

S/W/13.

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B.E. DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2013
MANUFACTURING ENGINEERING BRANCH
SIXTH 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. With a suitable example show how Jigs and Fixtures could help in increasing the productivity and reducing cost.
2. With at least two examples explain what is meant by redundant location.
3. What are modular fixtures? List with sketches the major components of the same.
4. Explain with sketches the need for and method of fixing tenons in Fixtures.
5. How is the Press capacity determined for a progressive die?
6. What is the effect of excessive and insufficient clearance in blanking operations?
7. What are the advantages of Compound Dies over Progressive Dies?
8. What is meant by piloting with respect to press tools?
9. Bring out all the differences between blanking and piercing.
10. What is meant by bend allowance? How is it computed?

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 3 mm thickness and made of Cold Rolled Steel of Shear strength 500 N/mm^2

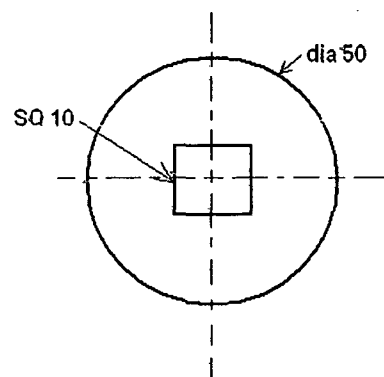


Fig.11

- i) Determine the press tonnage and the various stations required (3)
- ii) How is the 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)

12.a) Design a drilling jig for use when drilling the two ϕ 30 holes in the base of 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)

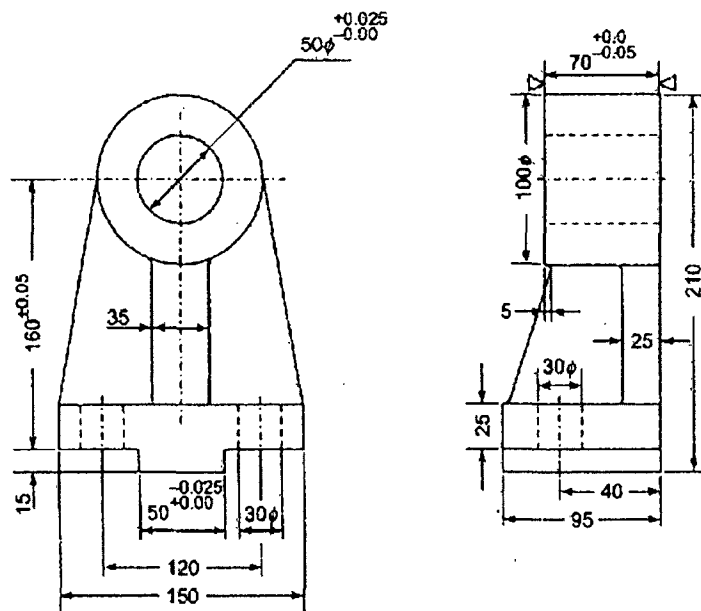


Fig.12a

(OR)

12.b) Design an indexing jig for use when drilling the 4, ϕ 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)

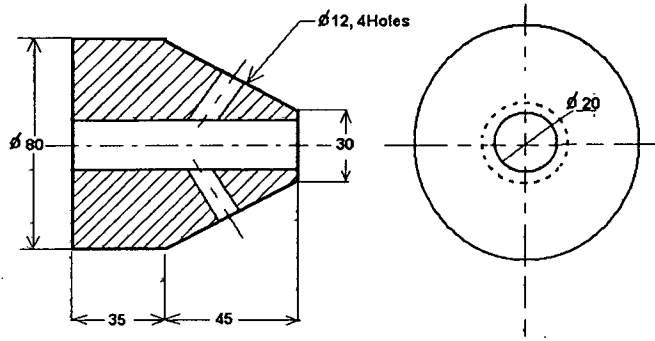


Fig.12.b

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)

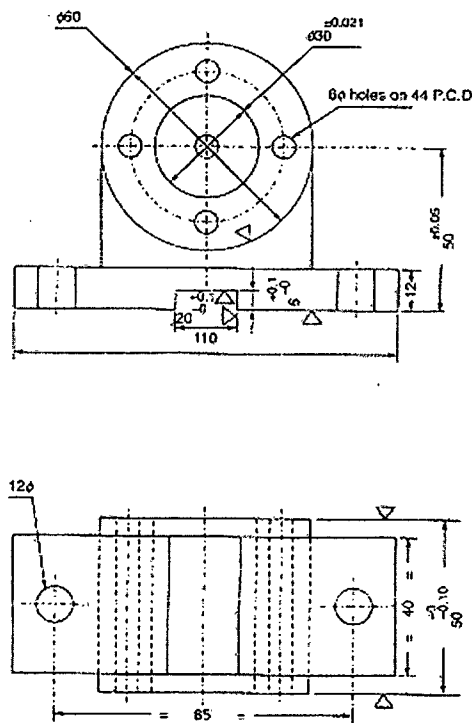


Fig.13.a

(OR)

13. b) Design a Turning Fixture for use when boring the $\phi 30$ hole 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)

14. a) Design and draw two views of a combination blanking and first stage drawing die for the component showed in Fig.14.a. Material is steel of Ultimate Strength 560 N/mm²

- i) Calculate the size of Blank required and the number of stages. (3)
- ii) Determine the press tonnage for each stage. (2)
- iii) Design all the parts of all first stage die. (5)
- iv) Draw two fully dimensioned views of the die in engaged position and give a neat parts list. (10)

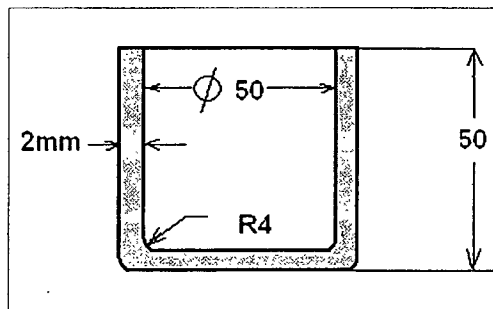


Fig.14a

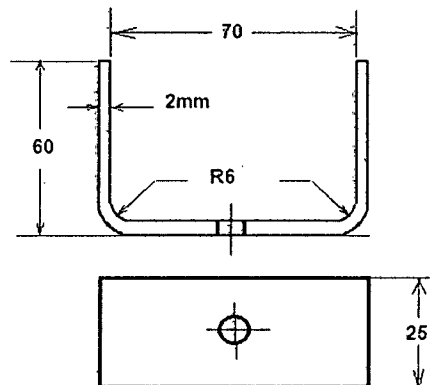


Fig.14b

(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.

- i) Calculate the size of Blank required (3)
- ii) Determine the press tonnage (2)
- iii) Design all the parts of the compound die. (5)
- iv) Draw two fully dimensioned views of the die in engaged position and give a neat parts list. (10)