BITS, PILANI-DUBAI,
Dubai International Academic City, DUBAI
II Semester - 2007-2008

TA UC112 WORKSHOP PRACTICE
I year Common to all Branches
COMPREHENSIVE TEST

Max. Marks: 75 Date: 21ST MAY 2008 Duration 3 h

Instructions.

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

Part A

1 Differentiate malleability and ductility with examples. 1

2 Define the modified tailor's tool life equation. 1

3 What is reaming? How it differs from boring? 1

4 List the abrasives used for honing operation 1

5 What is the use of disposable pattern and when it is used? 1

6 Differentiate counter boring and countersinking. 1

7 List down the possible accidents that can occur in the workshop because of negligence inside the workshop. 2

8 Find the type of fit and compute the allowance for a hole of $30.00^{+0, -0.025}$ and shaft of $30.01^{+0.025, -0}$. 4

9 A 100 mm circular rod is to be reduced by 50 mm diameter. If the depth of cut is 5mm and material removal rate is 7000 mm^3/min, calculate the number of passes required and machining time. 6

10 Using the Taylor's equation for tool life, calculate the change in tool life when the cutting speed reduced by 25% and increased by 25% for the data: n=0.5. Comment on this. 6

11 Draw and briefly discuss the HCP, BCC & FCC crystalline structures. Give examples of metals having this structure 6

12 Calculate the machining time required to machine cast iron block surface of 250 mm long and 150 mm wide on a shaper machine with cutting to return ratio of 3: 2. Use a cutting speed of 20 m/min, feed of 3mm/stroke and a clearance of 25 mm. The available ram strokes on the shaper are; 30, 50 and 90 strokes/min. Also determine the MRR a 8

PART B

1

2 Comment on the kind of energy used in the following machining processes 1

1. Ultrasonic Machining 1
2. Laser Jet Machining
3. Electric discharge machining.
4. Electro chemical machining

3 Differentiate a stud and a bolt. 1

4 "Inventory held in a system is Blessing in Disguise" – 1

BITS, PILANI-DUBAI,
Dubai International Academic City, DUBAI
II Semester - 2007-2008

5 What is termed as tardiness? 1

6 Match the following 4

1	Wire Drawing	A	Shear force
2	Extrusion	B	Tensile Force
3	Blanking	C	Compressive Forces
4	Bending	D	Spring Back forces

7 A certain component can be manufactured either by forming or casting process. The factory has an order for 15, 00,000 units. The costs involved for two methods of manufacturing are as follows: 6

Category	Casting	Forming
Fixed Cost	Rs. 10,000	Rs. 125,000
Variable cost/unit		
Direct material	18	24
Conversion cost	6	2
Labor cost	5	2
Sales expenses	6	2
Administrative expensive	1	1
Transportation cost	1	3

Which is the most economical method of manufacturing the components? What will be the loss if a wrong choice is made?

8 Suggest suitable method for manufacturing with reasons in brief 6

1. The front gate in your house.
2. Connecting rods used in IC engines.
3. The turbine blades
4. The links used in cycle chains.
5. The Engine and cylinder of an IC engine
6. The measuring can used to measure oils.

7 Comment on the type of layout used in the following manufacturing plant with reasons. 3

1. Meat processing Industry
2. Class room allocation in your college
3. Central workshop

8 Discuss the following heat treatment process highlighting their significance

1. Annealing
2. Tempering
3. Case hardening
4. Normalizing

9 With neat sketches explain the different types of flame used in oxyacetylene welding and its usage in different welding processes. 3

10 Write short notes on 6

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Dubai International Academic City, DUBAI
II Semester - 2007-2008

1. Up and Down milling process
2. Industrial application of robots with examples
3. closed and open loop control systems

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Dubai International Academic City, DUBAI
II Semester - 2007-2008
TA UC112 WORKSHOP PRACTICE
I year Common to all Branches
TEST -2 (OPEN BOOK)

Max. Marks: 30 Date: 20th April 2008 Duration 50min

Instructions.

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

1 Comment on the method of finishing operation used to finish
   a The slip gauges used in your workshop. 2
   b The inner bore of a petrol engine after enlarging it.
   c Removal of scratches from the glass in your watch
   d Finishing the tooth of a spur gear

2 The component shown in the figure.1, is to be machined from a square block of size 50x50x110mm^3 in the college workshop, which is equipped with lathes, milling machines (both horizontal & Vertical), shapers and drilling machine (Radial & bench drilling). Suggest on the following 8
   1 The machines used to machine the component along with their process
   2 The process sequence involved
   3 Cutting tools used
   4 The jig and fixtures if any required

3 The component shown in figure.2 is to be casted. Comment on the type of pattern used, its dimension if the shrinkage allowance is 2%, machining allowance of 2mm on horizontal surface only and draft of 1° on the vertical sides. 5

4 Comment on the following process
   a If the inlet velocity of the work piece is more than roll velocity of the rolls. 5
   b The need for very high temperature of liquid to cast very thin structures such as fins in engine head
   c Hot and Cold working of metals
   d Punching and blanking processes
   e Need for core in casting process

