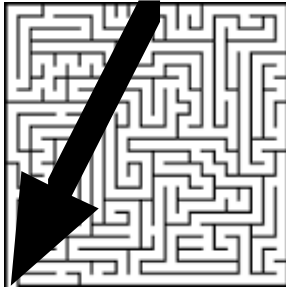


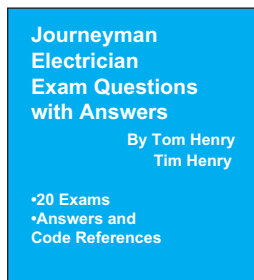
INTRODUCTION

Often we get asked if we know of a short cut in preparing for the electrical exam.

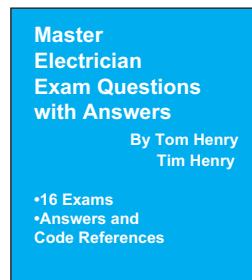


- A short cut is a quicker way of getting somewhere than the usual route.
- A short-cut, "path not as long as the ordinary way,"
- A short cut is a method of achieving something more quickly or more easily than if you use the **usual** methods.

The usual method is to work the 36 Open Book exams in the Journeyman and Master books. This is an excellent way to prepare for the Open Book questions but it is time consuming.



Journeyman Electrician Exam Questions and Answers. An excellent study-aid for the helper, apprentice, or electrician in preparing for the Journeyman exam. **20** open-book exams.



Master Electrician Exam Questions and Answers. Designed to advance the electrician in the Code from the Journeyman level. **16** open-book exams .

Now for my short cut I have written the new book **Preparing for the Electrical License Examination Short Cut.** In this book I'm giving you **2,283** actual questions from the electrical exam with the answers in a bold format with the NEC Article and section number where the answer is found.

6. All boxes and enclosures for emergency circuits shall be marked so they will be ____ as a component of an emergency circuit.

700.10(A)

- (a) **readily identified** (b) recognized (c) easily sighted (d) classified

7. Unless otherwise permitted, wiring for ____ loads shall be kept independent from all other wiring and equipment.

700.10(B)

- (a) **emergency** (b) legally-required standby (c) optional standby (d) all of these

8. Equipment for feeder circuits (including transfer switches, transformers, and panelboards) shall be located either in spaces fully protected by approved automatic fire suppression systems (including sprinklers, carbon dioxide systems) or in spaces with a ____ fire resistant rating.

700.10(D)(2)(2)

- (a) 15 minute (b) one hour (c) **two hour** (d) four hour

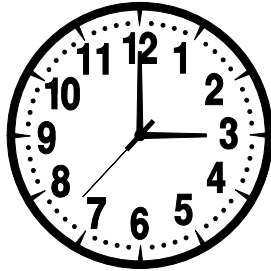
The book contains questions from all 9 Chapters, 155 Articles. **2,283** answers!

Open Book Exam

Most applicants agree this is the most difficult part of an electrical exam. Time becomes such an important factor. 50 open book questions are to be answered in two hours

Open book is a test of your knowledge and use of the National Electrical Code. 86% of the open book questions are from the Code book.

Your score on the open book exam depends on how familiar you are with the Code book. Most exam applicants run out of time and are not able to find all the answers to the questions within the limited time.



50 Questions
2 Hour Time Limit

That averages to
2.4 minutes
per question

The key to an open book exam is not to spend too much time on one question. If the question does not contain a key word that you can find in the index, **skip this question**, and continue to the next question. If you spend 3 minutes, 5 minutes, 6 minutes on a question and never find the answer you are eating into the time that should be used for the answers you can find.

In general, there are usually 8 to 10 really difficult questions on an exam. The remaining questions after proper preparation, you will be able to find within the allotted time. Skip these 8 or 10 as you recognize them and move on finding the other answers. If you answer 40 questions correctly out of a total of 50 questions your score would be 80%! That's better than in some cases where the applicant hasn't even answered 20 questions and time has run out. You **can't** spend 5 or 6 minutes on a question. Never leave a question unanswered, unanswered is counted wrong. Always select a multiple choice answer before time runs out.

