

BITS, Pilani – Dubai

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

I Year II Semester 2008-2009

Comprehensive Exam

Course No. TA C112

Course Title: Workshop Practice

Date: 20-05-2009

Max. Marks: 75

Weightage: 25%

Duration: 3 Hrs.

Notes:

- Answer all the questions Sequentially
- Draw neat sketches wherever necessary
- Make suitable assumptions if required and clearly state them
- Dimensions of all the drawings are given in millimeters
- Consider ± 0.5 as the tolerance for all dimensions if it's not specified

- I. A. Explain any two allied activities carried out in manufacturing process. [3M]
- B. The following data were obtained during the tensile test of a steel specimen having 48 mm diameter and 240 mm length. Extension at a load of 70 kN = 0.2 mm, Total extension = 60 mm, Diameter of rod at failure = 25 mm
Calculate (i) Young's modulus, (ii) Percentage of elongation and (iii) Percentage decrease in area [4M]
- C. What type of fracture has to be analyzed mainly while we are choosing a material for the beams on the roof of a building and explain it? [3M]
- D. Draw and explain the stress strain diagram for a ductile material. [4M]
- II. A. Determine the type of fit that can be obtained if the size of the hole and shaft are:
Hole: $70.00_{-0.065}^{-0.026}$ mm and Shaft: $70.00_{-0.011}^{-0}$ mm [3M]
- B. Explain the quality control systems which have a self correcting mechanism which is immune to errors and explain it with an example [3M]

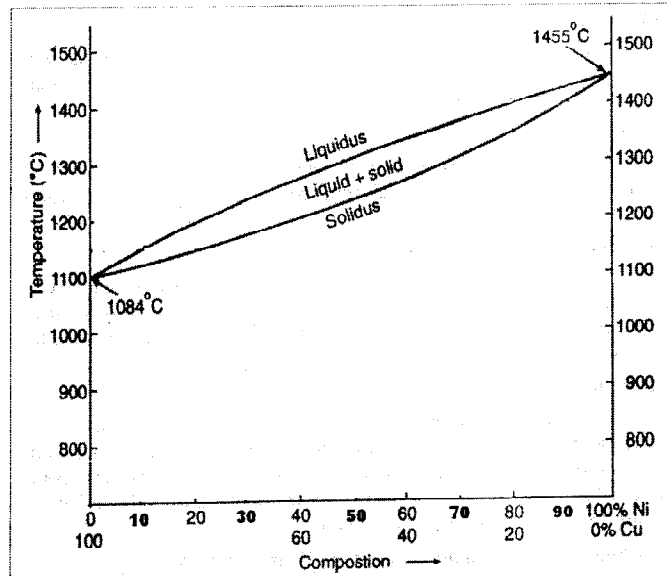
III. A. Explain with neat sketch (i) Back rake angle (ii) Nose Radius [3M]

