

Precision Machining

General Assessment Information

Blueprint Contents

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Test Type: The Precision Machining assessment is included in NOCTI's Teacher assessment battery. Teacher assessments measure an individual's technical knowledge and skills in a proctored proficiency examination format. These assessments are used in a large number of states as part of the teacher licensing and/or certification process, assessing competency in all aspects of a particular industry. NOCTI Teacher tests typically offer both a written and performance component that must be administered at a NOCTI-approved Area Test Center. Teacher assessments can be delivered in an online or paper/pencil format.

Revision Team: The assessment content is based on input from subject matter experts representing the following states: Missouri, New York, North Carolina, Oregon, Pennsylvania, and Virginia.



48.0501- Machine Tool
Technology/Machinist



Career Cluster 13-
Manufacturing



51-4034.00- Lathe and Turning
Machine Tool Setters, Operators,
and Tenders, Metal and Plastic

Written Assessment

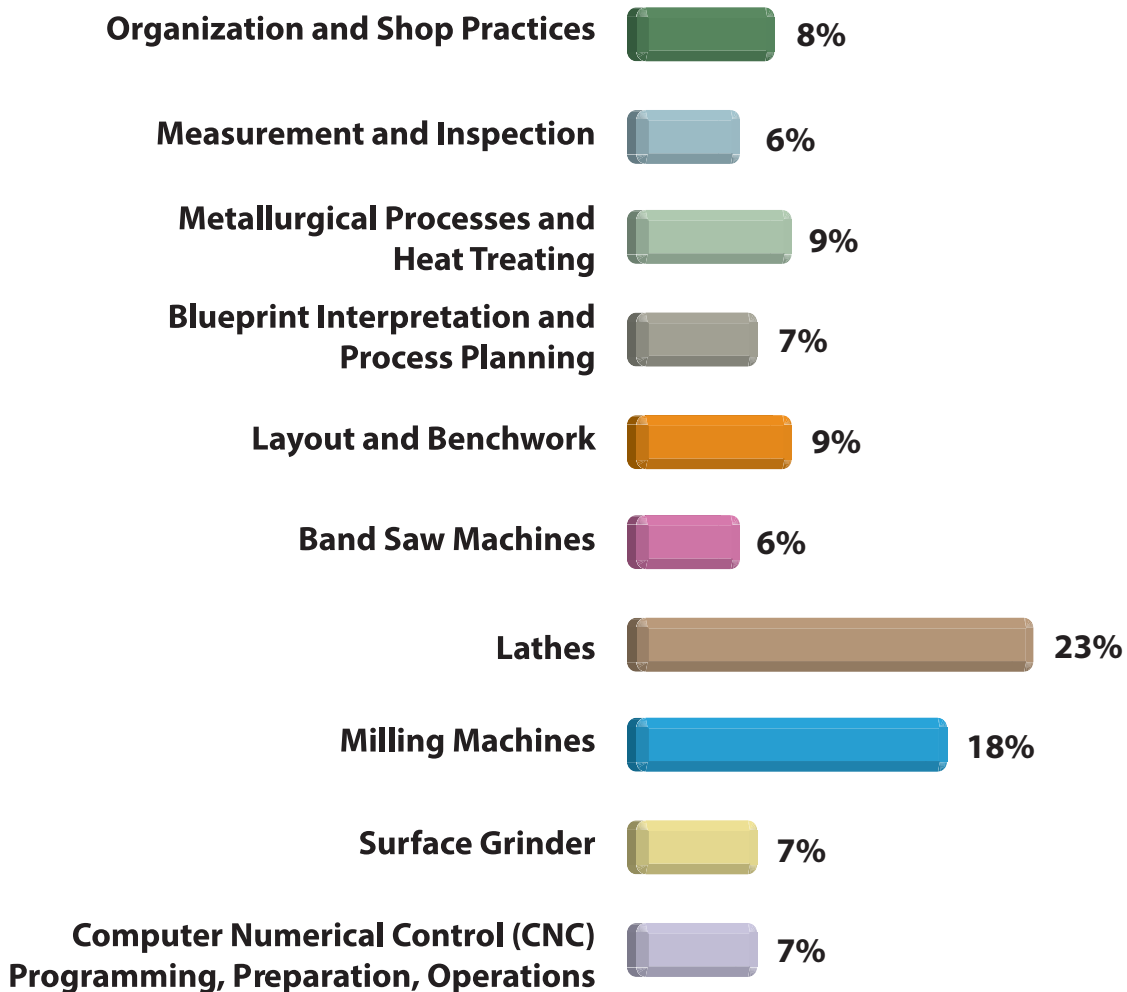
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

Administration Time: 3 hours

Number of Questions: 140

Number of Sessions: This assessment may be administered in one, two, or three sessions.

