MASSACHUSETTS VOCATIONAL TECHNICAL TEACHER TESTING

PROGRAM SCOPE OF TEST CODE #14 - ELECTRICITY

WRITTEN EXAM - 100 QUESTIONS

TIME ALLOWED: 3 HOURS

PERCENT OF TEST:

5% Health & Safety
- Health and safety regulations
- Right-to-Know
- Consequences for non-compliance
- Safety Data Sheet
- Safety Practices (Lockout/Tagout)

2% Reading Technical Drawings and Blueprints
- Basic layout
- Print terms, abbreviations, line types, symbols and notes
- Drawing dimensions

3% Tools, Electrical Test Equipment and Techniques in Fastening Objects
- Use and types of anchors
- Measurements of current, voltage and resistance

15% Concepts of Electrical Theory
- Distinguish between conductors and insulators
- Relationship between voltage, current and resistance
- Unit of measurements
- Ohm's law formula

25% MA Electrical Code (MEC) and Code of MA Regulations MGL and (CMR)
- Navigate the MEC Book
- Identify and Summarize the MGL’s and CMR’s
- Conductor requirements
- Raceway requirements
- Ground-fault circuit interrupters
- Branch circuit loads and requirements

12% Raceways, Boxes and Fittings
- Types and sizes of raceways, fittings and supports
- Methods of bending raceway
- Cutting, reaming and threading raceways
- Installing raceways and fittings on various surfaces
- Selection and installation of boxes
SCOPE OF TEST CODE #14 - ELECTRICITY

10% Fundamentals of Conductors and Cables
- Electrical conductors for specific applications
- Sizing conductors for a load
- Securing and supporting cables

15% Power and Distribution of Electricity
- Electrical service requirements for dwellings
- Operation of a circuit breaker and fuse
- Overcurrent devices
- Compute transformer sizes
- Identify power transformer connections

4% Fundamentals of Motors and Motor Controls
- Operating principles of motors and motor control

2% Fundamentals of Grounding and Bonding
- Sizing equipment grounding conductors

2% Elementary Use of Luminaires and Luminaire Controls
- Occupancy sensors, photoelectric sensors and dimmers
- Classification of lighting fixtures
- Rating of single-pole, double-pole, three-way, four-way and dimmer switches
- Installation and layout of lighting outlets

5% Basic Low Voltage Wiring
- Components of fire and security alarm systems
- Class 1, 2, and 3 low voltage systems
- Low voltage cable

NOTE: NATIONAL ELECTRICAL CODE BOOKS (2017 EDITION) WILL BE SUPPLIED, BY THE TEACHER TESTING PROGRAM, TO ASSIST YOU ON YOUR WRITTEN EXAM.

THE INTENT OF THIS EXAM IS TO ASSESS YOUR ABILITY TO TEACH THE SKILLS FOUND IN THE MASSACHUSETTS VOCATIONAL TECHNICAL EDUCATION ELECTRICITY FRAMEWORK. ALL EXAMS ARE ALIGNED WITH THE MATCHING FRAMEWORK.

SOME QUESTIONS REQUIRE A SYNTHESIS OF KNOWLEDGE BASED ON EXPERIENCE IN THE FIELD AND MAY NOT BE FOUND IN ANY BOOK. HOWEVER, CANDIDATES ARE ENCOURAGED TO STUDY FOR THEIR EXAMS BY REVIEWING CURRENT TEXTBOOKS AND REFERENCE MATERIAL WHICH CAN USUALLY BE FOUND IN THE LIBRARIES OF MOST VOCATIONAL TECHNICAL SCHOOLS AND SCHOOLS WHICH OFFER CHAPTER 74 PROGRAMS. YOU MAY ALSO BE ABLE TO OBTAIN LISTED REFERENCE MATERIALS ONLINE.

