

MN-119

INTRODUCTORY MACHINE OPERATIONS



STUDENT STUDY MANUAL FOR CHALLENGE EXAMINATION

Revised - Spring 2006

MN-119
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- A. Testing Conditions
A calculator and suitable machinists reference (Machinery's Hand book, Textbook, etc.) is recommended. *90 minute limit.*
- B. Test Norm Levels
None Given
- C. Testing Conditions
Open Book
- D. Test Format and Procedures
To take this test you must make an appointment with the Career Resource Center. Also, you must pay the test fee at the Cashier's Office *and* bring the receipt with you when you come *to* take the test.
- E. After you **pass** the written portion of the *test*, you may schedule the four hour machine shop competency test.
- F. Passing Score
70%

GRAND RAPIDS COMMUNITY COLLEGE

DEPARTMENT: Technology

COURSE TITLE: MN-119 Introductory Machine Operations

A. Course Description

Operation of basic metal removing machinery, cutting tool construction, selection of **speeds and feeds**, precision measurement, numerical control programming, carbide tooling, and EDM machining.

B. Student Performance Objectives

1. **Given** an engine lathe, accessories and **a** set of turning tools, a student will be able **to** face, turn, and drill metal work piece according to job shop requirements within $\pm .005$.
2. Given a set of hand bench tools, a vise and workbench, **a** student will be able *to* hack saw, file, tap, and center punch **a** metal piece according to job shop tolerances of $\pm .001$.
3. Given a **set** of semi-precision **and** precision measuring tools and a surface plate **the** student will be able *to* measure according to job shop specifications of 0.0010 with the precision measuring devices,
4. Given a vertical milling machine, accessories and cutters, the student **will** be able to square, groove, drill **or** bore a block of metal according to shop specifications ± 0.001 dimensions.
5. Given a surface grinder **and** accessories, *the* student will **be** able to square a block of metal according to job **shop** specifications of 0.001.
6. Given a **drill** press and its accessories, the student will **be** able to drill **and** ream **a** hole in **a** block of metal according to **shop** specifications of $\pm .001$ diameter.
7. Given a vertical milling machine with a CNC control, the student will be *able* to produce a part according to job shop specifications of ± 0.081 .
8. Given an electrical discharge machine *the* student will **be** able to cut a block of *steel* to job shop specifications.
9. Given cutting tools the student will be able to identify H.S.S. and carbide tooling and explain their proper use.

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CHALLENGE EXAM
STUDENT STUDY GUIDE

MACHINE TOOL THEORY:

1. The number of threads per **inch** can be checked with a _____.
 - a. tool gage
 - b. ring gage
 - c. metric rule by counting
 - d. screw pitch gage
2. On a lathe, a standard left *hand* tool _____.
 - a. cuts towards the chuck
 - b. cuts away from the chuck
 - c. cuts either direction
 - d. a, b, and c
3. The compound rest is at a right angle to the **axis** of the work piece. To chase a right hand thread, the compound must be swiveled _____.
 - a. 60 degrees to the right
 - b. 60 degrees to the left
 - c. 29 degrees to the right
 - d. 29 degrees to the left
4. When using a drill bit in the lathe that has a #3 Morse taper, the best **way of holding the bit is** in the _____.
 - a. four-jaw chuck
 - b. Jacob's *chuck*
 - c. tailstock
 - d. steady rest
5. On a milling machine, the saddle supports the _____.
 - a. knee
 - b. table
 - c. over arm
 - d. spindle

