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# INTRODUCTION

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## **HOW TO PREPARE FOR THE EXAM**

Congratulations on purchasing this book! You have taken the first step towards successfully passing your Master Electrician's Licensing Exam. You have in your hands the best self-study guide available for master electrician's exam preparation. This book will not make you a competent electrician, nor teach you the electrical trade, but it will give you an idea of the type of questions asked on most electrician's licensing exams and how to answer them correctly. This book covers practically all the subjects you will likely be tested on, including: branch circuits and feeders, motors and motor controls, transformers, hazardous locations, special occupancies, conductors, box and raceway fill, services, and the ever present electrical calculations, plus much more.

Most electrician's licensing exams consists of multiple-choice questions therefore, these are the types of questions shown in this exam preparation guide. The exam questions you may encounter may be, fill in the blank, complete a sentence, select a correct choice, or complete a math calculation. In this self-study guide you will find simulated exams, with questions much like the actual test questions. These questions are an example of the many questions the author and his students come upon when taking numerous licensing exams in recent years.

### **Begin your exam preparation with two important points in mind.**

- \* Opportunities in life will arise - be prepared for them.
- \* The more you LEARN - the more you EARN.

Attempting to take an exam without preparation is a complete waste of time. Don't make that mistake. Attend classes at your local community college. Attend seminars, electrical code updates, and company sponsored programs. Many major electrical suppliers and local unions sponsor classes of this type at no cost. Take advantage of them.

Become familiar with the National Electrical Code®; the Code has a LANGUAGE all its own. Understanding this language will help you to better interpret the NEC®. Do not become intimidated by its length. Become thoroughly familiar with the definitions in Chapter One; if you don't, the remainder of the NEC® will be difficult to comprehend. Remember, on the job we use different "lingo" and phrases compared to the way the NEC® is written and to the way many test questions are expressed.

## **HOW TO STUDY**

Before beginning to study, get into the right frame of mind, and relax. Study in a quiet place that is conducive to learning. If such a place is not available, go to your local library. It is important that you have the right atmosphere in which to study.

It is much better to study many short lengths of time than attempt to study fewer, longer lengths of time. Try to study a little while, say about an hour, every evening. You will need the support and understanding of your family to set aside this much needed time.

As you study this exam preparation book, the NEC® and other references, always highlight the important points. This makes it easier to locate Code references when taking the exam.

Use a straight edge, such as a six-inch ruler when using the NEC® tables and charts. A very common mistake is to get on the wrong line when using these tables; when that happens, the result is an incorrect answer.

Use tabs on the major sections of your NEC®, so they are faster and easier to locate when taking the exam. The national average allowed per question is less than three minutes, you cannot waste time.

## **WHAT TO STUDY**

A common reason for one to be unsuccessful when attempting to pass electrical exams is not knowing what to study. Approximately forty percent of most exams are known as "core" questions. These type of questions are reflected in this exam preparation book.

### **The subject matter covered in most electrical license examinations is:**

- \* Grounding and bonding
- \* Overcurrent protection
- \* Wiring methods and installation
- \* Boxes and fittings
- \* Services and equipment
- \* Motors
- \* Special occupancies
- \* Load calculations
- \* Lighting
- \* Appliances
- \* Box and raceway fill
- \* Hazardous locations

Become very familiar with questions on the above. Knowing what to study is a major step toward passing your exam.

## HELPFUL HINTS ON TAKING THE EXAM

- \* **Complete the easy questions first.** On most tests, all questions are valued the same. If you become too frustrated on any one question, it may reflect upon your entire test.
- \* **Keep track of time.** Do not spend too much time on one question. If a question is difficult for you, mark the answer sheet the answer you think is correct and place a check ( ✓ ) by that question in the examination booklet. Then go on to the next question; if you have time after finishing the rest of the exam, you can go back to the questions you have checked. If you simply do not know the answer to a question, take a guess. Choose the answer that is most familiar to you. In most cases, the answer is B or C.
- \* **Only change answers if you know you are right.** - Usually, your first answer is your best answer.
- \* **Relax** - Do not get uptight and stressed out when testing.
- \* **Tab your Code Book.** - References are easier and faster to find.
- \* **Use a straightedge.** - Prevent getting on the wrong line when referring to the tables in the NEC®.
- \* **Get a good nights rest before the exam.** - Do not attempt to drive several hours to an exam site; be rested and alert.
- \* **Understand the question.** - One key word in a question can make a difference in what the question is asking. Underlining key words will help you to understand the meaning of the question.
- \* **Use a dependable calculator.** - Use a solar-powered calculator that has a battery back-up. Since many test sites are not well lighted, this type of calculator will prepare you for such a situation. If possible, bring along a spare calculator.
- \* **Show up at least 30 minutes prior to your exam time.** – Be sure to allow yourself time for traffic, etc. when planning your route to the exam location.

## TYPICAL REGULATIONS AT THE PLACE OF EXAMINATION

Most licensing agencies outsource their examinations to a testing agency that is a separate entity from the licensing agency. After you get approval from the licensing agency to take the exam, contact the testing agency for their regulations. To ensure that all examinees are examined under equally favorable conditions, the following regulations and procedures are observed at most examination sites:

- \* Each examinee must present proper photo identification, preferably your driver's license before you will be permitted to take the examination.
- \* No cameras, notes, tape recorders, pagers, or cellular phones are allowed in the examination room.

