

**BITS, PILANI- DUBAI**  
**First Semester 2007- 08**

**WORKSHOP PRACTICE (TA UC112)**

**COMPREHENSIVE EXAMINATION (CLOSED BOOK)**

**Max. Marks: 75**

**Date: 26-12-07**

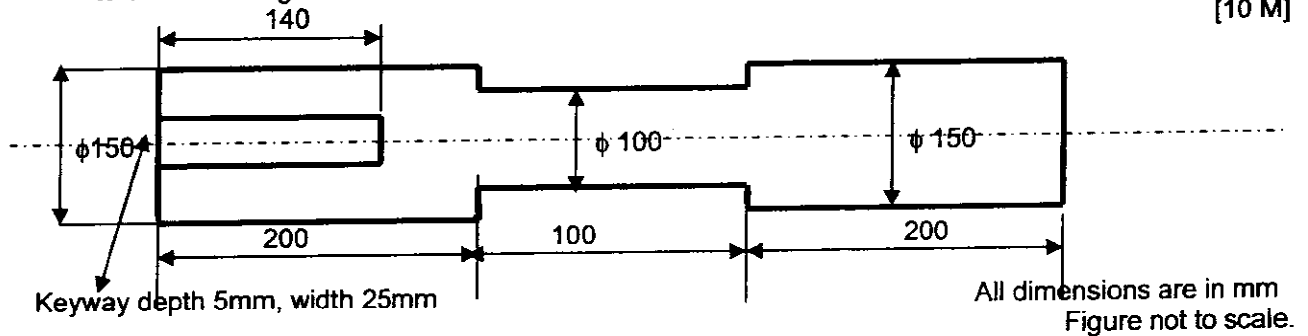
**Duration: 180 min**

**Instructions.**

- Answer all the questions.
- Answer **PART- A** and **PART- B** in separate answer sheets.
- Answer all questions sequentially.
- Draw neat sketches wherever necessary
- Make suitable assumptions if required and clearly state them

**PART A**

1. From a rod of 154 mm diameter and 502 mm length the following job shown in figure is to be made. Calculate the number of components that can be manufactured in a year. The assumption and data to be used are given below: [10 M]



**Assumptions:**

1. Facing on both sides
2. Turning for entire lengths
3. End mill is used for key way cutting (width of key = diameter of cutter)
4. The product is processed sequentially in lathe and milling machine
5. The time for manufacturing the job is 2 times the machining time on lathe and 3 times the machining time on milling machine.
6. 8 working hours per day and 300 working days in a year

**Data:**

LATHE	MILLING MACHINE
a. Feed = 0.1mm/rev	a. Diameter of the cutter = 25mm
b. Speed = 500 rpm	b. Approach and over travel = 13.6mm
c. Depth of cut = 1mm	c. Number of teeth = 4
	d. Feed/tooth = 0.1mm
	e. Depth of keyway = 5mm
	f. Cutter speed = 200rpm

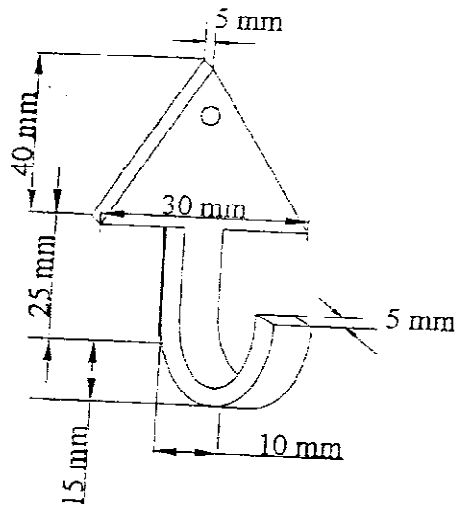
- 2.a. The nib of a fountain pen fails after long use. What is the type of failure? Explain: - [3M]
- b. The dimension of three shafts and holes are given in the table. For each assembly, identify the type of fit and compute the allowance( clearance /interference). [3M]

Size of hole	Size of shaft
(a) $25.00^{+0.02}_0$	$24.98^{+0}_{-0.02}$
(b) $20.00^{\pm 0.05}$	$20.00^{\pm 0.05}$
(c) $30.00^{+0}_{-0.025}$	$30.01^{+0.025}_0$

