

Roll.No.

B.E. /B.Tech. (Full Time) DEGREE END SEMESTER EXAMINATION, APRIL/MAY 2012

Mechanical Engineering Branch

20

FIFTH SEMESTER- (REGULATION 2008)

**ME 9301 - DESIGN OF JIGS, FIXTURES AND PRESS TOOLS**

Time: 3 hr.

Max. Marks: 100

- Note: i) Use of Approved Design Data Books permitted  
ii) Drawing sheets will be provided  
iii) Drawings need not be drawn to scale but should follow standards.  
iv) Assume missing dimensions suitably

**Answer ALL Questions**

**PART - A (10x 2= 20 Mark)**

1. Describe with the aid of suitable sketches what is meant by 3-2-1 Location Principle with respect to design of Jigs and fixtures.
2. What is meant by "Foolproofing"?
3. Indexing pin is surface hardened in many cases. Why?
4. If two or more holes to be drilled are very close, what is the method used in providing bushing?
5. What is the function of a tenon? How is it used in a fixture?
6. 'V' blocks are widely used in milling fixtures. State the reasons.
7. If two or more holes to be drilled are very close, what is the method used in providing bushing?
8. What is bend allowance? How is it computed?
9. How will you compute the diameter of Blank required for drawing a straight sided cylindrical cup of diameter 'd' and height 'h'?
10. What is the type of press used for drawing? Why?

**PART - B (5 x16 = 80 Mark)**

11 Design and draw two views of a progressive die is to be designed for producing the component shown in Fig.11. The sheet metal is of 16 gauge and made of Cold Rolled Steel of Ultimate Strength  $580 \text{ N/mm}^2$

16

- i) Determine the press tonnage and the various stations required
- ii) Design all the parts of the die.
- iii) Draw two fully dimensioned views of the die in engaged position.

12.a Explain with the help of neat sketches the 3-2-1 Location Principle. 16  
What are the basic principles of clamping? Draw and explain the working of an equalizer clamp and a quick acting clamp.

Or

12.b Design a drilling jig for use when drilling the  $\phi 30$  holes in the component shown in Figure. Assume that the base has been machined. 16

- i) Draw two views of the Jig.
- ii) Specify appropriate fits and tolerances for critical parts.
- iii) Dimension the views.
- iv) Give a neat parts list

13.a Design a Turning Fixture for use when finish boring the  $\phi 50$  bore in the shaft support shown in Figure. 16

- i) Give a neat operation chart.
- ii) Draw two views of the fixture.
- iii) Specify appropriate fits and tolerances for critical parts.
- iv) Dimension the views.
- v) Give a neat parts list.

Or

13.b Design a Milling fixture for milling the faces marked in the component shown in Figure 12.b 16



- i) Draw two views of the fixture.
- ii) Specify appropriate fits and tolerances for critical parts
- iii) Dimension the views.
- iv) Give a neat parts list.

14.a Design and draw 2 views of a combination Blanking and drawing die for the component shown in Figure. Assume yield strength  $45\text{kN/cm}^2$  16

- Calculate the size of Blank required
- Determine the press tonnage and the various stations required
- Design all the parts of the die.
- Draw two fully dimensioned views of the die in engaged position.
- Give a parts list.

Or

14.b Briefly describe the following. 16  
(i)Welding fixtures  
(iii)Inspection fixtures.

15.a Write short notes on the following: 16

- (i)Calculation of center of pressure with an example.
- (ii)Press tonnage.
- (iii)Strip layout.
- (iv)strippers

Or

15.b Design and draw two views of a progressive die for producing the component shown in Figure. The sheet metal is of 16 gauge thickness and width equal to the width of the component. The sheet is made of Cold Rolled Steel of Ultimate tensile Strength  $580\text{ N/mm}^2$ . The sequence of operations is piercing,parting and edge bending. 16

- i) Determine the press tonnage and the various stations required
- ii) Design all the parts of the die.
- iii) Draw two fully dimensioned views of the die in engaged position.
- iv) Give a parts list.

