flames or molten metal during ordinary operation
8. What is the maximum fine for a commercial bakery in which an electrical inspector found a motor without a name plate, a capacitor exposed to magnesium dust, and an unlocked transformer vault after these violations have continued for two days?
 - A. \$1,000
 - B. \$1,500
 - C. \$3,000
 - D. \$6,000
8. When placing wires and conductors upon or along a public way, what is the required distance from the curb to the public way?
 - A. Not more than five feet
 - B. At least five feet
 - C. Not more than four feet
 - D. At least four feet
9. Unless otherwise specified, conductors normally used to carry current shall be
 - A. copper or aluminum.
 - B. copper clad.
 - C. aluminum or aluminum clad.
 - D. silver plated.
10. Which branch circuits require color codes of black, red and blue?
 - A. All branch circuits
 - B. All ungrounded branch circuits
 - C. Circuits rated over 150 volts to ground
 - D. Circuits rated 150 volts to ground or less

11. Insulated equipment grounding conductors for multi-wire branch circuits may be
- | | |
|-----------|-----------|
| A. black. | C. blue. |
| B. green. | D. white. |
12. For direct current systems supplied from an off-premises source, the grounding connection is made
- A. on interior wiring.
B. at a supply station.
C. at individual services.
D. on the supply side of the service disconnecting means.
13. What is the minimum conductor size for a 3-wire feeder supplying at least two 3-wire branch circuits?
- | | |
|---------------|---------------|
| A. No. 8 AWG | C. No. 12 AWG |
| B. No. 10 AWG | D. No. 14 AWG |
14. The radius of the curve of the inner edge must be at least five times the diameter of the cable for bends in all of the following **EXCEPT**
- A. armored cable.
B. nonmetallic sheathed cable.
C. mineral insulated metal sheathed cable over $\frac{3}{4}$ inch.
D. nonmetallic sheathed cable and armored cable.
15. What is the ampacity for a type HPD 14 AWG flexible cord with four current-carrying conductors?
- | | |
|---------------|---------------|
| A. 20 amperes | C. 16 amperes |
| B. 17 amperes | D. 14 amperes |
16. How much unobstructed bending space is required in the gutter for a four-wire, size 350 kcmil conductor in a motor control center?
- | | |
|--------------|--------------|
| A. 8 inches | C. 10 inches |
| B. 12 inches | D. 14 inches |

17. What is the full-load current for a $\frac{3}{4}$ horsepower single-phase alternating current motor rated at 200 volts running at usual speed?
- | | |
|----------|-----------|
| A. 6.9 A | C. 9.2 A |
| B. 7.9 A | D. 13.8 A |
18. Stairways in common areas of three-flat apartment buildings shall
- A. be illuminated at all times.
 - B. have standard exit signs above all doors leading to the stairs.
 - C. be illuminated from one hour before sunset until one hour after sunrise.
 - D. be illuminated and have double-pole switches to control the lighting at each door leading to the stairs.
19. Portable equipment for audio signal processing shall be
- A. grounded by an approved means when housed in a metal enclosure.
 - B. securely mounted on the building at each location where it is used.
 - C. installed only with an approved flexible cord or MI cable.
 - D. served by isolated ground receptacles.
20. How far below grade must underground service conductors in rigid metal conduit for a fire pump be buried?
- | | |
|-----------------------|-----------------------|
| A. At least 6 inches | C. At least 24 inches |
| B. At least 18 inches | D. At least 36 inches |
21. Which of the following is **INCORRECT** regarding overcurrent devices for circuits operating at less than 50 volts?
- A. A disconnecting means shall be provided on the supply side of the fuses or thermal cutouts.
 - B. Circuit breakers shall indicate whether they are in open or closed position.
 - C. Enclosures for overcurrent devices shall be mounted vertically.
 - D. Overcurrent devices shall be enclosed or suitably protected.

22. Which of the following is **INCORRECT** regarding overcurrent devices for circuits operating at less than 50 volts?
- A. Overcurrent devices shall be enclosed or suitably protected.
 - B. Enclosures for overcurrent devices shall be mounted vertically.
 - C. Circuit breakers shall indicate whether they are in open or closed position.
 - D. A disconnecting means shall be provided on the supply side of the fuses or thermal cutouts.
23. Which of the following are Class I remote control circuits?
- A. Signal circuits in which power is limited
 - B. Remote control circuits in which power is not limited
 - C. Circuits that would be Class 2 if they were not in a hazardous location
 - D. Signal circuits whose conductors are in the same cable with conductors of communication circuits
24. Optical fibers may always be installed in the same cable with conductors for
- A. electrical power circuits operating at 600 volts or less.
 - B. television, communication and signaling circuits.
 - C. electrical lighting circuits.
 - D. Class 1 circuits.
25. Which of the following is required by the *Chicago Electrical Code* when poles support both communication conductors and light or power conductors?
- A. Open communication conductors shall be insulated from woodwork.
 - B. Communication conductors shall be kept at least 8 feet above all roofs.
 - C. The light and power conductors shall be below communication conductors.
 - D. Communication conductors shall not be attached to a cross-arm that carries light or power conductors.

ANSWER KEY

The *2018 Chicago Electrical Code* is the primary reference for these examinations. Answers to most items can be located through the *Code* index; other items require the candidate to refer to *Code* headings and/or section numbers. Many items also refer to additional sections of the *Code*. All applicable *Code* listings are provided, plus citations for other references.

Question	Correct Answer	2018 Chicago Electrical Code plus Other References as noted
1	B	<i>American Electrician's Handbook</i> , §1.123
2	C	<i>Handbook</i> §1.19
3	B	<i>Handbook</i> §3.37, 38
4	A	<i>Handbook</i> §1.152 to 155; $I_L = 20\text{kVA}/(240 \times \sqrt{3})$ = 20,000/(240*1.732) = 48.1 A
5	D	<i>Handbook</i> §1.103, Equation 27. <i>Chicago Code</i> Chapter 900, Table 8; Table 8 shows resistance=0.0797/1000' = .000797 ohms. Voltage drop is $E=IR=(300\text{A})(.000797\Omega) = 0.2391 \text{ V} = 0.24 \text{ V}$
6	D	OSHA §1926.403(c)(2)
7	C	<i>Chicago Code</i> 13-12, 010, 040, 890
8	D	<i>Code</i> §13-12-860
9	A	<i>Code</i> §110.5
10	D	<i>Code</i> §210.5.C.1
11	B	<i>Code</i> §210.5B, 250.119
12	B	<i>Code</i> §250.164A
13	C	<i>Code</i> §215.2B
14	C	<i>Code</i> §320.24, 332.24, 334.24, 336.24
15	C	<i>Code</i> §400.5, Table 400.5A
16	B	<i>Code</i> §430.10B, 373.6A
17	B	<i>Code</i> §430.248
18	A	<i>Code</i> §560.78A2
19	A	<i>Code</i> §640.7 & 9
20	A	<i>Code</i> §695.6A1, Table 300.5
21	D	<i>Code</i> §700.33
22	A	<i>Code</i> §240.40, 240.20B
23	B	<i>Code</i> §725.2
24	B	<i>Code</i> §770.133B
25	D	<i>Code</i> §800.44A2