

**BITS, Pilani –Dubai**

Dubai International Academic City, Dubai, U.A.E

I Year I Semester 2008-2009

**Test No.1 (Closed Book)**

**Course No.** TA C112

**Course Title:** Workshop Practice

**Date:** 09-10-2008\_

**Max.Marks:** 30

**Weightage:** 10%

**Duration:** 50 min.

Notes:

- Answer all the questions
- Draw neat sketches wherever necessary
- Make suitable assumptions if required and clearly state them

- Q 1 A.** List different **manufacturing processes** and give examples of components made by these processes. [4M]
- B.** List the **safety** precautions you have take while working with machines. [4M]
- Q 2.A.** Identify the **crystal structure** for the following materials: [3M]
- i).Copper. ii).vanadium .iii).Zinc. iv).Gold v)Iron vi)Aluminum
- B.** The following data were obtained during the tensile test of a steel specimen having 20 mm diameter and 150 mm length:
- a. Extension at a load of 80 KN = 0.28 mm      b. Load at elastic limit = 300 kN
- c. Maximum load = 580 kN      d. Length of the specimen at failure = 188 mm
- e. Diameter of the rod at failure = 14.5 mm
- Calculate (i) Young's modulus, (ii) percentage elongation [6M]
- Q.3.A.** What is the difference between **accuracy** and **precision** ? Explain with example: [3M]
- B.** The nominal size of a part is 30 mm. the standard tolerance selected for this part is 0.010 mm. Express the size of the part using **unilateral** and **bilateral** tolerances. [4M]
- Q.4.** The tool life for a HSS tool is expressed by the relation  $vT^{1/7} = C_1$ , and for tungsten carbide is expressed as  $vT^{1/5} = C_2$ , If at a speed of 24 m/min the tool life is 128 minutes Compare the **tool life** of the two tools at a speed of 30 m/min. [6M]

**BEST OF LUCK**

BITS, Pilani –Dubai

Dubai International Academic City, Dubai, U.A.E

I Year I Semester 2008-2009

Test No.2 (Open Book)

Course No. TA C112

Course Title: Workshop Practice

Date: 16-11-2008

Max.Marks: 30

Weightage: 10%

Duration: 50 min.

---

---

Notes:

- Answer all the questions
  - Draw neat sketches wherever necessary
  - Make suitable assumptions if required and clearly state them
- 
- 

- Q.1. The rotor shaft for a motor is to be machined from steel polished circular bar as shown in Fig.1. Write the sequence of operation involved:- [7M]
- Q.2. During a tapping operation, an operator tries to pull out the tool after stopping the machine. As a production engineer, will you allow the operator to do so? What will be your advice and explanation to him? [3M]
- Q 3. It is required to make a triangular hole in a workpiece as shown in Fig.2. Can a shaping process be used for it? Why or why not? Justify your answer. [3M]
- Q 4. The component shown in Fig.3 is to be manufactured by machining process. The raw material size is 200 x 200 x 200
- a) List different possible machine tool(s) on which the component can be produced.
- b) Which machine tool(s) is to be used if the component were to be produced in mass production
- c) Do you think that the component can be produced by using multipoint cutting tool? If yes, write a possible sequence for the process. If no, justify why it cannot be made using multipoint cutting tool? [7M]
- Q. 5. A company has got a bulk order for manufacturing 10000 nos. of the component shown in Fig.4. with a surface finish of 0.005 mm. Assuming that the cost of manufacturing for the surface finish upto 1.0 mm is the same, which of the following materials will the company choose to manufacture the product? Why?
- (a) cemented carbide      (b) copper [4M]
- Q6. Refer the phase diagram shown in Fig.5. Cite the phases that are present and the phase compositions for 30 wt% Ni-70 wt% Cu alloy at the following temperatures:

(a) 1300°C

(b) 1200°C

(c) 1100°C

[6M]

