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B.E. DEGREE END SEMESTER EXAMINATIONS, MAY 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. With a neat sketch explain what is 3-2-1 location.
2. With neat sketches discuss the use of different types of drill bushes.
3. Sketch and explain the function of a setting block.
4. Sketch and explain a turn over jig.
5. What are the precautions to be taken in designing Welding fixtures?
6. How is the press tonnage requirement for piercing and blanking dies computed?
7. What are the advantages of Compound Dies over Progressive Dies?
8. What is meant by bend allowance? How is it computed?
9. Distinguish between direct and indirect piloting.
10. Explain the function of a stripper?

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/mm²
 - 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)

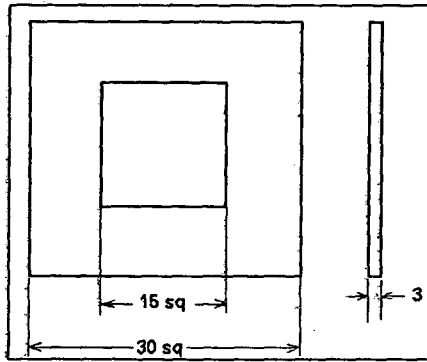


Fig.11

12.a) Design a drilling jig for use when drilling the four ϕ 16 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. (2)
- iv) Dimension the views and give a neat parts list. (4)

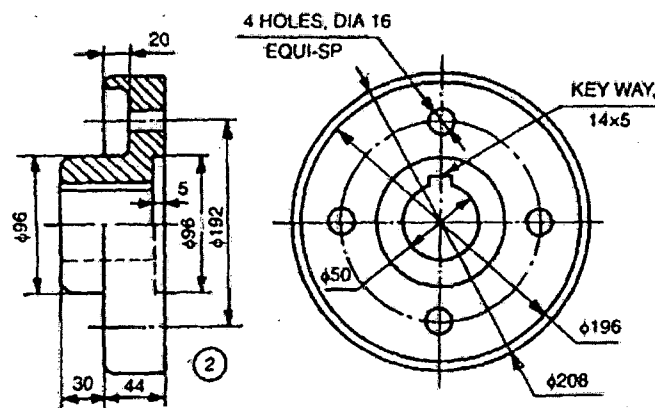


Fig.12a

(OR)

12.b) Design an indexing jig for use when drilling the 4 ϕ 10 holes in the component shown in Fig.12.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. (2)
- iv) Dimension the views and give a neat parts list. (4)

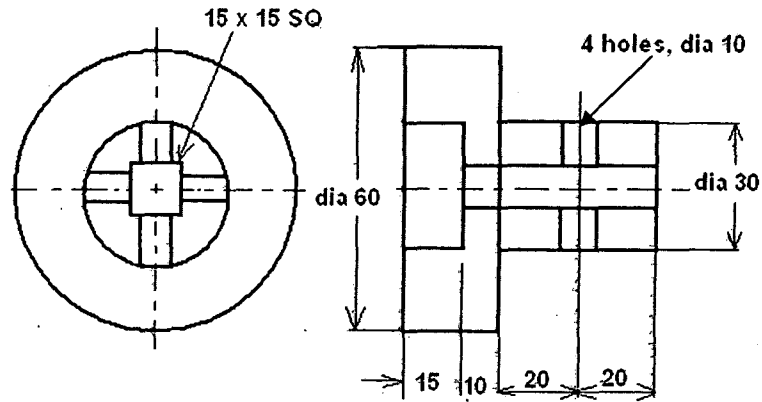


Fig.12.b

13. a) Design a Milling fixture for machining the 4 mm slot 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. (2)
- iv) Dimension the views and give a neat parts list. (2)

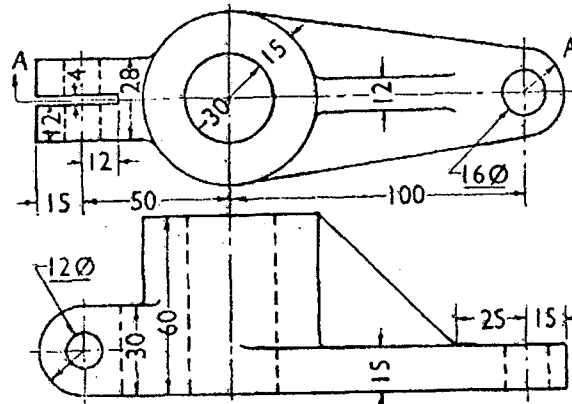


Fig.13.a

(OR)

13. b) Design a Turning Fixture for use when boring the $\phi 62$ hole in the component shown in Fig. 13.b.

- i) Give a neat operation chart. (2)
- ii) Draw two views of the Fixture. a bending die for the part shown in Fig.14.a. (12)
- iii) Specify appropriate fits and tolerances for critical parts. (2)
- iv) Dimension the views and give a neat parts list (4)

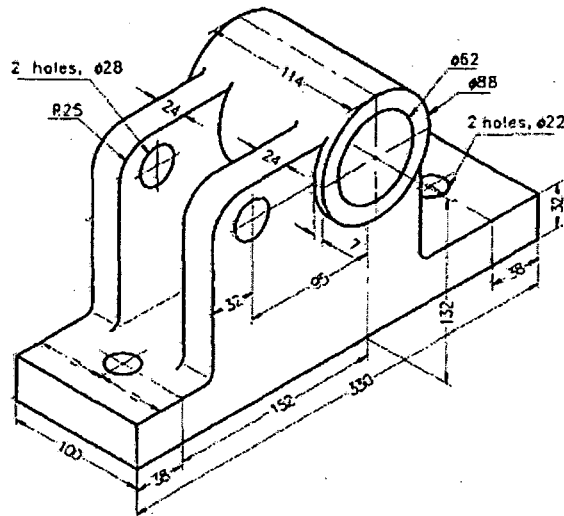


Fig.13.b

14. a) Design and draw two views of a bending die for the part shown in Fig.14.a. The stock width is 35 mm and yield strength 50kN/cm^2 (2)
 width is 35 mm and yield strength 50kN/cm^2 (2)
 I. Calculate the size of Blank required (8)
 II. Determine the press tonnage (8)
 III. Design all the parts of the die.
 IV. Draw two fully dimensioned views of the die in engaged position and give a neat parts list.

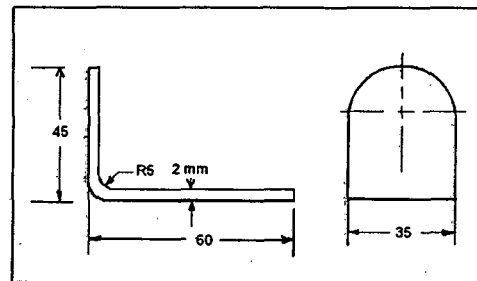


Fig.14a

(OR)

- 14.b) Design and draw 2 views of a combination Blanking and drawing die for drawing a cup of diameter 60mm and height 120 mm . Assume thickness as 2mm and Yield strength as 55kN/cm^2
 I. Calculate the size of Blank required (2)
 II. Determine the press tonnage (2)
 III. Design all the parts of the die. (6)
 IV. Draw two fully dimensioned views of the die in engaged position and give a neat parts list. (10)