B. Explain the Characteristics of a grinding wheel [3M]

IV. A. What are casting defects? Explain [5M]

B. Refer the phase diagram shown below. 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 [4M].



V. A. Differentiate hot working and cold working in a metal forming process [3M]

B. Name the various types of extrusion.
Explain the method of ointment tube production with neat sketch. [5M]

C. Explain the following with a simple sketch (a) Notching (ii) Lancing [3M]

D. Name the Sheet metal forming process which can be carried out in a lathe with a neat sketch. [2M]

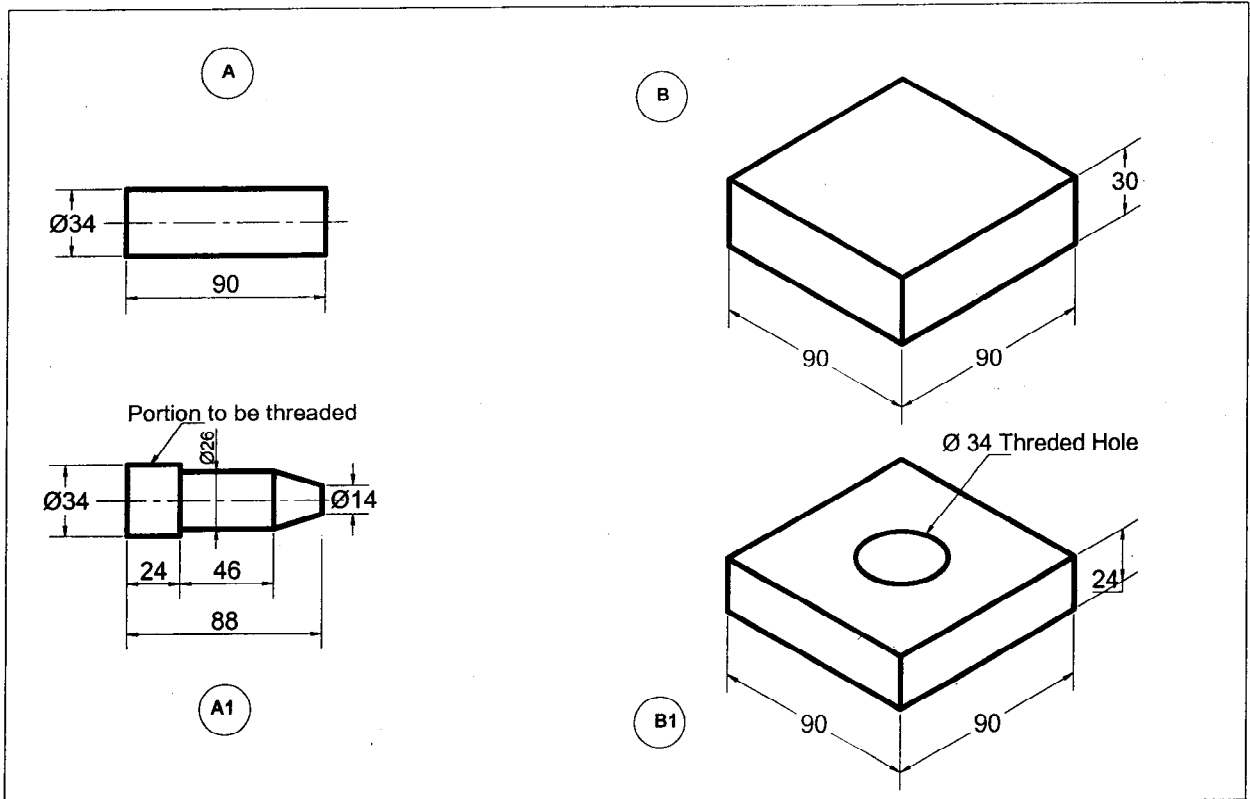
VI. A. Explain the significance of penetration in a welding process and explain straight polarity and Reverse polarity. [4M]

B. Discuss the principle of EDM Process. Draw a sketch of the arrangement. [4M].

VII. A. Explain about the following
(i) CNC retrofitting (ii) Direct numerical Control (iii) Adaptive Control System [6M]

B. Name the various types of layout and explain them briefly [3M]

VIII. A Final product has to be made by assembling part A1 in to the threaded hole of part B1 shown in figure. Part A and B are raw material for producing Part A1 and B1 respectively.



	Lathe	Milling	Drilling
Tool	HSS Turning Tool	HSS End Mill Cutter	HSS Twist Drill
Feed	0.3 mm for facing 0.4 mm/rev for Straight Turning 0.2 mm/rev for taper turning	0.2 mm/tooth	0.1 mm/rev
Cutting Speed	60 m/min for facing 75 m/min for straight turning 45 m/min for taper turning	65 m/min	55 m/min
Depth of cut	1.5 mm for facing 2 mm for turning & taper turning	3mm	Not applicable
Cutter diameter	Not applicable	90 mm	Not applicable
No. of teeth	Not applicable	18	Not applicable
Approach and Over travel	Not applicable	25 mm (Excluding L1)	22 mm

Assume time for thread cutting is 0.6 min, time for tapping is 1.76 min and time for assembly is 0.5 min. neglect setup and idle time for operations.

[10M]

ALL THE BEST.

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I Year II Semester 2008-2009

Test No.2 (Open Book)