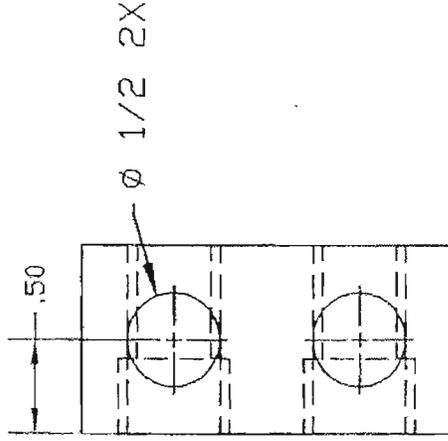
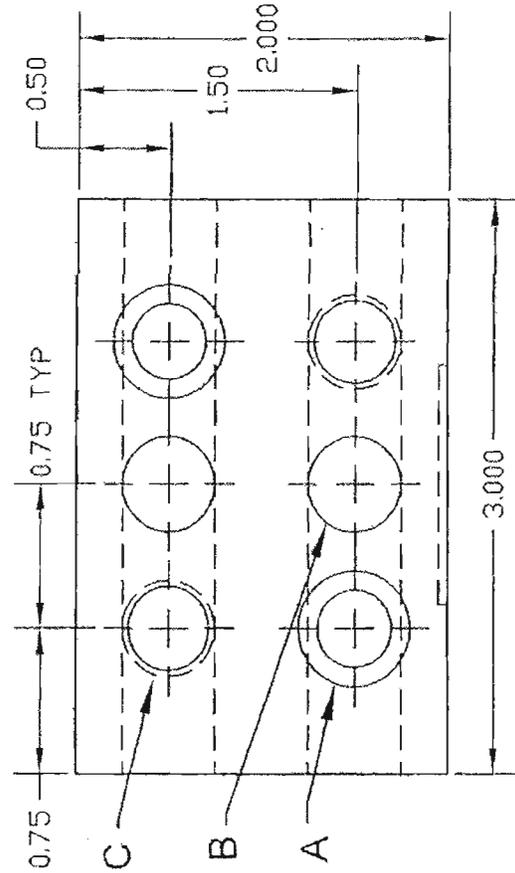
6. When sharpening a twist drill to *be* used for an average class of work, the clearance angle behind the cutting edge should be _____.
- a. 53 degrees
 - b. 15 degrees
 - c. 29.5 degrees
 - d. 7 degrees
7. The ram on a vertical mill _____.
- a. **can** be moved
 - b. holds the tool head
 - c. gives added machine capacity
 - d. all of the above
8. To remove an arbor from a milling machine, the drawbar should be _____.
- a. unscrewed from the *arbor* and struck with a hammer
 - b. loosened a few turns and **tapped** with a lead hammer
 - c. struck with a **sharp** blow *before* unscrewing
 - d. turned clockwise and pulled out
9. It is common to "Ring test" a grinding wheel before mounting it on an arbor. This test will detect _____.
- a. balance of the wheel
 - b. a crack in the wheel
 - c. a run out of the wheel
 - d. none of *these*
10. High cutting speeds are used with _____.
- a. heavy *cuts*
 - b. light cuts
 - c. **large** diameter cutters
 - d. all of these

MACHINE TOOL APPLICATION:

Given machines, part print, and tooling complete *the* part per print specifications.
See sample included in packet

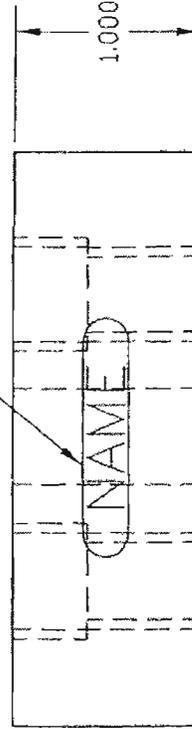
NOTES:

1. MATERIAL: HRS
2. LEAVE .010 / .015 ON ALL EDGES FOR GRINDING
3. CASE HARDEN BEFORE GRINDING (OPTIONAL)
4. 2 PIECES REQUIRED (1 PAIR)



- A. DRILL / C'BORE FOR 3/8 SHCS 2X
- B. DRILL / REAM FOR 1/2 DOWEL 2X
- C. 1/2-13 TAP 2X

.38 X 1.25 SLOT .05 DP



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
DECIMALS FRACTIONS
.XX ± .02 ANGULAR
.XXX ± .002
DO NOT SCALE DRAWING

DRAWN: T. BOETSIMA DATE: 10/08

CHECKED:

DESIGN:

GRC MN119

123 BLOCKS

SIZE	FROM NO.	DWG NO.	REV
		119-123B	
SCALE		SHEET	OF