Proper preparation is so important in passing an open book exam. Don't be guilty of reading a question and feeling, "I know the answer so I won't bother looking in the Code book." The following pages will prove how this can be a big mistake. I teach by being properly prepared with how to find your way around in the Code book. You'll be able to look up all the answers within the time limit.



The difficulty occurs when you say Code book.

The National Electrical Code is not always easy to understand. You have to know how the Code is organized (Chapters, Articles, Parts, sections.)

INTRODUCTION

The difficulty is finding the answer to the question in the NEC Article and section in the 2 minute time frame.

I will show examples of recent exam questions that are very difficult as **there is no key word** in the question that would lead you to the Article containing the answer.

#1. The use of the term ____ is intended to convey that a controller can be operated via another means or location through communications without a direct operator interface with the controlled device.

(a) **remote** (b) wireless (c) robotic (d) signal

• Sometimes the answer is in the choice of answers. **remote** 750.50 I.N.

#2. In readily accessible locations, **turbine** output circuits that operate at voltages greater than ____ shall be installed in raceways.

(a) 12v (b) 20v (c) 24v (d) **30v**

• The Key Word is **turbine**. The question should have stated WIND which would direct you to the Article 694 and section .30 for the answer 30v. **694.30**

#3. A main common-return conductor in the **electromagnetic valve supply** shall not be less than ____.

(a) **#14** (b) #18 (c) #20 (d) #22

• The Key Word Index **book on page 19** lists **electromagnetic valve supply** in **650.6(A)**.

#4. Transformers and **electronic power supplies** shall have secondary current ratings not more than ____ milliamperes.

(a) **300** (b) 350 (c) 400 (d) 600

• When you read **Transformers** you think it's in Article 450, but the answer is found in Article 600 Signs. The Key Word Index **book on page 19** lists **electronic power supplies** in **600.23(D)**.

#5. **Voltage markings** on cables may be misinterpreted to suggest that the cables may be suitable for ____ applications.

I. power II. electric light III. Class 1

(a) **I only** (b) **II only** (c) **III only** (d) **I, II and III**

• The Key Word Index **book on page 65** lists **Voltage markings** in **725.179(J) I.N.**

#6. Examples of **support spaces** are ____.

I. lounges II. morgues III. sterile supply

(a) III only (b) I and III (c) I only (d) **I, II and III**

•The Key Word Index book lists **four** key words, **support spaces page 59, lounges page 36, morgues page 39 and sterile supply on page 58** found in **517.2 DEF I.N.**

#7. Low-voltage cables connecting to oil-filled units that are not completely sealed, such as transformers, condensers, oil coolers, and high-voltage switches, shall have insulation of the ____ type.

(a) thermoplastic (b) lead (c) **oil-resistant** (d) shielded

•The Key Word Index book lists the key word **oil-resistant on page 42** found in **517.78(B).**

#8. It is desirable to limit the size of the **isolation transformer** to ____ kVA or less and to use conductor insulation with low leakage to meet impedance requirements.

(a) **10** (b) 15 (c) 20 (d) 30

•The Key Word Index book lists the key word **isolation transformer on page 33** found in **517.160(A)(6) I.N.1**

#9. All operating room receptacles shall be listed hospital grade and so identified. The grounding terminal of each receptacle shall be connected to the reference grounding point by means of ____ .

517.19(C)(2)

(a) rigid metal conduit
 (b) EMT (tubing is permitted)
 (c) a bare copper equipment grounding conductor
 (d) **an insulated copper equipment grounding conductor**

•Question #9 lists key words **operating room and hospital** which directs you to Article 517 Health Care which makes it easier to find the answer. Questions #6, #7, and #8 were more time consuming as there was to mention of Article 517 Health Care.

#10. Ballast, transformers, and **electronic power supplies** shall be permitted to be located in attics and soffits, provided there is an access door and passage way at least _____. As well as a suitable permanent walkway at least 300 mm (12 in.) wide, extending from the point of entry to each component.