Course No. TA C112

Course Title: Workshop Practice

Date: 30-04-2009

Max.Marks: 30

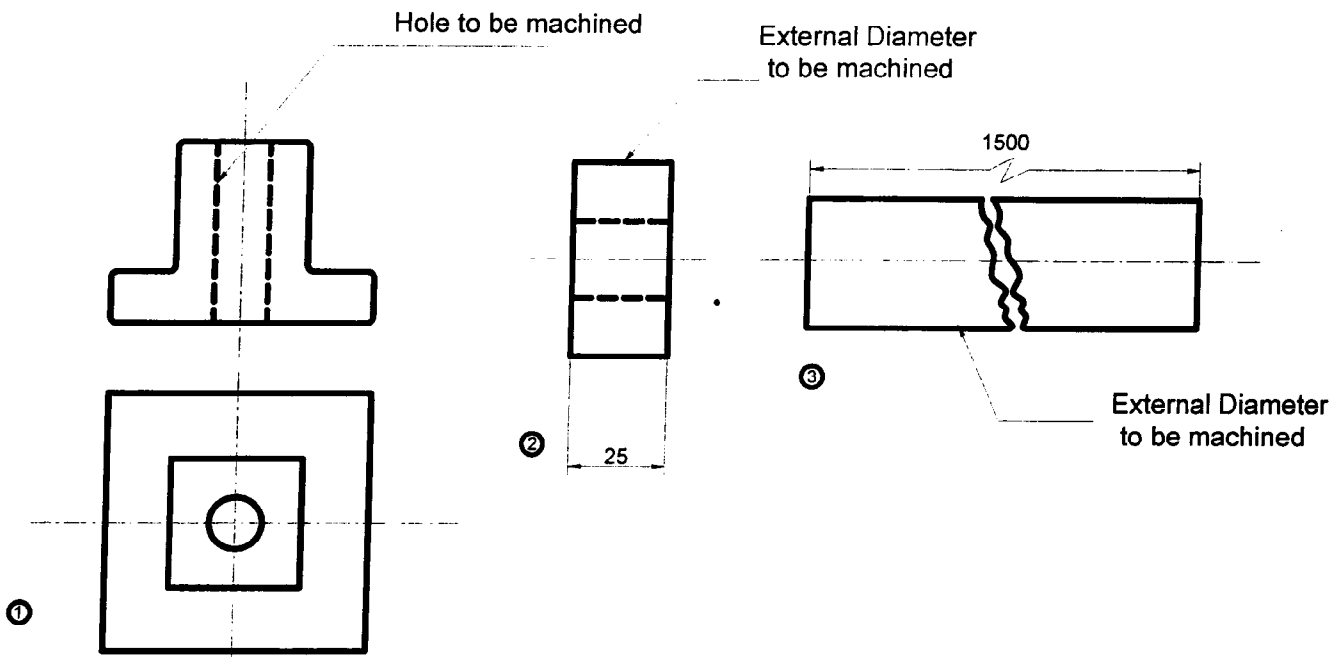
Weightage: 10%

Duration: 50 min.

Notes:

- Answer all the questions
- Draw neat sketches wherever necessary
- Make suitable assumptions if required and clearly state them
- Dimensions of all the drawings are given in millimeters
- Consider ± 0.5 as the tolerance for all dimensions if it's not specified

Q.1. Suggest the suitable work holding devices to carry the following operations conveniently in a lathe.



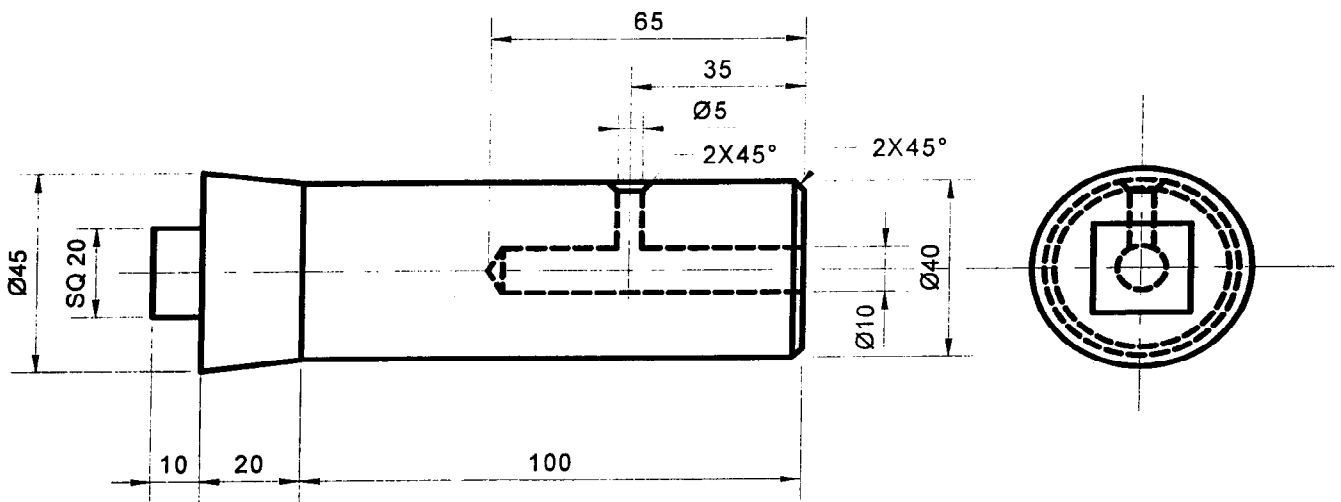
[3M]

Q2. Name the specially designed and vastly used work holding device used in drilling and milling machine for producing a component in mass production. Also mention in what way it will be useful in increasing the production and quality of the component manufactured.