3. a. A tool life of 80 minutes is obtained at a speed of 30 m/min. and 8 minutes at 60 m/min. Determine
- (1) Tool life equation
  - (2) Cutting speed for 4 minutes tool life [4M]
- b. How do lapping and honing differ from grinding? [2M]
4. a. Explain the phenomena **Hogging** in Lathe: - [2M]
- b. At what speed (rpm) a 20 mm drill should run for cutting steel at 25 m/min surface speed? [2M]
  - c. Explain how **T-slots** are manufactured? [2M]
- 5.a. Differentiate between hemming, beading, seaming and flanging operations [4M]
- b. What are the consequences of a (a) High current, (b) High speed and (c) High voltage in arc welding processes? [4.5M]
  - c. Why is the primary reason to select a threaded fastener instead of a non- threaded fastener? [1.5M]

## PART B

- 1.a. In a foundry, three castings of same weight and material are to be produced. Shapes of the three castings are: a cube, a sphere, and a cylinder. Find the cooling time ratio in all these cases. Assume for the cylindrical shaped casting a length to diameter ratio of 0.5. [4.5M]
- b. What is casting yield? How is it calculated? [1.5M]
2. a. Simply stretching the material can reduce thickness of the material. Then why do we require rolling process? [2M]
- b. Product shown in figure below is to be manufactured. Explain the sequence of operation involved in manufacturing the product? [5M]



- 3.a. Give a possible technical and economical reasons why non- conventional machining processes are necessary? [3M]
- b. Explain the difference between *open loop* and *closed loop* control system: [3M]
- c. Explain *PTP* and *Contour* type system with examples [3M]
4. A certain component can be manufactured either by welding or by forging process. The factory has an order for 500000 units. The costs involved for two methods of manufacturing are as follows: [8M]

Cost	Welding	Forging
Fixed cost	Rs.15000	Rs.94000
Variable cost/ unit	Rs.5	Rs.4.25

1. Which is the most economical method of manufacturing the component?
  2. What will be the loss if a wrong choice is made?
- 5.a. What is economic order quantity and how is it obtained? [2M]
- b. Which type of layout will be the best for the manufacture of the following products? [4M]
1. Mixer
  2. Car manufacturer
  3. Automobile carburetor
  4. Space Rocket

GOOD LUCK

**BITS, PILANI – DUBAI,  
INTERNATIONAL ACADEMIC CITY, DUBAI  
FIRST SEMESTER 2007-2008  
TA UC112 WORKSHOP PRACTICE  
TEST – 2(OPEN BOOK)**

Date: 25-11-2007;

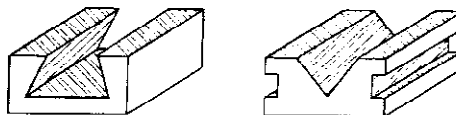
Duration: 50 min.;

Maximum Marks: 30

Notes:

1. Answer all the questions
2. Assume any missing data suitably and mention the same at appropriate place in your answer
3. Draw neat sketches wherever necessary

1. When you sharpen your scissor/knife you observe sparks. Where as when carryout machining operations such as facing, turning etc. you do not. What is the reason? **3 M**
2. We use single point cutting tool in Lathe and shaping machines. Operator, Mr. X was opinion that since both tools are single point tools, he can use the same tool interchangeably on both the machines. If you are in charge of workshop, how do you react for his suggestion? Justify your answer. **3 M**
3. It is mentioned that *Lathe is the most versatile machine tool and offers more flexibility in terms of the operations that can be performed jobs that can be produced*. It is required to produce jobs shown in Figure 1. Is it possible to produce the jobs shown in Figure 1 on lathe? If yes, explain how it can be done? If no explain why it cannot be made? **4 M**



**Figure 1 (Figure for Question 3)**

4. Finishing operations ensure good dimensional accuracy and good surface finish. Why all the components produced are not subjected to the finishing operations? 2 M
5. With overall knowledge of metal machining, suggest the minimum variety of machines a workshop should possess so that the company can produce component of any shape. Justify your answer. 4 M
6. Component shown in Fig. 2 is to be manufactured from a raw material of 50 mm diameter and 150 mm length. Give a possible sequence for manufacturing the component in detail. 6 M
7. Explain why it is difficult to produce curved surfaces using shaping machine? 2 M
8. Which machine tools and cutting tools would you use for machining the profiles shown in the Fig 3. 6 M