(a) 3' x 3' (b) 2 1/2' x 3' (c) **3' x 2'** (d) 2' x 3 1/2'

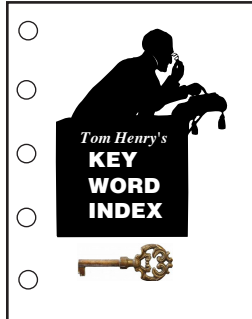
•The Key Word Index book lists the key words **electronic power supplies on page 19** found in **600.21(E)**

INTRODUCTION

After reviewing these 10 questions do you feel you could find the correct answer to each question in two minutes?

Are these questions fair?

Note: I've been in the electrical trade 66 years starting with my apprenticeship in 1956. I've been teaching the NEC since 1979 and have written over 90 electrical books and I could not find the answer to some of their questions in 2 minutes, maybe 2 hours!



In 1993 I wrote the first "Tom Henry Key Word Index" and installed the words that are not in the Code book index.

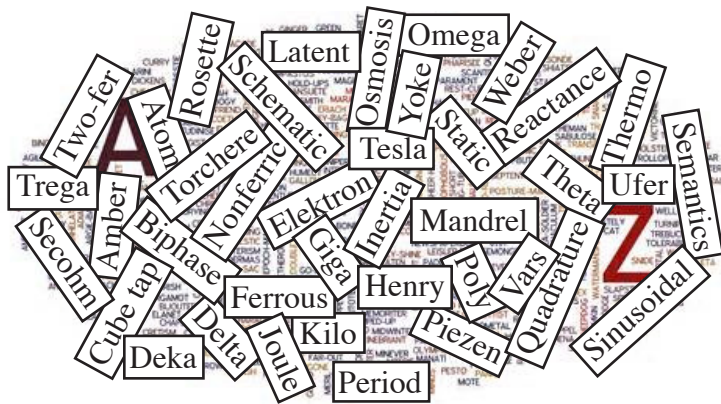
Now you can find what you're looking for in two minutes!

The best reference book for locating words in the Code book is "The Key Word Index". This book contains the words in the Code book with section number and page number. The words the person writing the question forgot to include that are not in the NEC index. The Key Word Index does NOT contain the answer. It only contains where a person can find it in the Code book.

Why is the *Key Word Index* not allowed to be used in the exam, only the NEC index can be used which does **not** contain the words to direct you to the Article.

The biggest comment from the electrician is I ran out of **time** so I had to **guess** to half of the questions rather than leaving them unanswered. It's called a multi-guess exam today.

UNDERSTANDING THE WORDS



"How can you answer the question if you don't know what the words are asking?"

The minimum size conductor for lighting elevator circuits traveling cables is ____.

620.12(A)(1)

(a) #12 (b) #18 (c) #16 (d) **#14**

The minimum size conductor permitted in **parallel** for elevator lighting is ____, provided the ampacity is equivalent to a #14 wire.

620.12(A)(1)

(a) #14 (b) **#20** (c) #16 (d) #1/0

•Almost the same question with different answers except for a word **parallel**.

INTRODUCTION

The same 110.9 question but using different words in the question.

•Equipment intended to **interrupt** current at fault levels shall have an/a ____ rating at nominal circuit voltage sufficient for the current that is **available** at the line terminals of the equipment.

110.9

- (a) operating (b) **interrupting** (c) ampacity (d) temperature

•Equipment intended to break current at fault levels shall have an **interrupting** rating at nominal circuit voltage sufficient for the current which is ____ at the line terminals of the equipment.

110.9

- (a) at maximum (b) operating (c) **available** (d) required

The same 200.6(A)(5) question but using different words in the question.

•The grounded conductors of ____ metal-sheathed cable shall be identified by **distinctive** marking at the terminals during the process of installation.

200.6(A)(5)

- (a) armored cable (b) **mineral-insulated** (c) copper (d) aluminum

•The grounded conductor of a **mineral-insulated**, metal-sheathed cable Type MI shall be identified at the time of installation by ____ marking at its termination.

200.6(A)(5)

- (a) **distinctive** (b) neutral (c) solid (d) identified

Save these lengthy questions for last as its takes too much time to even read them.

•The nearest readily accessible location for the main 150 amp service disconnecting means for a dwelling unit is in the bathroom. The required working clearances can be maintained in this room and the branch-circuit overcurrent devices will be located in another room through a feeder. Which of the following best describes Code requirements for this installation of this disconnecting means?