[2M]

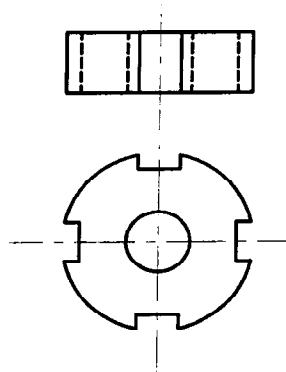
Q3. A part shown in figure has to be manufactured from cylindrical bar $\phi 47 \times 132$. Suggest the suitable machine tool(s), cutting tool(s) and the sequence of operations with dimensions as shown in the following tabular column.

Sl.No	Machine Tool	Cutting Tool	Operation	Dimension
1				



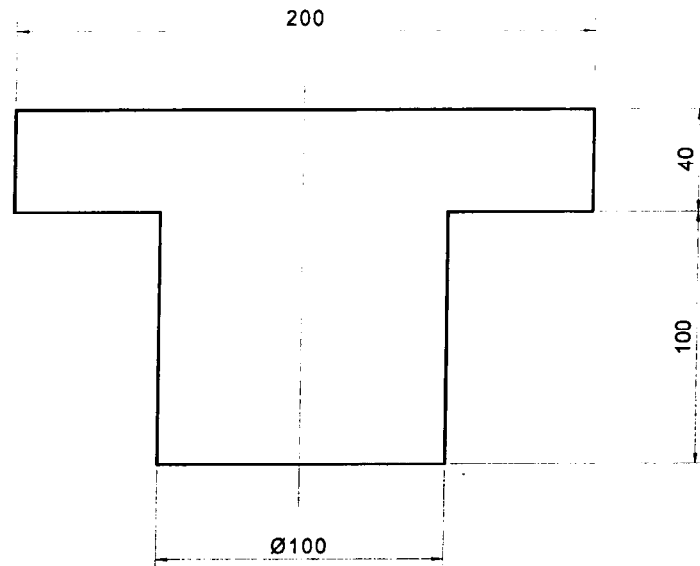
[6M]

Q4. In the following component the rectangular slot has to be machined, suggest any two machine tool and cutting tool used to manufacture the component.



[2M]

- Q5. The following component is to be made from cast iron by the casting process. The mould for the job is made using a wooden pattern. Determine the dimensions of the wooden pattern. Assume machining allowance is 4% for all the dimensions, shrinkage allowance of 1.1% and a draft allowance of 1° . Also suggest the suitable pattern and mould type required to manufacture the component.



[5M]

- Q6. **Surface Hardness depends upon the quenching medium.**

State the above mentioned statement is true or false and justify your answer. Also write what type of quenching medium is used for thin components and state the reason for the same.

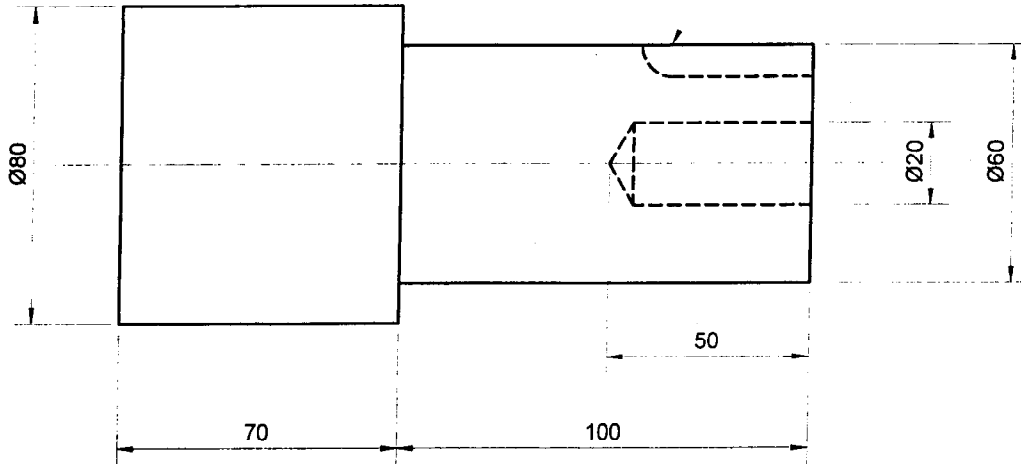
[2M]

- Q7. The component shown in figure is to be manufactured by machining process. The pre machined raw material size is $\phi 85 \times 173$ mm. The assumptions and the data to be used are given below. List the possible sequence for the process as per the dimensions.

Find

- Total time required for manufacturing a component.
- Calculate the Material Removal Rate for turning, drilling and milling.