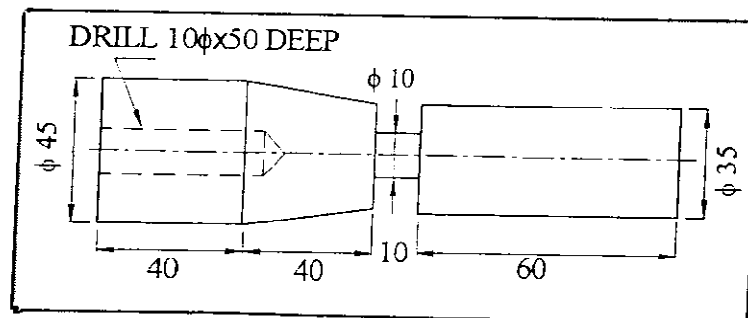


Figure 2 - Figure for Question No. 6

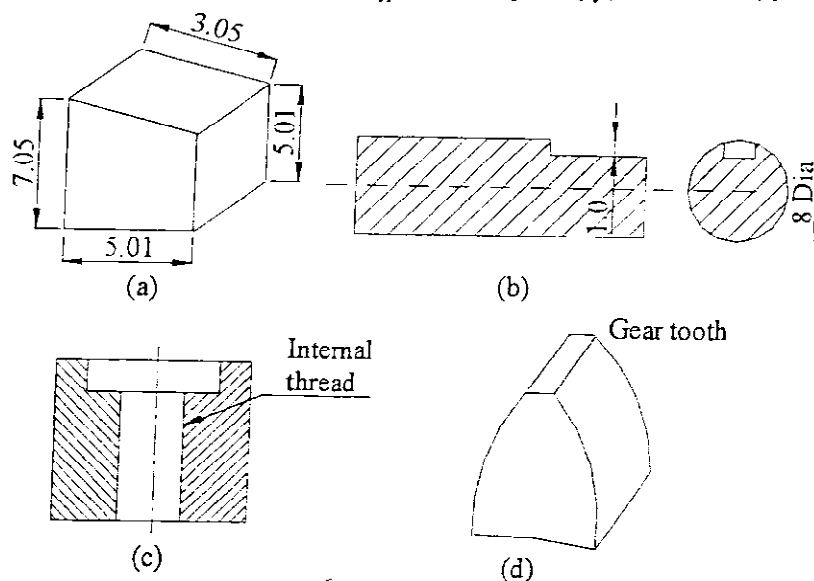


Figure 3 (Figure for question 3)

Write the answer in a tabular form as shown:

Figure	Machine tool	Cutting tool
(a)		
•		
•		

**BITS PILANI –DUBAI, ACADEMIC CITY, DUBAI**  
**WORKSHOP PRACTICE (TA UC112)**  
**First Semester 2007-08**

**TEST -1 (CLOSED BOOK)**

Max. Marks: 25

Date: 30-09-07

Duration: 50min

Notes:

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

**PART A**

1. What are the different joining processes available and specify an example for each? (2)
2. How does the ductility of a material differ from its malleability? (2)
3. Draw the stress-strain relationship of a ductile material. (2)
4. Does the tolerance chosen affect the production cost and time of the product being manufactured? If yes, how? (2)
5. " Components made out of cast iron are machined without coolants" State true or false with reason:- (2)

**PART B**

6. (a) Describe with simple sketches the casting and forming operations. (3)  
(b) Briefly explain any six safety precautions you need to follow in a shop floor. (2)
7. Choose the best suitable material for making the following components: (3)
  1. Single point cutting tool to be used on mild steel
  2. Switchboards in houses
  3. Passenger aircraft body
  4. Integrated chips
  5. Base of machine tools
  6. Incandescent bulb filaments

(b) Differentiate between inspection and measurement (2)
8. (a) If the bore diameter (internal diameter of the cylinder) is 50mm with an upper deviation of 0.25mm and lower deviation of -0.25mm, fix the dimensions of the piston diameter, hence the maximum tolerance if the maximum gap between the piston and cylinder is 5mm (3)  
(b) Specify the type of manufacturing process suitable for making space ship and Television sets. (2)