Areas Covered



Specific Standards and Competencies Included in this Assessment

Organization and Shop Practices

- Demonstrate safe work habits and operating procedures
- Clean and maintain personal work area and equipment
- Select and appropriately use cutting fluids
- Identify and appropriately use personal protection equipment (PPE)
- Identify environmental and safety considerations established by the EPA, OSHA, and listed in MSDS publications

Measurement and Inspection

- Identify, select, and calibrate precision and semi-precision measuring tools
- Measure workpiece to verify compliance with print specifications
- Display knowledge of quality control standards and process improvement

Metallurgical Processes and Heat Treating

- Identify the properties and characteristics of common metals
- Identify the steel identification system (ANSI)
- Identify properties that affect machinability
- Identify heat treating processes and objectives

Blueprint Interpretation and Process Planning

- Interpret blueprints with geometric dimensioning and tolerancing (G D & T) symbols
- Develop a production plan based on blueprint specifications



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Specific Standards and Competencies (continued)

Layout and Benchwork

- Identify and safely use hand tools
- Identify and safely use power tools
- Grind and shape tools using a pedestal/bench grinder
- Perform semi-precision layout

Band Saw Machines

- Identify parts and preventive maintenance of a band saw
- Explain safe principles of operation
- Set up and perform band saw machine operations

Lathes

- Identify parts and preventive maintenance of a lathe
- Explain safe principles of operation
- Select and maintain appropriate tools
- Calculate appropriate cutting speed, feed rate, and depth of cut
- Grind and form lathe tools
- Demonstrate knowledge of various workholding methods (independent, universal, collet, faceplate, between centers, steady and follower rests)
- Set up and perform lathe machine operations (turning, boring, threading, taper turning, knurling, grooving and cut-off, drilling and tapping, filing, polishing)
- Explain and perform threading procedures
- Identify appropriate uses for carbide inserts



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Specific Standards and Competencies (continued)

Milling Machines

- Identify parts and preventive maintenance of a mill
- Explain safe principles of operation
- Select and maintain appropriate tools
- Calculate appropriate cutting speed, feed rate, and depth of cut
- Demonstrate knowledge of various workholding methods (mill vise, table set-ups, angle plates, rotary table/index, v-blocks)
- Set up and operate milling machines (head alignment, indicate the vise, select tool holder, establish a part zero, set DRO)

Surface Grinder

- Identify parts and preventive maintenance of a surface grinder
- Select appropriate grinding wheel
- Explain safe principles of operation

Computer Numerical Control (CNC) Programming, Preparation, Operations

- Demonstrate knowledge of the axis and coordinate systems
- Read and write basic machine code
- Manually program, setup, and operate a CNC machine



Sample Questions

What combination of precision blocks from the standard 81-block set should be used to stack a combination of gage blocks that total 0.7777 inch?

- A. 0.1007, 0.127, and 0.550
- B. 0.1007, 0.120, and 0.550
- C. 0.1257, 0.150, and 0.500
- D. 0.1877 and 0.600

The rapid cooling of a heated metal for the purpose of hardening the metal is called

- A. carburizing
- B. spheroidizing
- C. annealing
- D. quenching

What is the most common grinding wheel material used on a bench or pedestal grinder for grinding mild steel?

- A. aluminum oxide
- B. silicon carbide
- C. cubic boron nitride
- D. diamond

A cut-off parting operation is hazardous when work is turned

- A. in an independent chuck
- B. in a universal chuck
- C. in a collet
- D. between centers

Find the feed rate of a 4-tooth cutter, using a 0.005 chip load, at a speed of 200 rpm.

- A. 2 inches per minute
- B. 4 inches per minute
- C. 6 inches per minute
- D. 8 inches per minute

Performance Assessment

NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

Administration Time: 3 hours

Number of Jobs: 2

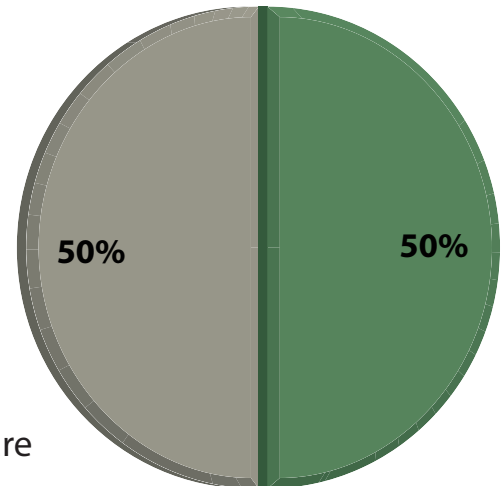
Areas Covered:

50% Milling Operations

Participants will safely operate the mill with correct measurements for quality work, and clean up and take care of the tools and equipment.

50% Lathe Operations

Participants will safely operate the lathe with correct measurements for quality work, and clean up and take care of the tools and equipment.



Sample Job

Lathe Operation

Maximum Time: 2 hours

Participant Activity: The participant will receive a piece of cold rolled steel, machine the part on the lathe according to the specifications provided on a drawing, deburr the part and break all edges, notify the evaluator to inspect the work is in customer ready condition, and clean up the machines and work area.