--- KEY WAY 43mm length, 10mm width and 8mm depth



	Lathe	Milling	Drilling
Tool	HSS Turning Tool	HSS End Mill Cutter	HSS Twist Drill
Feed	0.1mm/rev	0.1 mm/tooth	0.2 mm/rev
Speed	300rpm	200 rpm	250 rpm
Depth of cut	2 mm for facing 2.5 mm for turning	3mm	Not applicable
Cutter diameter	Not applicable	10 mm	Not applicable
No. of teeth	Not applicable	4	Not applicable
Approach and Over travel	Not applicable	14 mm	15 mm

Assume the operator consumes 10 minute time for changing and setting the workpiece in another machine.

[10M]

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I Year II Semester 2008-2009

Test No.1 (Closed Book)

Course No. TA C112

Course Title: Workshop Practice

Max.Marks: 30

Weightage: 10%

Date: 22-03-2009

Duration: 50 min.

Notes:

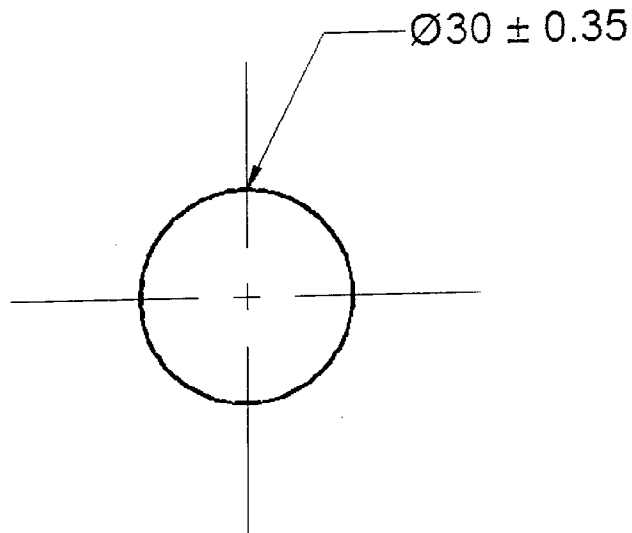
- Answer all questions sequentially.
 - Draw neat sketches wherever necessary
 - Make suitable assumptions if required and clearly state them
-
-

- Q1.** (A) Illustrate the *manufacturing process* and its interaction with the five M's [2.5M]
- (B) Define the different *types of production processes* and give an example for each [4.5 M]
- Q2.** (A) Identify the type of material based on their classification:
- i. Teflon
 - ii. Germanium
 - iii. Carbon fibers in epoxy resin
 - iv. Glass [2M]
- (B) Define the following
- i. unit Cell
 - ii. Poisson's ratio [2M]
- (C) Define the various types of load with a simple sketch [3M]
- Q3.** A 60 mm diameter & 300 mm length brass rod was subjected to a tensile load of 60 kN. The extension of the brass rod was found to be 0.381 mm axially. Find the *Young's modulus* of the bar. [4M]
- Q4.** (A) Explain
- i. *Reliability*
 - ii. *Quality control* [4M]

(B) Go through the following drawing and write the

- i. *Nominal size*
- ii. *Upper deviation*
- iii. *Lower deviation and*
- iv. *Type of tolerance of the specified dimension*

[2M]



Q5. (A) Illustrate the geometry of a *single point turning tool* (3 views)

[4M]

- (B) (i) List the composition of any one type of HSS
(ii) State the properties of ceramics

[2M]

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TA C112 Workshop Practice

Quiz -III

Duration: 15 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Do not scribe or overwrite.

Name: _____ Section: 9 I.D No. _____

1. Name any two metal forming processes involving compressive stresses.
2. The initial product obtained by the casting of metal is called _____ (Ingot/Bloom/Billet)
3. The difference between the plate and sheet is determined by _____
(Thickness, Length, width, cross sectional area)
4. The process in which the material is heated and then shaped by the plastic deformation is called as _____
5. The process of forming the desired shape hammering the heated bar onto die cavities is called _____ (Open forging, hand forging, drop forging, closed die forging)
6. The process in which produces the hole of any shape is called _____
(Punching, Piercing)
7. The formation of rolled edge by bending the edge of the sheet metal is called _____
8. The process of cutting the sheet metal in a straight line along the length is called _____
9. The process of shaping a flat blank into three dimensional hollow component is called _____
10. The processes of producing raised or depressed impression on sheet metal parts is called _____

Quiz -II

Duration: 15 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Do not scribe or overwrite.