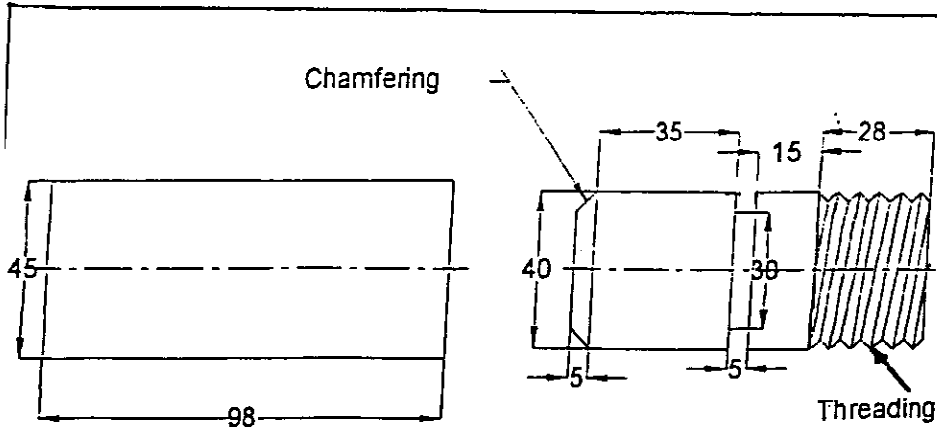


Fig.1.

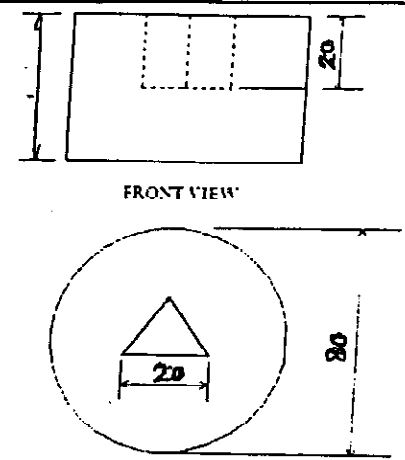


Fig.2.

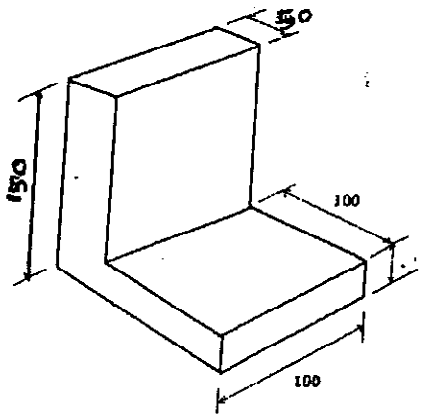


FIG.3.

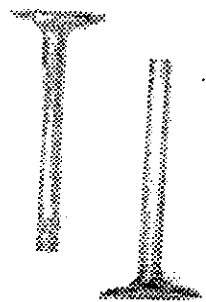


Fig.4

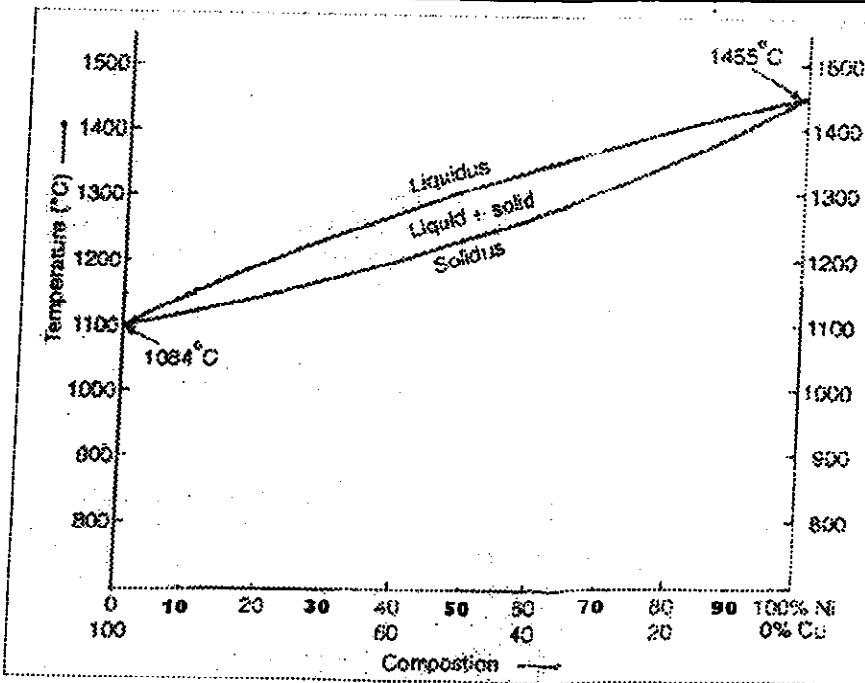


Fig.5.