5 A MEP (Mechanical Electrical and Plumbing) company wants to optimize its ducting design for the air-conditioning plant. it was found that the required cross section for the air flow was 100cm^2. What should be the optimal shape along with its dimensions (circular, rectangle of any dimension, square) so that the sheet metal used is less? 3

6 Suggest suitable sheet metal layout, and method for the manufacturing of the square air-conditioning louvers fixed in the class rooms 5

7 How does the press forging differ from drop forging? 2

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II Semester - 2007-2008

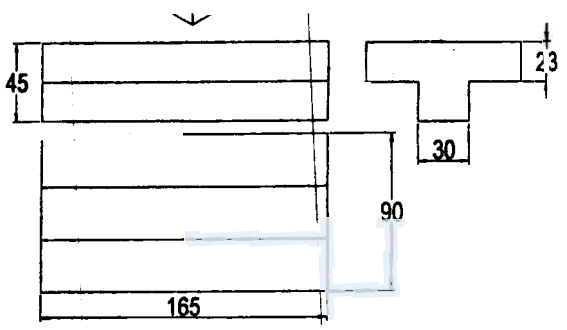
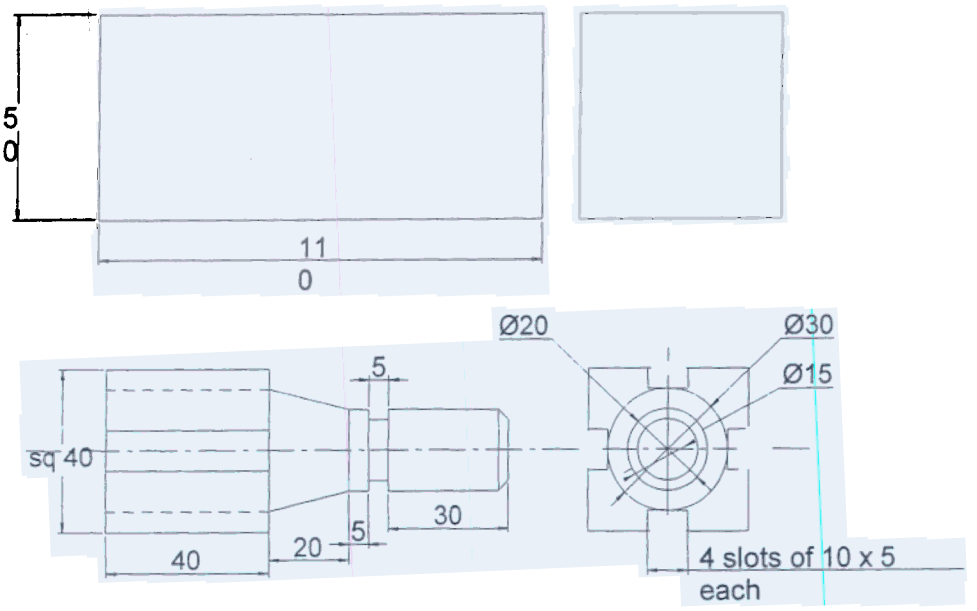


Figure 1, Work piece size = 50 x 50 x110mm



Finished product (first angle projection)

BITS, PILANI-DUBAI, ACADEMIC CITY, DUBAI
SECOND SEMESTER 2007-2008
I year Common to all Branches
TA UC112 WORKSHOP PRACTICE

TEST -1 (CLOSED BOOK)

Max. Marks: 30 Date: 02-03-2008 Duration: 50min

Notes:

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

1 "Cast Iron components have good machining properties and can be machined without coolants" State true or false with reason:- 2

2 Comment on the manufacturing processes used to produce of the following

- a Nike producing sport shoes for its sport shops globally 4
- b A paper mill manufacturing paper for news paper requirement
- c IAL manufacturing nozzle for AGNI missile
- d Dell computer assembling computers as per the customer needs

3 A 200mm long steel rod (modulus of elasticity = 205MPa) of diameter 30mm is subjected to an axial load of 500KN. Further to this load, again an axial load of 250 KN is applied. Calculate the strains produced by these loads. Also find the strain if an axial load of 750KN were to be applied one time. Compare these two strains and comment. 4

4 Comment on the material used for manufacturing the following with reasons

- a Electrical cables used in houses 4
- b Passenger aircraft body
- c handle wheel in the tailstock of the lathe
- d Pressure cooker

5 List the different manufacturing processes followed traditionally. 2

6 Discuss with neat graph the stress – strain relationship for ductile and a brittle material 4

7 The dimensions of shaft and hole are $50^{+0.025}_{-0.020}$ and $50^{+0.005}_{-0.010}$ respectively. Determine the tolerance for the shaft and the hole, Maximum and minimum clearance and the type of fit 4

8 Among positive, negative and zero rake angle, which is most suitable for a better tool life. Give reasons 2

9 Differentiate between inspection and measurement with example 2

10 "Prevention better than cure" – what are the precautions one should take in the arc welding shop 2