MN-119

INTRODUCTORY MACHINE OPERATIONS

Grand Rapids Community College

STUDENT STUDY MANUAL FOR CHALLENGE EXAMINATION

Revised - Spring 2006
MN-119
INTRODUCTORY MACHINE OPERATIONS

A. Testing Conditions
   A calculator and suitable machinists reference (Machinery's Handbook, 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 ± .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 ± 1/64.

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 ± .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.
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