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**B.E. DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2012**
MECHANICAL ENGINEERING BRANCH
FIFTH SEMESTER - (REGULATIONS 2008)
**ME 9301 DESIGN OF JIGS, FIXTURES AND PRESS TOOLS**

Time: 3 Hours 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

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

1. Explain how Jigs and fixtures help in mass producing interchangeable parts at a low cost.
2. Explain how a component is located with respect to two holes.
3. Sketch and explain a spring actuated indexing pin arrangement.
4. Explain with sketches the use of tenons and setting blocks in Fixtures?
5. How is the Press capacity determined for V, edge and channel bending dies?
6. What are the advantages of Compound Dies over Progressive Dies?
7. Distinguish between direct and indirect knock out.
8. What is the effect of excessive and insufficient clearance in blanking operations?
9. What is meant by reverse redrawing? What is its advantage?
10. Explain what is Poka Yoke and how it is implemented in the design of toolings.

**PART-B** (4 x 20 = 80 Marks)

11. Design and give two views of a progressive die to be designed for producing the component shown in Fig.11. The sheet metal is of 2 mm thickness and made of Cold Rolled Steel of Shear strength 500 N/mm$^2$

i) Determine the press tonnage and the various stations required (3)
ii) How is center of pressure to be determined for this die layout? (2)
iii) Design all the parts of the die. (5)
iv) Draw two fully dimensioned views of the die in engaged position. (8)
v) Give a neat parts list. (2)

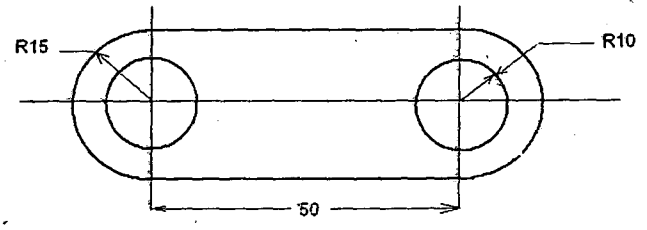


**Fig.11**

12.a) Design a drilling jig for use when drilling the four $\phi$ 6 holes in the component shown in Fig. 12 a

i) Give a neat operation chart. (2)

ii) Draw two views of the Jig. (12)

iii) Specify appropriate fits and tolerances for critical parts. (3)

iv) Dimension the views and give a neat parts list. (3)

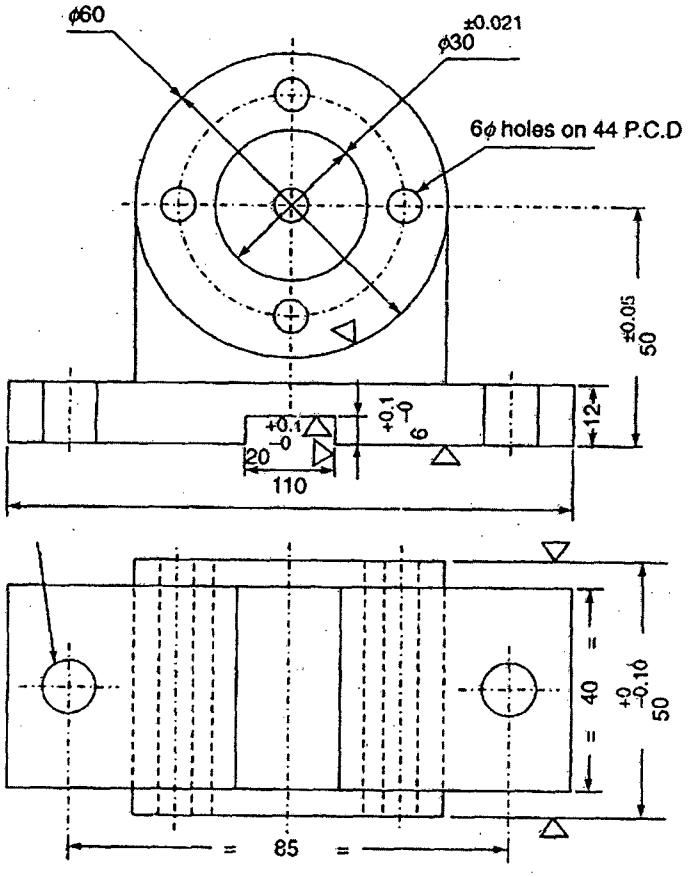


**Fig.12a**

**(OR)**

12.b) Design an indexing jig for use when drilling the 4 $\phi$12 inclined holes in the component shown in Fig12.b.

i) Give a neat operation chart. (2)

ii) Draw two views of the Jig. (12)

iii) Specify appropriate fits and tolerances for critical part. (3)

iv) Dimension the views and give a neat parts list. (3)

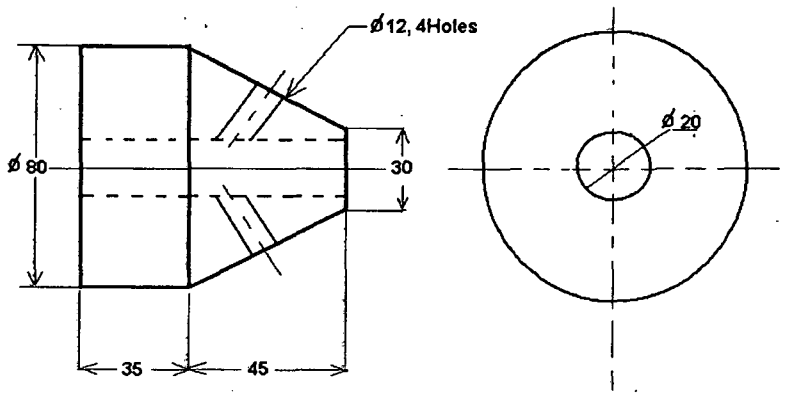


**Fig.12.b**

13. a) Design a Milling fixture for finish machining the 20 mm slot marked ▽ in the component shown in Fig. 13.a

i) Give a neat operation chart. (2)

ii) Draw two views of the Fixture. (12)

iii) Specify appropriate fits and tolerances for critical parts. (3)

iv) Dimension the views and give a neat parts list. (3)