You may refer to http://www.doe.mass.edu/cte/frameworks for the Massachusetts Vocational Technical Educator Frameworks.
THE FOLLOWING LIST OF REFERENCE MATERIALS WAS DEVELOPED AS A GUIDE FOR WRITTEN EXAM CANDIDATES:

(USE CURRENT EDITION FOR ALL REFERENCE MATERIALS)

DESIGNING ELECTRICAL SYSTEMS by James Stallcup
American Technical Publishers

NATIONAL ELECTRICAL CODE with Massachusetts Amendments
National Fire Protection Association Publishers

DELMAR STANDARD TEXTBOOK ON ELECTRICITY, by Herman
Delmar Press

AMERICAN ELECTRICIANS HANDBOOK by Croft and Summers
McGraw-Hill

OFFICIAL OSHA CONSTRUCTION SAFETY HANDBOOK by JJ Keller & Associates, Inc.

The written exam consists of 100 multiple choice questions. Each question consists of one incomplete sentence or a question followed by four choices. Listed below are several sample items:

The general lighting load for dwellings expressed in volt-amperes per square foot is volt-ampere(s).

a. 1/4  
b. 1/2  
* c. 3  
d. 4

If the reactive volt-amperes on an A.C. circuit is 12 kva and the true power is 16 kw, what is the value of the apparent power supplied in kva?

* a. 20 kva  
b. 24 kva  
c. 28 kva  
d. 32 kva

* indicates correct answer

THE TEACHER TESTING PROGRAM WILL PROVIDE NON-PROGRAMMABLE CALCULATORS FOR USE IN COMPLETING THE WRITTEN EXAM. DOCUMENTATION REGARDING THESE CALCULATORS WILL BE INCLUDED IN YOUR ADMISSION PACKAGE.

UPDATED: 9-2017 lmb
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PERFORMANCE EXAM CANDIDATES WILL BE ASSESSED ON THEIR COMPLETION OF THE EXAM TASKS AND THEIR DEMONSTRATION OF INDUSTRY AND OSHA RECOMMENDED SAFETY PROCEDURES.

Most exam tasks require a synthesis of knowledge based on vocational technical work experience. As a result we highly recommend that Performance Exam Candidates possess the required years of related work experience as well as the appropriate industry recognized credentials as outlined as requirements for preliminary vocational technical educator licensure. Candidates are also encouraged to prepare for their exams by reviewing current textbooks and reference material which can usually be found in the libraries of most Vocational Technical Schools and Schools which offer Chapter 74 Programs. You may also be able to obtain listed reference materials online.
**CANDIDATE MUST SUPPLY:**

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<thead>
<tr>
<th>Item</th>
<th>Item</th>
<th>Item</th>
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</thead>
<tbody>
<tr>
<td>□ 9” Linemans Pliers</td>
<td>□ MEC Code Book Current Edition</td>
<td>□ Torpedo Level</td>
</tr>
<tr>
<td>□ 6” Straight Blade Screwdriver</td>
<td>□ Safety Glasses</td>
<td>□ Claw Hammer</td>
</tr>
<tr>
<td>□ Knife</td>
<td>□ Pencils</td>
<td>□ Work Shoes</td>
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<tr>
<td>□ Hack Saw and Blades</td>
<td>□ 6’ Ruler or Tape</td>
<td>□ Pencils</td>
</tr>
<tr>
<td>□ Slip Joint (Channelocks/Pliers)</td>
<td>□ Electrical Multi Meter</td>
<td>□ #2 Phillips Head Screw Driver</td>
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* NO BENDING GUIDES WILL BE ALLOWED*

**NO CELL PHONE USAGE WILL BE ALLOWED – INCLUDING ALL ELECTRONIC DEVICES**

CANDIDATES ARE REMINDED THAT THE USE OF A CALCULATOR IS ALLOWED FOR THE PERFORMANCE EXAM PROVIDING YOU BRING YOUR OWN.

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(USE CURRENT EDITION FOR ALL REFERENCE MATERIALS)

DESIGNING ELECTRICAL SYSTEMS by James Slattery  
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McGraw-Hill

OFFICIAL OSHA CONSTRUCTION SAFETY HANDBOOK by JJ Keller & Associates, Inc.

Electricians Guide to Conduit Bending by Cox  
COXCO

Safety Orientation NCCER, Person Prentice Hall  
www.crafttraining.com

1910 Subpart I - Personal Protective Equipment

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