Name: _____ Section: 9 I.D No. _____

1. Material used for manufacturing bed of the lathe is _____
2. The spindle of the headstock is _____ to facilitate holding of long work pieces.
3. The tool post is placed above _____ in the carriage.
4. Which type of work holding device can be used for machining eccentrics in a lathe?
5. Name the device used for providing additional support to the long work piece when it is machined between centres.
6. Write the formula for cutting speed in a lathe.
7. The process of providing a recess for bolt head in a hole is called _____
8. The point angle of the twist drill used for machining softer material is _____ than that of a point angle of drill used for machining harder material. (Greater / Lesser)
9. The chips produced are guided upwards through _____ of the drill bit in the drilling operation
10. Arrange the sequence of operation for drilling
Boring, drilling, centering, reaming

BEST OF LUCK

Quiz -1

Duration: 15 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Put \checkmark across the correct answer for multiple choice Questions. Do not scribe or overwrite.

Name: _____ Section: 9 I.D No. _____

1. The manufacturing process in which the raw material is displaced and deformed to get the desired shape is called as _____
2. Process of manufacturing identical products in massive quantities is _____
3. The type of load applied when a body is subjected to two equal and opposite forces acting to pull the body is called as _____ load.
4. The ratio of stress to strain is known as _____
5. Medium carbon steel contains _____ to _____ percentage of carbon
6. A Material that changes the lattice type with temperature is known as:
(a) Amorphous (b) Polymorphic (c) space lattice (d) polymers
7. The ability of material to resist deformation is called as:
(a) Stiffness (b) Toughness (c) Hardness (d) resilience
8. Material failure due to cyclic or repeated stress is known as _____ fracture
9. The inspection for a small percentage of components picked up randomly fro a lot is called _____
10. In interference fit, the size of the hole is _____ than size of the shaft

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Quiz -III

Duration: 15 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Do not scribe or overwrite.

Name: _____ Section: 7 I.D No. _____

1. Name any two metal forming processes involving the combination of tensile and compressive stresses.
2. The product obtained by hot rolling of ingot is called _____
3. The extrusion process similar to backward extrusion process is _____
(**Impact extrusion**, side extrusion)
4. The forging carried out between flat dies or dies of very simple shape is called _____
forging(**Open forging**, hand forging, closed die forging)
5. The difference between the plate and sheet is determined by _____
(**thickness**, Length, width, cross sectional area)
6. The process in which produces the hole of any shape is called _____
7. The formation of rolled edge by bending the edge of the sheet metal is called _____
(**beading**)
8. The operation of producing number of evenly spaced holes in regular pattern on a sheet metal is called _____ (**Perforating**)
9. The process of cutting the sheet metal through the part of its length and bending the cut portion is called _____ (**Lancing**)
10. The processes of producing raised or depressed impression on sheet metal parts is called _____(**embossing**)

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Quiz -II

Duration: 15 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Do not scribe or overwrite.

Name: _____ Section: 7 I.D No. _____

1. Which type of work holding device do you prefer for machining eccentrics in a lathe?
2. Name the process of beveling the sharp ends of a work piece in a lathe machine tool.
3. Draw the figure for the right hand turning tool.
4. Write the special feature of gap bed lathe.
5. MRR equation for lathe is _____
6. Feed rod is used for _____
7. The process of tapering the entrance of the hole is called _____
8. The point angle of the twist drill used for machining harder material is _____ than that of a point angle of drill used for machining softer material. (Smaller/Larger)
9. The chips produced are guided upwards through _____ of the drill bit in the drilling operation
10. Write the process sequence
Step turning, Grooving, Facing, Plain turning and Threading

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TA C112 Workshop Practice

Quiz -1

Duration: 15 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Put \checkmark across the correct answer for multiple choice Questions. Do not scribe or overwrite.

Name: _____ Section: 7 I.D No. _____

1. The ratio of change in dimension to original dimension is _____
2. The manufacturing process in which the raw material is displaced and deformed to get the desired shape is called as _____
3. When a body is subjected to two equal and opposite forces acting to push into the body is known as _____ load.
4. Poison's ratio is the ratio of _____ strain to _____ strain
5. Failure of material due to repeated stress is known as:
(a) Creep Failure (b) Fatigue failure (c) Brittle failure (d) Ductile Failure
6. The ability of material to withstand suddenly applied load and thus to absorb a certain amount of energy without fracture is known as;
(a) Stiffness (b) Toughness (c) Hardness (d) resilience
7. Permissible deviation of a dimension from the desired size is known as _____
8. Factor of safety for ductile material is
(a) Ultimate stress/ Design Stress (b) yield stress/ Design Stress
(c) Yield stress/ultimate stress (d) stress/ strain
9. High carbon steel contains _____ to _____ percentage of carbon
10. In interference fit, the size of the shaft is _____ than size of the hole

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Quiz -III

Duration: 15 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Do not scribe or overwrite.