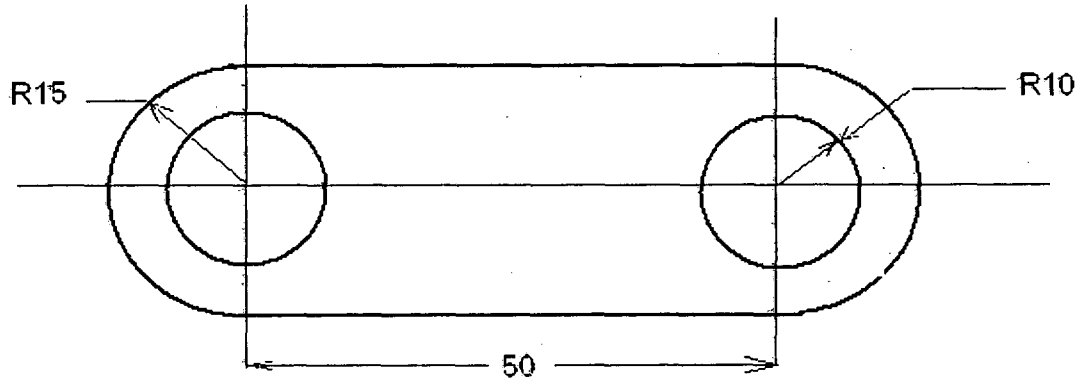


Fig.11

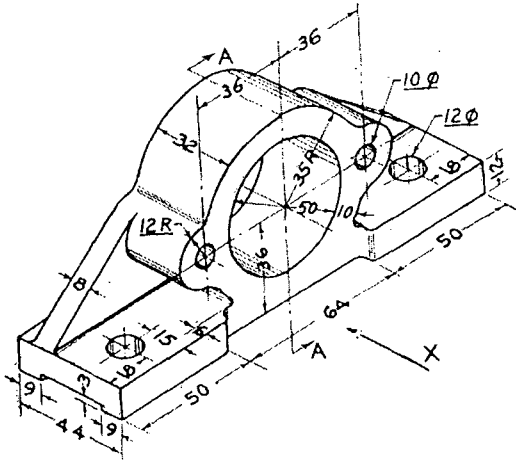


Fig.13.a

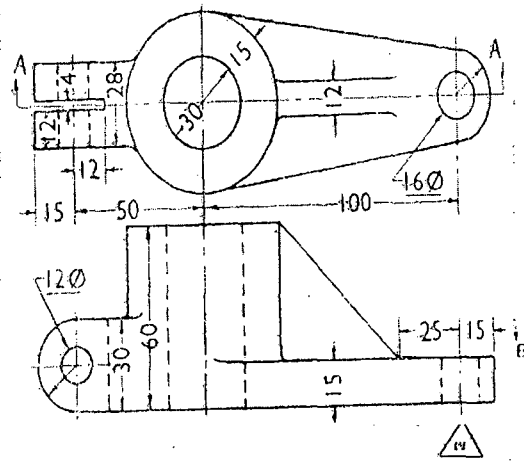


Fig.12.b

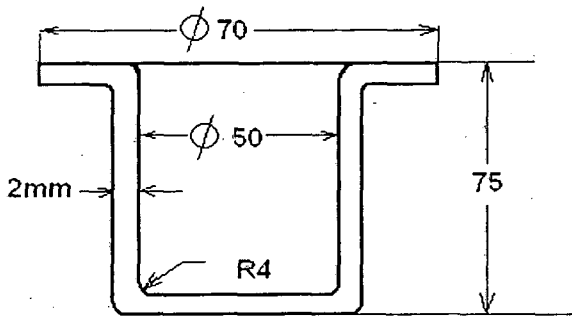


Fig.14.a

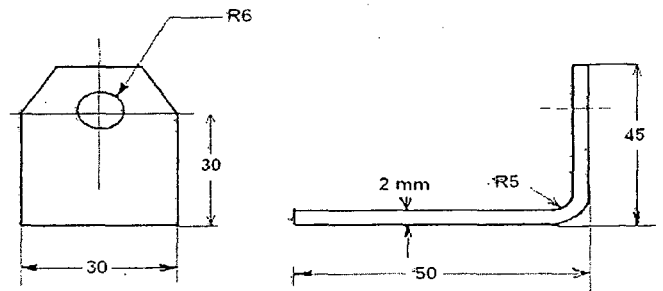


Fig.15.b