COMPREHENSIVE EXAMINATION [CLOSED BOOK]

Course No. TA C112

Course Title: WORKSHOP PRACTICE

Max.Marks: 75

Weightage: 25%

Date: 23-12-2008

Duration: 3HRS.

Notes:

- Answer PART A, B & C questions in *separate* answer sheets
- Draw neat sketches wherever necessary
- Make suitable assumptions if required and clearly state them

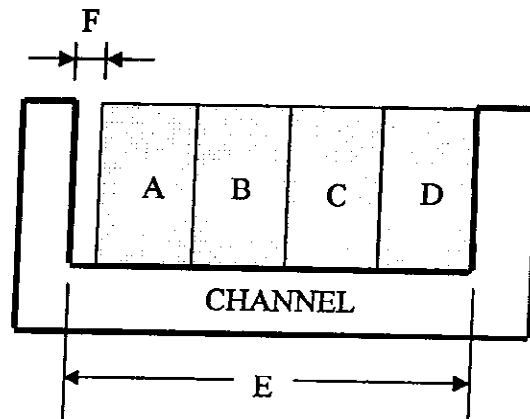
PART A

A1. Mention any three hazard sources for industrial deafness in a shop floor. [3M]

A2. A square wooden column is subjected to a compressive load of 15 kN, it contracts by 0.025 mm for 2.5 m length. If the modulus of elasticity of wood is 14 GPa, calculate the dimensions of the column. [3M]

A3. Four blocks are to be assembled in a channel as shown below. Determine the tolerance that must be assigned to the channel if its basic dimension is  $E = 4.625$  mm and the minimum gap  $F$  is not less than 0.006 mm. The dimensions of the blocks are:

$A = 0.70 \pm 0.003$  mm,  $B = 0.95 \pm 0.004$  mm,  $C = 1.70 \pm 0.004$  mm,  $D = 1.25 \pm 0.005$  mm.



[4M]

A4.(a). A 100 mm long 14 mm diameter mild steel rod is to be reduced in diameter to 10 mm by turning on a lathe in one pass. The spindle rotates at 450 rpm and the tool is traveling at an axial speed of 220 mm/min. calculate the cutting speed, depth of cut, material removing rate and time required for machining the mild steel rod. [8M]

(b). How many times we have to re-sharpen the tool, if 500 work-pieces are to be produced. In the Taylor's expression for tool life, take  $n = 1.1$  and  $C = 190$ . [4M]

A5. Draw neat diagrams to show the following in a drilled hole.

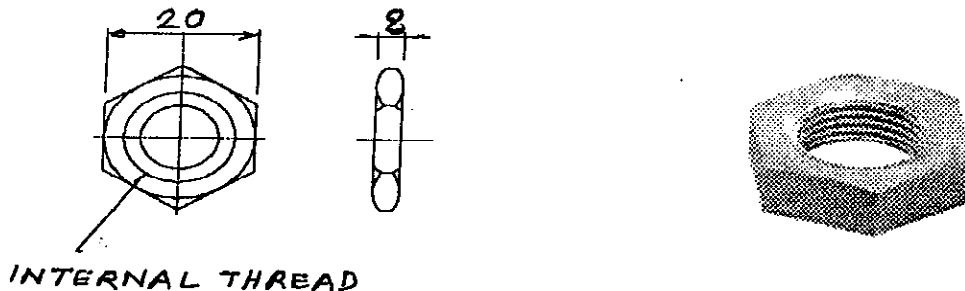
- a) Counter boring
- b) Counter sinking
- c) Spot facing

[3M]