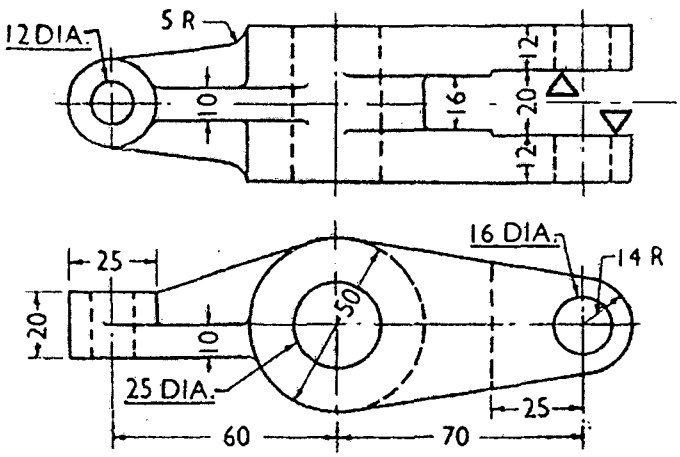


**Fig.13.a**

**(OR)**

13. b) Design a Turning Fixture for use when boring the ϕ75 hole in the component shown in Fig. 13.b.

i) Give a neat operation chart. (2)

ii) Draw two views of the Fixture. (12)

iii) Specify appropriate fits and tolerances for critical parts. (3)

iv) Dimension the views and give a neat parts list (3)

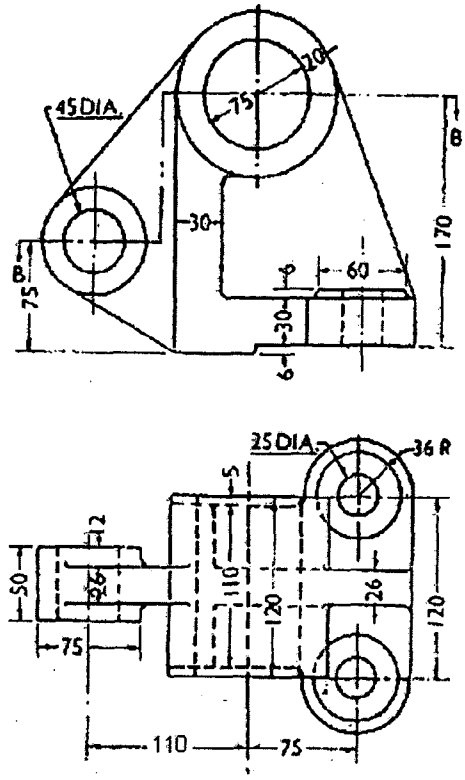


**Fig.13.b**

14. a) Design and draw two views of a combination blanking and drawing die for the component showed in Fgi.14.a (3)

I. Calculate the size of Blank required (2)

II. Determine the press tonnage (5)

III. Design all the parts of the die. (10)

IV. Draw two fully dimensioned views of the die in engaged position and give a neat parts list.

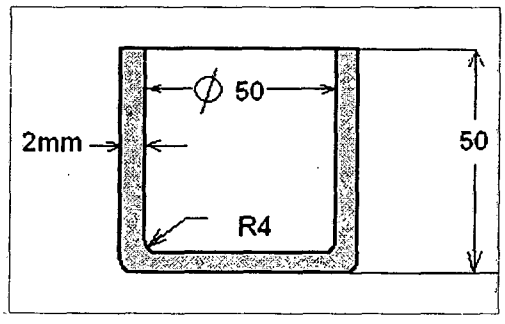


**Fig.14a**

**(OR)**

14.b) The component shown in Fig.14.b is to be done in two stages- Blanking followed by Bending. Design and draw 2 views of a compound die for the first stage piercing and blanking operation. (3)

i) Calculate the size of Blank required (2)

ii) Determine the press tonnage (5)

iii) Design all the parts of the compound die. (10)

iv) Draw two fully dimensioned views of the die in engaged position and give a neat parts list.

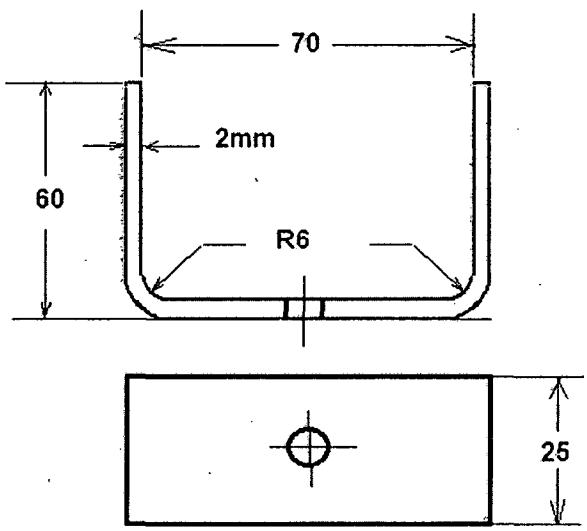


**Fig.14b**