Name: _____ Section: 5 I.D No. _____

1. Name any two metal forming processes involving shearing stresses.
2. The initial product obtained by the casting of metal is called _____
(Ingot/Bloom/Billet)
3. The extrusion process similar to backward extrusion process is _____
(Impact extrusion, side extrusion)
4. The forging carried out between flat dies or dies of very simple shape is called _____
forging
5. The operation of removal of metal of the desired shape from the edge of the plate is called _____
6. The process of bending the edge of the sheet metal at 90° is called _____
7. The formation of rolled edge by bending the edge of the sheet metal is called _____
8. The process of cutting the sheet metal through the part of its length and bending the cut portion is called _____
9. The processes of producing raised or depressed impression on sheet metal parts is called _____
10. The operation of producing number of evenly spaced holes in regular pattern on a sheet metal is called _____

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Quiz -II

Duration: 15 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Do not scribe or overwrite.

Name: _____ Section: 5 I.D No. _____

1. Because of the property to withstand _____ and _____ Grey cast iron is used for manufacturing machine beds.
2. The spindle of the headstock is hollow to facilitate holding of _____ pieces.
3. The tailstock has a _____ into which the dead centre, drills and reamers can be fixed.
4. The three jaw chuck is also called as _____ chuck
5. Which type of rest moves along with the carriage?
6. Write the formula for machining in a lathe.
7. The holes produced by drilling are _____ than the drill bit diameter. (Smaller/ larger)
8. The point angle of the twist drill used for machining softer material is _____ than that of a point angle of drill used for machining harder material. (Greater / Lesser)
8. The coolant reaches the cutting edges of the drill bit through of the drill bit in the drilling operation.
10. Arrange the sequence of operation for drilling
Boring, drilling, centering, reaming

BEST OF LUCK

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TA C112 Workshop Practice

Quiz -1

Duration: 15 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Put \checkmark across the correct answer for multiple choice Questions. Do not scribe or overwrite.

Name: _____ Section: 5 I.D No. _____

1. Pick the odd one out:
(a) Welding (b) Fastening (c) Soldering (d) Brazing (e) None
2. Low volume of production and variety of work characterize
(a) Mass Production (b) Job Production (c) Batch Production (d) Both b and c
3. The type of load applied when a body is subjected to two opposite forces acting radially across the cross section of the body is called as _____ load.
4. Young's Modulus is the ratio of _____ to _____
5. Best suited manufacturing process for manufacturing bodies of vehicle is
(a) Machining (b) Metal forming (c) Casting (d) Joining (e) Powder Metallurgy
6. A material that undergoes very little plastic deformation before rupture is called:
(a) Yield Point (b) Elasticity (c) Malleability (d) Ductility
7. Plastic deformation is not necessary in the case of _____ fracture
8. The process of determining whether a dimension is within the specified limits or not is known as
(a) Testing (b) Gauging (c) accuracy (d) None of the above
9. Probability of a product functioning in the intended manner over its intended life under normal operating conditions is known as :
(a) Quality (b) Reliability (c) Interchangeability (d) Precision (e) None
10. Which one of the following is suitable for manufacturing chisels?
(a) Alloy steel (b) Low carbon Steel (c) Medium Carbon Steel (d) High carbon steel

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Quiz -III

Duration: 15 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Do not scribe or overwrite.

Name: _____ Section: 3 I.D No. _____

1. Name any two metal forming processes involving tensile stresses.
2. The process of shaping metals and alloys into semi-finished or finished condition by passing between the rolls is known as _____
3. The product obtained by hot rolling of ingot is called _____ (Ingot/Bloom/Billet)
4. The difference between the plate and strip is determined by _____ (thickness, Length, **width**, cross sectional area)
5. The forging carried out between flat dies or dies of very simple shape is called _____ forging(**Open forging**, hand forging, closed die forging)
6. The process which uses greater amount of compressive force to the workpiece is called _____ (Pres forging)
7. The extrusion process in which the movement of material is perpendicular to the ram motion is called as _____
8. The operation of removal of metal of the desired shape from the edge of the plate is called _____ (**Notching**)
9. The process of folding over the edge of a piece of sheet-metal and then pressing it to make flat is called _____ (**hemming**)
10. The process of cold squeezing of metal while all of the surfaces are confined within the set of dies is called _____ (**coining**)

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Quiz -II

Duration: 10 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Do not scribe or overwrite.

