ANALOG
15% DC
- Calculate ohmic values using the Resistor Color Code
- Analyze series and parallel resistive circuits
- Use Ohm’s Law to calculate circuit values
- Calculate maximum power in a circuit
- Analyze voltage divider circuits
- Calculate RC and RL time constants

15% AC
- Determine voltage values on a sine wave
- Calculate frequency and time of sine waves
- Calculate capacitive and inductive reactance
- Calculate impedance in AC circuits
- Determine resonance in AC circuits
- Calculate transformer efficiency and voltage

20% Semiconductors
- Analyze voltage regulator circuits
- Analyze half and full wave power supplies
- Calculate circuit values of transistor amplifier circuits
- Determine op-amp gain

DIGITAL
(20%) Combinational Logic and
- Convert between binary, octal, hexadecimal and decimal number systems
- Analyze truth tables of basic logic gates
- Determine Boolean expressions from logic circuits
- Write truth tables for combinational logic circuits
- Analyze adder circuits

(15%) Sequential Logic
- Write truth tables for sequential logic circuits
- Determine waveforms for sequential logic circuits
- Analyze decodes for counter circuits
- Analyze shift registers

12% TROUBLESHOOTING TECHNIQUES
- Analyze how to test diodes
- Analyze how to test digital IC’s
- Analyze how to use the oscilloscope
- Analyze transistors circuit troubleshooting
THE INTENT OF THIS EXAM IS TO ASSESS YOUR ABILITY TO TEACH THE SKILLS FOUND IN THE MASSACHUSETTS VOCATIONAL TECHNICAL EDUCATION ELECTRONICS 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 EDITIONS FOR ALL REFERENCE MATERIALS)

ANALOG ELECTRONICS

INTRODUCTION TO ELECTRONICS, by Earl Gates
Cengage Learning

ELECTRONICS PRINCIPLES AND APPLICATIONS, by Charles A. Schuler
McGraw-Hill Book Company

DIGITAL ELECTRONICS

DIGITAL ELECTRONICS, by Roger L. Tokheim
Glencoe

DIGITAL SYSTEMS PRINCIPLES AND APPLICATIONS, by Ronald J. Tocci
Prentice-Hall
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:

Assume diode (D3) burns out (becomes open), what symptom will be observed at the output?

- a. output voltage will equal zero volts
- b. excessive unregulated output voltage
- c. fuse F1 will overheat and blow
- d. output voltage is not affected

For the circuit below calculate the AC voltage gain of the amplifier. (Assume rE = 5 ohms)

- a. 10
- b. 50
- c. 100
- d. 200

* 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.
PERCENT OF TEST:

29 % FABRICATION
- Identify Resistor Values and Compute Tolerance Range Limits
- Measure Values Using a (D.M.M.)
- Determine Resistor Tolerance
- Perform IC Placement and Removal Procedures
- Draw a Schematic of a Given Circuit Board

38 % ANALOG
- Construct an Amplifier Circuit to Design Specifications
- Construct a SCR Circuit
- Construct and Test a Power Supply
- Transistor Testing

33 % DIGITAL
- Identify Gates
- Wire a Flip-Flop
- Interpret a Wave Form

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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.
CALCULATORS ARE REQUIRED AND WILL BE SUPPLIED BY THE TEACHER TESTING PROGRAM

Personal Protective Equipment

Safety Glasses (required)

Lighted or non-lighted magnifiers/reading glasses maybe utilized for fine detail work.

THE FOLLOWING LIST OF REFERENCE MATERIALS WAS DEVELOPED AS A GUIDE FOR PERFORMANCE EXAM CANDIDATES:

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

www.osha.gov Go to Regulations, select sections:
1910.1200 - Hazard Communication
1910 Subpart I - Personal Protective Equipment

*You may refer to http://www.doe.mass.edu/cte/frameworks for the Massachusetts Vocational Technical Educator Frameworks.