

## **Assignment 3**

### **Manufacturing Systems Technology**

1) Choose correct one

- Casting, turning & drilling are material removal processes.
- Milling, welding & turning are material removal processes.
- a) only
- b only
- None of the above

2) The hardness of the cutting tool material should be

- lower than workpiece material
- higher than workpiece material
- both a and b are true
- none of the above

3) The tool having one cutting edge is known as.....

- Single point cutting tool
- Multi point cutting tool
- Grinding tool
- Milling cutter

4. Which of the following materials has the highest hardness?

- (a) aluminum oxide,      (b) cubic boron nitride,  
(c) high speed steel,      (d) titanium carbide, or    (e) tungsten carbide.

5. The IGES utilizes the basic entities as elements of the design whereas PDES data exchange is done in terms of applications.

- (a) Yes                      (b) No

**6.** A lathe is used to perform which of the following machining operations (one best answer)?

(a) broaching, (b) drilling, (c) milling, or (d) turning.

**7.** Reaming is used for which of the following functions (more than one)?

(a) accurately locate a hole position, (b) enlarge a drilled hole,  
(c) improve surface finish on a hole, (d) improve tolerance on hole diameter, and  
(e) provide an internal thread.

**8.** A face milling operation is used to machine 5 mm from the top surface of a rectangular piece of aluminum 400 mm long by 100 mm wide. The cutter has four teeth (cemented carbide inserts) and is 150 mm in diameter. Cutting conditions are:  $v = 3$  m/s,  $f = 0.27$  mm/tooth, and  $d = 5.0$  mm. The time to make one pass across the surface, and metal removal rate during cutting will be.

(a) 1.33 min and  $4337.5$  mm<sup>3</sup>/s (b) 1.33 min and  $3437.5$  mm<sup>3</sup>/s  
(c) 2.33 min and  $3437.5$  mm<sup>3</sup>/s (d) 1.33 min and  $3477.5$  mm<sup>3</sup>/s

**9.** A slab milling operation is performed to finish the top surface of a steel rectangular workpiece 10.0 in long by 3.0 in wide. The helical milling cutter, which has a 2.5 in diameter and eight teeth, is set up to overhang the width of the part on both sides. Cutting conditions are:  $v = 100$  ft/min,  $f = 0.009$  in/tooth, and  $d = 0.250$  in. What will be the time to make one pass across the surface, and the metal removal rate during the cut.

(a) 0.98 min and  $8.25$  in<sup>3</sup>/min. (b) 1.98 min and  $8.25$  in<sup>3</sup>/min.  
(c) 0.98 min and  $9.25$  in<sup>3</sup>/min. (d) 0.38 min and  $8.25$  in<sup>3</sup>/min.

**10.** Smaller grain size in a grinding wheel tends to do which one of the following?

(a) improve surface finish, (b) have no effect on surface finish, or  
(c) degrade surface finish.

**11.** In a surface grinding operation the wheel diameter = 150 mm and the infeed = 0.07 mm. The wheel speed = 1450 m/min, work speed = 0.25 m/s, and the cross-feed = 5 mm. The number of active grits per area of wheel surface  $C = 0.75$  grits/mm<sup>2</sup>. Determine the metal removal rate.

(a)  $5250$  mm<sup>3</sup> /sec (b)  $5350$  mm<sup>3</sup> /min  
(c)  $5150$  mm<sup>3</sup> /min (d)  $5250$  mm<sup>3</sup> /min

**12.** Which of the following abrasive materials is most appropriate for grinding steel and cast iron (one best answer)?

(a) aluminum oxide, (b) cubic boron nitride, (c) diamond, or (d) silicon carbide.