230.70(A)(2)

- (a) **It is not permitted in this room.**
(b) It may be installed in this room.
(c) The location of disconnecting means is not covered by Code.
(d) It may be installed in this room, but must be a weatherproof type.

*A dwelling has five 2-wire branch circuits supplying the total load. The electrician installed a 60 amp service using #6 service entrance conductors. Would this meet the Code?

230.79(C)

- (a) Yes, this service would handle seven 120 volt circuits.
(b) **No, the Code requires a 100 amp service for a dwelling.**
(c) No, three 120 volt, 15 amp circuits plus the two small appliance circuits might all be on at one time exceeding the 60 amps.
(d) Yes, three 15 amp circuits, plus the two-20 amp small appliance circuits, divided by 2, would only be 42.5 amps. A 60 amp service would be adequate.

**Save these lengthy questions for last
as its takes too much time to even read them.**

•Which of the following conditions apply to receptacle cover plate's NEC regulation ____?

406.6(A,B,C)

(a) Metal faceplate shall be of ferrous metal not less than 1.2 mm (0.040 in.) in thickness and/or of nonferrous metal not less than 0.76 mm (0.030 in.) in thickness.

(b) Metal faceplate shall be ungrounded.

(c) Faceplate of insulating material shall be noncombustible and not less than 2.54 mm (0.010 in.) in thickness but shall be permitted to be less than 2.54 mm (0.010 in.) in thickness if formed or reinforced to provide adequate mechanical strength considered suitable for damp locations.

(d) all of the above

•Which of the following is a **false** statement?

230.3

(a) Where a building is supplied by more than one service, a permanent plaque or directory shall be installed at each service disconnect denoting the location of all other services.

(b) Service conductors supplying a building are permitted to pass through the interior of another building.

(c) Conductors other than service conductors shall not be installed in the same service raceway.

(d) Conductors run above the top level of a window shall be permitted to be less than 3 feet away from a window that is designed to be opened.

•Means must be provided in the service equipment to disconnect the grounded conductor. Is this true even when the service equipment disconnects the ungrounded conductors?

230.75

(a) **No, the grounded conductor is the neutral and it must never be disconnected.**

(b) Yes, the Code has this requirement and it shall be followed.

(c) No, disconnecting the neutral during normal operations would create a hazard.

(d) Yes, whenever the ungrounded conductors are disconnected they also open the grounded.

•For motors used in alternating-current, adjustable voltage, variable torque drive systems, the ampacity of conductors, or ampere ratings of switches, branch-circuit short-circuit and ground-fault protection, and so forth, shall be based on the maximum operating current marked on the motor or control nameplate, or both. If the maximum operating current does not appear on the nameplate, the ampacity determination shall be based on ____ percent of the values given in Table 430.249 and Table 430.250.

430.6(C)

(a) **150**

(b) 115

(c) 125

(d) 58



The key to the exam is that the student must first **understand** the question, which requires **careful reading of each word**.

Read this sentence:

FINISHED FILES ARE THE RESULT OF YEARS OF SCIENTIFIC STUDY COMBINED WITH THE EXPERIENCE OF YEARS.

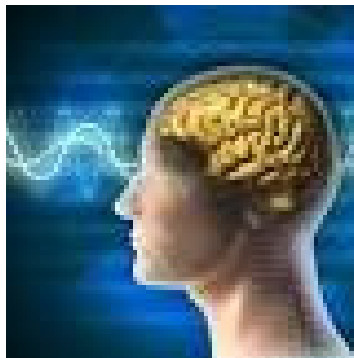
Now read it once more, and count the **F's** in the sentence. How many did you find?

- (a) 3 (b) 4 (c) 5 (d) 6

If you are a careful reader, you will find all **6 F's**.

A person who reads everyday gets better at it over time. Not surprisingly, daily readers also gain more enjoyment from it than those that read less often. It can even improve memory and critical thinking skills. And activities like reading have been linked to a lower risk of Alzheimer's disease.

