MASSACHUSETTS VOCATIONAL TECHNICAL TEACHER TESTING PROGRAM

SCOPE OF TEST CODE #20 – MACHINE TOOL TECHNOLOGY

WRITTEN EXAM - 100 QUESTIONS

TIME ALLOWED: 3 HOURS

PERCENT OF TEST:

7% Health & Safety
5% Quality Control
3% Material Preparation
5% Material Sciences
3% Blueprints
9% Machining Operations
6% Power Saw, Finishing, and Grinding Processes
12% Lathe Processes
5% Milling Processes
35% CNC Operations
10% Machine Tool Technology Related Mathematics

THE INTENT OF THIS EXAM IS TO ASSESS YOUR ABILITY TO TEACH THE SKILLS FOUND IN THE MASSACHUSETTS VOCATIONAL TECHNICAL EDUCATION MACHINE TOOL TECHNOLOGY 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:

MACHINERY'S HANDBOOK
Industrial Press

TECHNOLOGY OF MACHINE TOOLS by Krar, Oswald and St. Armand
McGraw-Hill

ADVANCED BLUEPRINT READING FOR MACHINE TRADES
Delmar Publishers, Inc.

FAMILIAR PROBLEMS IN MECHANICAL DRAWING by French and Svenson
McGraw-Hill

http://www.haascnc.com/training/MillProgram_PDF/xmwb.pdf

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

If a person comes in contact with a live electrical wire, the first thing to do is:

   a. immediately separate the person from the wire
   * b. shut off the power source
   c. cover person with fire blanket
   d. go for help

The included angle of an Unified National Form threading tool

is: * a. 60°
   b. 59°
   c. 14 ½°
   d. 30°

   * 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: 12-2014 LMB
PERCENT OF TEST:

23% MILLING OPERATIONS-LENGTH-WIDTH-HOLES-& SLOTS
- Set up and adjust specified feeds and speeds
- Set up vise and other devices for holding regular and irregular shapes
- Mill to specified tolerances
- Accurately use and demonstrate measurement practices

37% LATHE OPERATION-LENGTHS-DIAMETERS-THREAD-CHAMFERS & CONCENTRICITY
- Set up and operate the engine lathe for basic external operations such as facing, grooving, turning, and threading
- Use various speeds and feeds
- Accurately use and demonstrate measurement practices

34% CNC MILL AND DRILL
- Use the Cartesian Co-Ordinate System to Manually Program the CNC Milling Part
- Accurately create profile according to supplied drawing
- Accurately locate all holes and grooves to designated depths
- Accurately locate and position drill holes

6% SAFETY
- Demonstrate safe operation of milling machine and lathe
- Demonstrate general safety according to OSHA requirements and machine trade standards
- Demonstrate use of tools, eye protection and work attire according to industry and OSHA safety standards.

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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.
TRADE STANDARD FOR THE MACHINE TRADES:

Work pieces must fall within the specific parameters of geometric shape, actual size, and surface finish that has been predetermined by the blueprint, drawing, or verbal directions.

Included is the safe operation and care of tools and equipment used in the manufacture of work pieces according to industry and OSHA safety standards.

Safety concerns in the Machine Trade include all OSHA requirements. The individual must be concerned with both his/her safety as well as the safety of everyone in the exam site.

TOOLS CANDIDATE IS REQUIRED TO BRING:

- Calculator
- 0-1 Micrometer
- Safety Glasses - OSHA Approved
- 6" Scale (Steel Rule)
- 1-2 Micrometer
- Last Word or Beat Type Indicator

All Lathe tools will be provided. They will be indexable Carbide for Turning and Threading. Indexable Carbide Fly tools will be provided.

Candidate may bring any other personal tools that he/she feels will assist him/her in successfully completing the Exam.

MACHINIST HANDBOOK AVAILABLE AT SITE

HAAS CNC Simulator Controller will be used during the exam to write your program. You will manually program a CNC Milling part to be run on a HAAS Machining center.

You will be provided with a sample of often used G and M codes, along with some basic drilling format examples.

You will be allowed to use a HAAS Machinist’s CNC reference guide provided by the examiners during the performance exam.

REGULATION WORK SHOES AND SAFETY GLASSES MUST BE WORN
THE FOLLOWING LIST OF REFERENCE MATERIALS WAS DEVELOPED AS A GUIDE FOR PERFORMANCE EXAM CANDIDATES:

Mill Operator’s Manual 96-8000 Rev. AP

If you are presently teaching, use the resources at your school to prepare for this exam.

If you are still in the trade, use the web for additional resources (i.e. youtube).

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

1910 Subpart I - Personal Protective Equipment

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