Name: _____ Section: III I.D No. _____

1. _____ is used to support the lengthy work piece to avoid deflection
2. Draw the figure for the left hand turning tool.
3. What is the difference between drilling and Reaming process?
4. Write the special feature of gap bed lathe
5. Which type of Drilling machine is suitable for drilling Heavy jobs?
Heavy duty, Drill press, Radial drilling machine.
6. MRR equation of Lathe operation is _____
7. Purpose of "Counter boring" is _____
8. Pick the odd one: Turning, Taper turning, Step Turning, Facing
9. The quill in the tailstock can move in and out. True / false
10. Arrange the following in a sequence
Facing, Plain Turning, Step Turning

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SECOND SEMESTER 2008-2009
TA C112 WORKSHOP PRACTICE

QUIZ -1

DURATION: 15 MINUTES

MAXIMUM MARKS: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Put \surd across the correct answer for multiple choice Questions. Do not scribe or overwrite.

Name: _____ Section: III I.D No. _____

1. The manufacturing process in which the unwanted material is removed to get the desired shape is called as _____
2. Factor of safety for ductile material is
(a) Ultimate stress/ Design Stress (b) yield stress/ Design Stress
(c) Yield stress/ultimate stress (d) stress/ strain
3. The type of load applied when a body is subjected to two equal and opposite forces acting to push in to the body is called as _____ load.
4. The strain in the direction of the applied load is known as _____
5. Poisson's ratio is the ratio of _____ strain to _____ strain
6. The capacity of a material to absorb energy elastically is known as
(a) Toughness (b) Resilience (c) Stiffness (d) Brittleness
7. Materials which don't have their atoms arranged on a lattice are known as:
(a) Amorphous (b) non crystalline (c) Polymorphic (d) none
8. High carbon steel contains _____ to _____ percentage of carbon.
9. _____ fit is used for permanent / semi permanent assembly parts.
10. Comparator is an example of an _____ type measuring instruments.

Quiz -III

Duration: 15 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Do not scribe or overwrite.

Name: _____ Section: 1 I.D No. _____

1. Name any two metal forming processes involving shearing stresses.
2. The initial product obtained by the casting of metal is called _____
(Ingot/Bloom/Billet)
3. The process in which the material is heated and then shaped by the plastic deformation is called as _____
4. The difference between the plate and sheet is determined by _____
5. The process of forming the desired shape hammering the heated bar onto die cavities is called _____ (Open forging, hand forging, drop forging, closed die forging)
6. The operation of removal of metal of the desired shape from the edge of the plate is called _____
7. The process of bending the edge of the sheet metal at 90° is called _____
8. The process of cutting the sheet metal in a straight line along the length is called _____
9. The process of cold squeezing of metal while all of the surfaces are confined within the set of dies is called _____
10. The operation of producing number of evenly spaced holes in regular pattern on a sheet metal is called _____

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Quiz -II

Duration: 15 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Do not scribe or overwrite.

Name: _____ Section: 1 I.D No. _____

1. Face plate is used for _____
2. Write any two types of taper turning methods of a lathe?
3. What is the difference between drilling and boring process?
4. The tailstock can be moved along the guide ways. True / False
5. Which type of rest moves along with the carriage?
6. MRR equation of drilling operation is _____
7. Purpose of "Spot facing" is _____
8. The point angle of the twist drill used for machining softer material is _____ than that of a point angle of drill used for machining harder material. (Larger/Smaller)
9. The chips produced are guided upwards through _____ of the drill bit in the drilling operation
10. Arrange the following in a sequence
Centering, drilling, reaming

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Quiz -1

Duration: 15 Minutes

Maximum Marks: 10

Note:

- ❖ Write Name, I D No.
- ❖ Answer only in the sheet provided
- ❖ Put \surd across the correct answer for multiple choice Questions. Do not scribe or overwrite.

Name: _____ Section: 1 I.D No. _____

1. Best suited for manufacturing process for manufacturing very large sized components is
(a) Machining (b) Forming (c) Casting (d) Powder Metallurgy
2. Low volume of production and variety of work characterize
(a) Mass Production (b) Job Production (c) Batch Production (d) Both b and c
3. When a body is subjected to two opposite forces acting radially across the cross section of the body is called _____ load.
4. The ratio of lateral strain to linear strain is known as _____
5. Failure of material due to repeated stress is known as:
(a) Creep Failure (b) Fatigue failure (c) Brittle failure (d) Ductile Failure
6. The ability of material resist wear and scratching is known as:
(a) Hardness (b) Toughness (c) Stiffness (d) resilience
7. The strain in the direction of the applied load is known as _____
8. Factor of safety for brittle material is
(a) Yield stress/ Design Stress (b) Ultimate stress/ Design Stress
(c) Yield stress/ultimate stress (d) stress/ strain
9. Door hinges is an example of _____ fit.
10. Which one of the following is suitable for manufacturing hammers?
(a) Mild Steel (b) Low carbon Steel (c) Medium Carbon Steel (d) none