One of the great benefits of reading books is that the knowledge you gain from them can never be taken away from you. Unlike worldly possessions, your knowledge will stay with you till the end of time.



Do our brains have limited memory?

You might have only a few gigabytes of storage space, similar to the space in an iPod or a USB flash drive. Yet neurons combine so that each one helps with many memories at a time, exponentially increasing the brain's memory storage capacity to something closer to around 2.5 petabytes (or a million gigabytes).

One of the greatest benefits of reading daily is that your brain becomes super powerful. An amazing fact about our brain is that it can **retain** a great amount of information, and with every new memory, your brain creates new brain pathways.

Try to understand the information first. Information that is organized and makes sense to you is easier to memorize.

The best way to **memorize multiple choice answers** is two-fold. First, use mnemonics to link keywords and answers to questions with pictures or stories. Second, use spaced repetition to recall and remember the mnemonics you make.

A mnemonic is a tool that helps us remember certain facts or large amounts of information. They can come in the form of a bold image.

A mnemonic, also known as a memory aid, is a tool that helps you remember with answers in bold letters.

INTRODUCTION

Why is reading important?

When you read, you exercise your comprehension abilities and your analytical abilities. It fires up your imagination and stimulates the memory centers of your mind. It helps recall information as well as stabilize your emotions. The importance of a reading habit is that it strengthens mental muscles.

He who knows how to read but doesn't read is no different than the man who can't read.

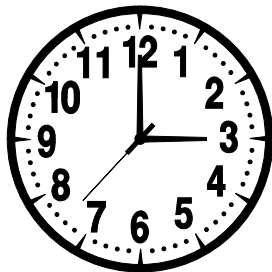
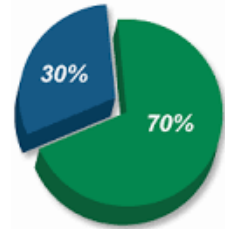


Study, don't just read. Read twice, thrice and study once. The next read you give it, close your eyes or book and try to recite the answer.

Ask yourself questions and force yourself to remember it without looking at the answer or material. This will enable you to identify Articles.



Most applicants taking an exam are not familiar enough with the Code book and it's easy to understand why only 30 out of 100 pass an electrical exam. Many are *unsuccessful* because they failed to *read* the question correctly.



**50 Questions
2 Hour Time Limit**

**That averages to
2.4 minutes
per question**



2.4 minutes to answer a question. One minute = 60 seconds x 2 minutes = 120 seconds + .4 minute (60 ÷ 10 = 6 x 4 = 24 seconds) = 144 seconds. Start by turning the 2-minute hour glass and start searching for the correct answer. At 2 minutes the sand will be emptied and now you have 24 seconds to make an educated guess of choice of (a), (b), (c) or (d).



Will Rogers once said, "You can't come back from someplace you've never been." This book will take you there.

**Article 210
Branch Circuits**

1. A circuit containing #12 THHN conductors is a ____ rated circuit when protected by a 15 amp rated circuit breaker.

210.3

- (a) 25 amp (b) 20 amp (c) **15 amp** (d) 30 amp

2. Which of the following is not a standard classification for a branch circuit supplying several loads?

210.3

- (a) 20 amp (b) **25 amp** (c) 30 amp (d) 50 amp

3. All conductors in a multiwire branch circuit shall originate from the same ____.

210.4(A)

- (a) feeder (b) service (c) **panelboard** (d) receptacle

4. Each multiwire branch circuit shall be ____ at the point where the branch circuit originates.

210.4(B)

- (a) run in the same raceway
 (b) restricted to the same floor of the dwelling
 (c) **provided with a means to simultaneously disconnect all ungrounded conductors**
 (d) provided with a disconnecting means one standard size larger than normally required

5. A multiwire branch-circuit may supply ____.

210.4(C) ex.1,2

- (a) only one utilization equipment
 (b) where all ungrounded conductors are opened simultaneously
 (c) **both (a) and (b)**
 (d) neither (a) nor (b)

6. The means of identification of each ungrounded conductor of a branch circuit supplied from more than one nominal voltage system, wherever accessible, may be by ____.