### PART B

B1. You are supplied with mild steel rod of 25 mm diameter and 100 mm long. It is required to produce hexagonal nut as shown in the figure below. Explain the sequence of operations involved in manufacturing the nuts from the given raw material

[3M]



B2. List the different types of patterns used in casting process. Give an example of components made from each type of pattern. Briefly justify why you would select a particular type of pattern for the example component you have given. [6M]

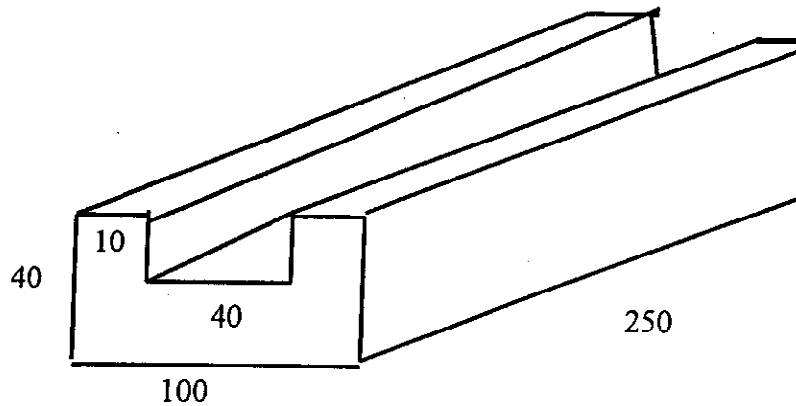
B3. Differentiate annealing and hardening processes. [2M]

B4. (a) What is grading of grinding wheel? [2M]

(b) How does lapping differ from grinding process? [2M]

B5. The job shown in figure needs to be machined from a block of Mild Steel (250mm X 100mm X 50mm). The workshop has a shaper and a milling machine for machining the same. The shaper is used for machining the outer surfaces and the milling machine is used for slot cutting. The cutting conditions are as indicated below. Assume approach and over travel for shaper to be 40 mm and cutting-to-return ratio of 2:1. The milling cutter diameter is 20 mm and number of teeth on it is 20. Assume approach length as half the cutter diameter. Equal material should be removed from top and bottom surfaces in shaping. Calculate the total machining time for the job given.

[10M]



All dimensions are in mm. Figure not to scale

| Machine        | Depth of Cut |           | Feed          |               | Cutting Speed |
|----------------|--------------|-----------|---------------|---------------|---------------|
|                | Roughing     | Finishing | Roughing      | Finishing     |               |
| <b>Shaper</b>  | 2 mm         | 0.5 mm    | 0.5 mm/stroke | 0.2 mm/stroke | 20 m/min      |
| <b>Milling</b> | 4.5 mm       | 1.0 mm    | 0.2 mm/tooth  | 0.2 mm/tooth  | 50 m/min      |

### PART C

C1. Differentiate with help of neat sketches the following :

(i) Piercing (ii) Blanking (iii) Perforating & (iv) slitting

[4M]

C2.a) What is the primary reason to select a threaded fastener instead of a non-threaded fastener?

[2M]

a) What are the consequences of (i) high current (ii) high speed (iii) high voltage in arc welding processes?

[3M]

C3. In conventional machining processes, you have studied that heat generated during the machining process is a major problem. The **water jet machining** process does not produce any heat. Then why all the traditional machining processes cannot be substituted by water jet machining process? Justify your answer:

[2M]

C4.a) Discuss the possible applications of **Robots** in industry :-

[2M]

b) Can continuous path NC machine be open loop? Why or why not?

[2M]

company is decided to manufacture one component by welding and forging process. The factory has an order for 400000 units. The costs involved for two methods of manufacturing are as follows:

| TYPE OF COST       | WELDING   | FORGING   |
|--------------------|-----------|-----------|
| Fixed cost         | Rs.15,000 | Rs.94,000 |
| Variable cost/unit | Rs.5      | Rs.4.25   |

- a) Which is the most economical method of manufacturing the component? [4M]
- b) What will be the loss if a wrong choice is made? [3M]
- C6. What is *EOQ* (Economic Order Quantity) and how is it obtained? [3M]