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B.E. DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2013
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 the differences between Jigs and fixtures.
2. With at least two examples explain what is meant by redundant location.
3. With an example explain how sequence of operation is important in the design of Jigs and fixtures.
4. With the aid of a sketch bring out the major elements of an indexing jig.
5. Explain with sketches the need for and method of fixing tenons in Fixtures.
6. Distinguish between cutting and parting dies.
7. What are the advantages of Compound Dies over Progressive Dies?
8. Differentiate between direct and indirect piloting.
9. How is the blank size computed for a straight sided cup of diameter d and height h ?
10. With the help of a sketch explain what is meant by reverse redrawing and its advantage.

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 540 N/mm^2

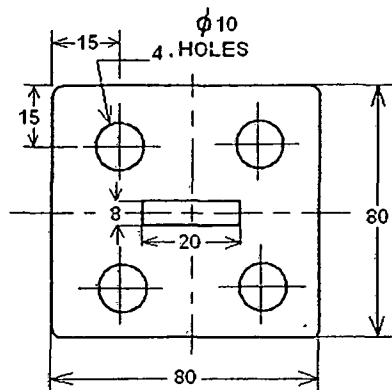


Fig.11

- 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 ϕ 18 hole 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)

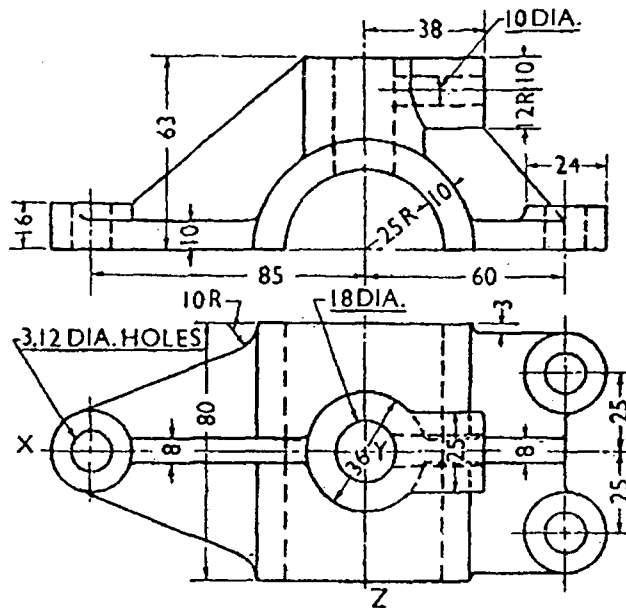


Fig.12. a

(OR)

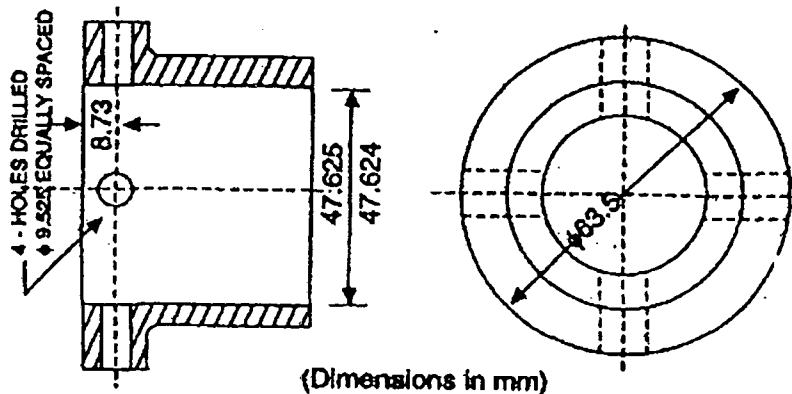
12.b) Design an indexing jig for use when drilling the 4, ϕ 9.525 holes in the component shown in Fig12.b.

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)



(Dimensions in mm)

Fig 12.b

13. a) Design a Milling fixture for finish machining the surfaces marked as ∇ in the component shown in Fig. 13.a
- Give a neat operation chart. (2)
 - Draw two views of the Fixture. (12)
 - Specify appropriate fits and tolerances for critical parts. (3)
 - Dimension the views and give a neat parts list. (3)

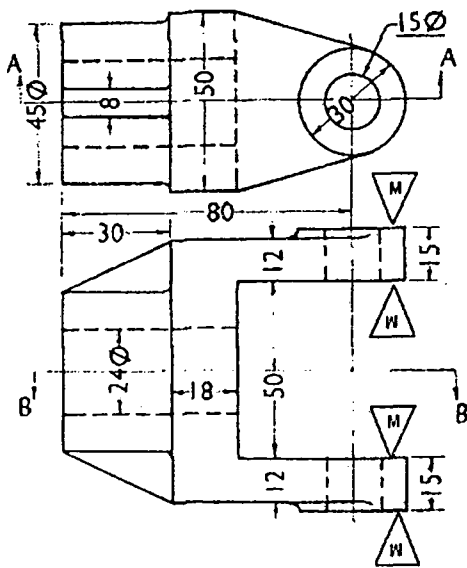


Fig.13.a

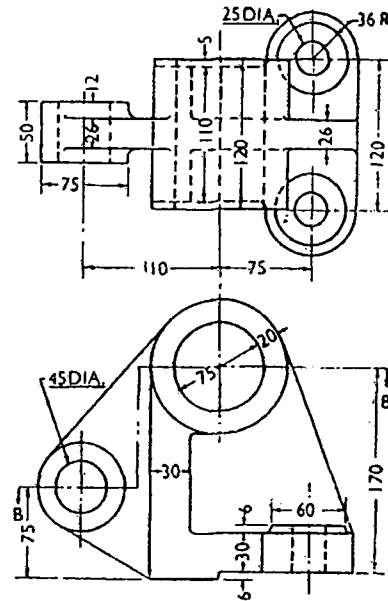


Fig.13.b

OR

13. b) Design a Turning Fixture for use when boring the $\phi 75$ hole in the component shown in Fig. 13.b
- Give a neat operation chart. (2)
 - 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/mm^2
- i) Calculate the size of Blank required, the number of stages and the diameters achieved in each stage. (3)
 - ii) Determine the press tonnage for each stage. (2)
 - iii) Design all the parts of the first stage blanking and drawing die. (5)
 - iv) Draw two fully dimensioned views of the die in engaged position and give a neat parts list. (10)

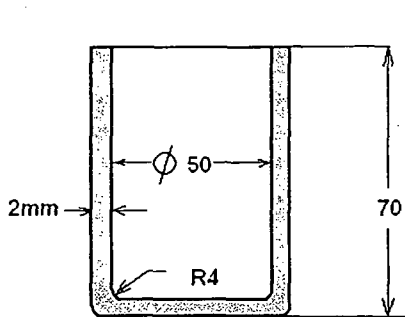


Fig.14a

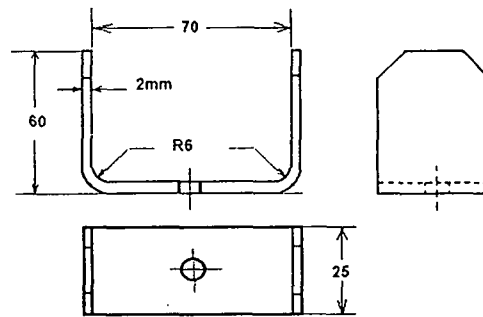


Fig.14b

(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. Material is steel of Ultimate Strength 600 N/mm^2
- 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)