- \* No one will be permitted to work beyond the established time limits.
- \* Examinees are not permitted any reference material EXCEPT the National Electrical Code®.
- \* Examinees will be permitted to use noiseless calculators during the examination. Calculators which provide programmable ability or pre-programmed calculators are prohibited.
- \* Permission of an examination proctor must be obtained before leaving the room while the examination is in progress.
- \* Each examinee is assigned to a seat specifically designated by name and/or number when admitted to the examination room.

## TYPICAL EXAMINATION QUESTIONS

### EXAMPLE 1

An equipment grounding conductor of a branch circuit shall be identified by which of the following colors?

- A. gray
- B. white
- C. black
- D. green

Here you are asked to select from the listed colors the one that is to be used to identify the equipment grounding conductor of a branch circuit. Since Section 250.119 of the NEC® requires that green or green with yellow stripes be the color of insulation used on a grounding conductor (when it is not bare), the answer is **D**.

### EXAMPLE 2

A circuit leading to a gasoline dispensing pump must have a disconnecting means \_\_\_\_\_.

- A. only in the grounded conductors
- B. only in the ungrounded conductors
- C. operating independently in all conductors
- D. that simultaneously disconnects both the grounded and ungrounded conductors supplying the dispensing pump

Here the "question" is in the form of an incomplete statement. Your task is to select the choice that best completes the statement. In this case, you should have selected **D** since Section 514.11(A) of the NEC® specifies that such a circuit shall be provided with a means to disconnect simultaneously from the source of supply all conductors of a circuit, including the grounded conductor.

### **EXAMPLE 3**

A building or other structure served shall be supplied by only one service EXCEPT one where the capacity requirements are in excess of \_\_\_\_\_.

- A. 800 amperes at a supply voltage of 1000 volts or less
- B. 1000 amperes at a supply voltage of 1000 volts or less
- C. 1500 amperes at a supply voltage of 1000 volts or less
- D. 2000 amperes at a supply voltage of 1000 volts or less

Again, the "question" is in the form of an incomplete statement and your task is to select the choice that best completes the statement. In this case, you are to find an exception. You have to select the condition that has to be met when supplying a building or structure by more than one service. You should have selected **D** because Section 230.2(C)(1) requires the conditions listed in **D** but does not require or permit the conditions listed in A, B, or C.

### **EXAMPLE 4**

Disregarding exceptions, the MINIMUM size overhead service-drop conductors shall be \_\_\_\_\_ AWG copper.

- A. 6
- B. 8
- C. 12
- D. 14

Here the "question" is in the form of fill in the blank and your task is to select the choice that best completes the statement. In this case, exceptions are not applicable. You have to select the minimum size conductor required for overhead service-drop conductors. You should have selected **B** because Section 230.23(B) specifies that the conductors shall not be smaller than 8 AWG copper.

### **HOW TO USE THIS BOOK**

Practice exams numbers 1-12 contained in this book consists of 25 questions each. The time allotted for each of these practice exams is 75 minutes or 3 minutes per question. After taking the first 12 exams try the final exams. The two final exams are 100 questions in length; the allotted time for each final exam is 5 hours. Using this time limit as a standard, you should be able to complete an actual examination in the allotted time.

You will seldom find trick questions in this exam prep guide, but many will require careful reading. Certain words such as, shall, shall not, should and should not, can make a difference in the correct answer. When a question contains verbiage such as, in general, generally, the general rule is, disregarding exceptions, etc., this means exceptions are not to be taken into consideration.

To get the most out of this book you should answer every question and highlight your NEC® for future reference. If you have difficulty with a question and cannot come up with the answer that is familiar to you, put a check mark next to the question and come back to it after completing the

remainder of the questions. Review your answers with the **ANSWER KEY** located in the back of this book. This will help you identify your strengths and weaknesses. When you discover you are weaker in some areas than others, you will know that further study is necessary in those areas.

Do only one practice exam contained in this book during an allotted study period. This way you do not get burned out and fatigued trying to study for too long a period of time. This also helps you develop good study habits. **GOOD LUCK!**

## **ABOUT THE AUTHOR**

H. Ray Holder has worked in the electrical industry for over fifty years as an apprentice, journeyman, master, field engineer, estimator, business manager, contractor, inspector, consultant, and instructor.

Mr. Holder is a graduate of Texas State University and holds a Bachelor of Science Degree in Occupational Education. He also holds a lifetime teaching certificate from the Texas Education Agency, in the field of Vocational Education.

He is a certified instructor of electrical trades. His classes are presented in a simplified, easy-to-understand format for electricians.

He has taught over 35,000 students at Austin Community College, and the University of Texas at Austin, Texas, Odessa College, at Odessa, Texas, Howard College at San Angelo, Texas, Technical-Vocational Institute of Albuquerque, New Mexico, and in the public school systems in Ft. Worth and San Antonio, Texas. He is currently the Director of Education for Electrical Seminars, Inc.

Mr. Holder is a former member of the National Fire Protection Association, International Association of Electrical Inspectors, and retired member of the International Brotherhood of Electrical Workers.