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B.E. (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2011
MECHANICAL ENGINEERING BRANCH
SIXTH SEMESTER - (REGULATIONS 2004)
ME 381 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. What are the basic elements of Jigs and Fixtures?
2. Differentiate between a latch jig and a box jig.
3. With neat sketches explain the function of tenons and setting block.
4. What is the need for assembly and inspection fixtures?
5. What is meant by 3-2-1 location principle?
6. How is the strip layout decided in blanking operations?
7. Distinguish between shaving and trimming.
8. Explain the different types of stops used in multi station progressive dies.
9. What and how is bend allowance computed?
10. What is meant by knock out arrangement?

PART-B (4 x 20 = 80 Marks)

11. Design and draw 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 560 N/mm^2
    i) Determine the press tonnage and the various stations required (4)
    ii) Design all the parts of the die. (6)
    iii) Draw two fully dimensioned views of the die in engaged position. (8)
    iv) Give a parts list. (2)

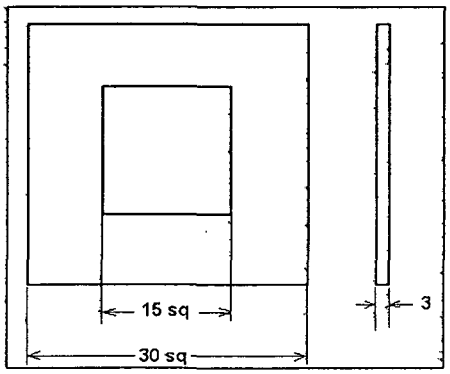


Fig.11

12.a) Design a drilling jig for use when drilling the two ϕ12 holes in the base of the component shown in Fig. 12 a

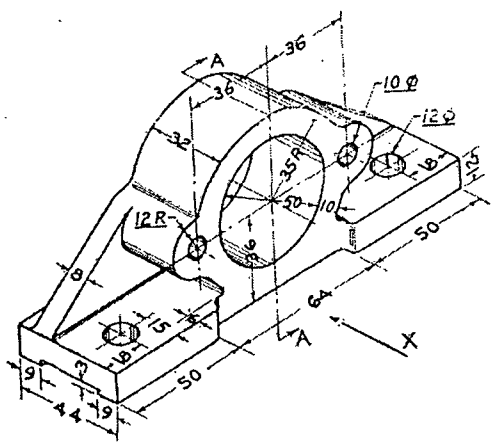
i) Give a neat operation chart. (2)

ii) Draw two views of the Jig. (13)

iii) Specify appropriate fits and tolerances for critical parts. (2)

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 ϕ10 holes in the shank of the component shown in Fig12.b

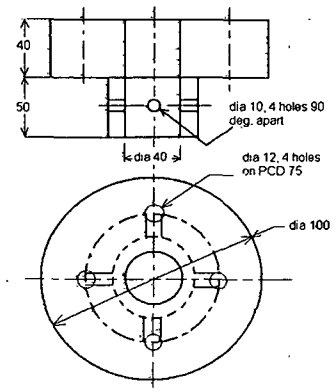
i) Give a neat operation chart. (2)

ii) Draw two views of the Jig. (13)

iii) Specify appropriate fits and tolerances for critical parts. (2)

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

Fig.12.b



13. a) Design a Milling fixture for machining the faces marked △ in the component shown in Fig. 13.a

i) Give a neat operation chart. (2)

ii) Draw two views of the Fixture. (13)

iii) Specify appropriate fits and tolerances for critical parts. (2)

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

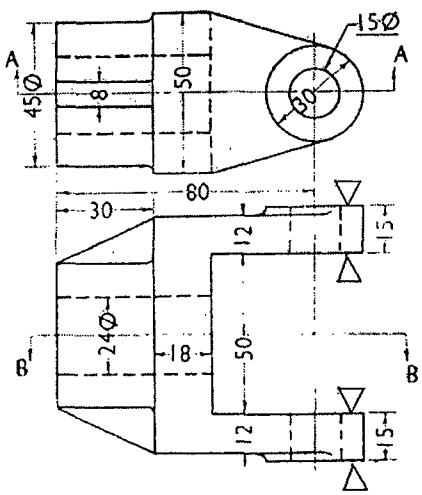


Fig.13.a

(OR)

13. b) Design a Turning Fixture for use when boring the ϕ50 hole in the component shown in Fig. 12a.

i) Give a neat operation chart. (2)

ii) Draw two views of the Fixture. (13)

iii) Specify appropriate fits and tolerances for critical parts. (2)

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

14. a) i) Distinguish between bending, forming and drawing. (4)

ii) Design and draw two views of a bending die for the part shown in Fig.14.a.The stock width is 30 mm and yield strength 50kN/cm^2

I. What is the sequence of operations? (2)

II. Calculate the size of Blank required (2)

III. Determine the press tonnage (2)

IV. Design all the parts of the die. (4)

V. Draw two fully dimensioned views of the die in engaged position and give a neat parts list. (6)

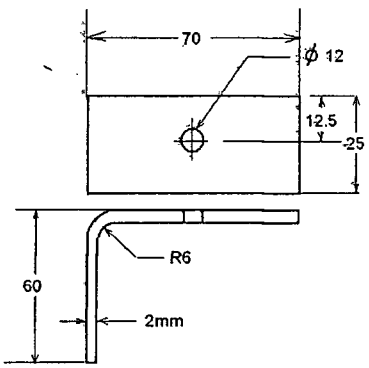


Fig.14.a

(OR)

14.b) 1) What is meant by reverse redrawing? (3)

Design and draw 2 views of a drawing die for drawing a cup of diameter 60mm and height 130 mm. Thickness of the sheet metal is 2mm and yield stress 50kN/cm^2.

i) Calculate the size of Blank required (2)

ii) Determine the press tonnage (3)

iii) Design all the parts of the die. (4)

iv) Draw two fully dimensioned views of the die in engaged position and give a neat parts list. (8)