210.5(C)(1)(a)

- I. tagging, or other equally effective means
 II. marking tape
 III. separate color coding

- (a) I only (b) II only (c) III only (d) **I, II or III**

Article 210

7. The maximum voltage allowed to supply listed electric-discharge lighting in residences, hotels, motels and similar occupancies is ____.

210.6(A)

- (a) **120 volts** (b) 208 volts (c) 240 volts (d) 277 volts

8. In dwelling units and guest rooms of hotels, motels, and similar occupancies, the voltage shall not exceed 120 volts, between conductors that supply the terminals of ____.

- I. cord and plug connected loads 1440 volt amperes or less
II. cord and plug connected loads 1440 volt amperes or less, or less than 1/8 horsepower
III. luminaires

210.6(A)(1,2)

- (a) I only (b) I and II only (c) **I and III only** (d) I, II and III

9. Voltage shall not exceed 600 volts between conductors on branch circuits supplying only ballasts for electric-discharge lamps in tunnels with a height of not less than ____ feet.

210.6(D)(1b)

- (a) 12 (b) 15 (c) **18** (d) 22

10. Where two or more branch circuits supply devices or equipment on the same yoke or mounting strap, a means to simultaneously disconnect the ungrounded supply conductors shall be provided at the point at which the branch circuit ____.

210.7

- (a) starts (b) terminates (c) **originates** (d) separates

11. In dwelling units, all ____ volt receptacles in locations specified and supplied in single-phase branch circuits rated 150 volts or less to ground shall have GFCI protection for personnel.

210.8(A)

- (a) 110-220 (b) 115-230 (c) 120-240 (d) **125-250**

12. Where a 20 amp receptacle is installed in a residential laundry area, designated for the washing machine, the receptacle shall be provided with ____ protection.

210.8(A)(1) and 210.12(A)

- (a) GFCI (b) AFCI (c) **both GFCI and AFCI** (d) neither GFCI and AFCI

13. A wet bar is installed in the family room area of a dwelling unit with a wall receptacle installed within 6' of this wet bar. Which of the following best describes Code requirements for installation of this receptacle?

210.8(A)(7)

- (a) It is not permitted within 6' of the wet bar.
(b) No other protection is required because it is in the family room.
(c) **It must have GFCI protection even though it is in the family room.**
(d) GFCI protection is required only if near kitchen and bathroom sinks.

14. Bathroom receptacle outlets shall be supplied by ____ .

I. ground fault protection for personnel II. at least one 20 amp branch circuit
210.8(A)(1) & 210.52(D)

- (a) I only (b) II only (c) **both I and II** (d) neither I nor II

15. Ground-fault circuit protection for personnel is required for all 120v single-phase, 15 and 20 ampere receptacles that are installed in a dwelling unit ____.

210.8(A)(2)

- (a) attic (b) **garage** (c) bedroom (d) living room

16. GFCI protection is required where receptacles are installed within ____ of the outside edge of the bathtub or shower stall.

210.8(A)(9)

- (a) **6'** (b) 8' (c) 10' (d) 12'

17. In other than dwellings, ____ must have GFCI protection in a commercial building.

210.8(B)(1-5)

- (a) sinks (b) outdoor receptacle (c) bathroom receptacle (d) **all of these**

18. All 125-volt through 250-volt receptacles supplied by single-phase branch circuits rated 150 volts or less to ground in kitchens or areas with a/an ____ and permanent provisions for either food preparation or cooking shall have GFCI protection for personnel.

210.8(B)(2)

- (a) **sink** (b) oven (c) range (d) fryer

19. GFCI protection is required for personnel ____.

210.8(B4)(C)(D)

- (a) for boat houses
(b) for the kitchen
(c) laundry areas
(d) **all of these**

20. GFCI protection shall be provided for lighting outlets not exceeding ____ volts installed in crawl spaces.

210.8(E)

- (a) 30 (b) 50 (c) 90 (d) **120**

21. A motor control center in an equipment room requires GFCI protected 125-volt, single-phase, 15 or 20 amp rated receptacle outlet within ____ feet.

210.8(E) 210.63

- (a) **25** (b) 30 (c) 45 (d) 50