A 1384

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Sixth Semester

Mechanical Engineering

ME 339 — DESIGN OF JIGS, FIXTURES AND PRESS TOOLS

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Explain the term redundant location.

2. Sketch and write the use of a equalising clamp.

3. Distinguish between a pot jig and a box jig.

4. Write the specific requirements of a turning fixture.

5. Distinguish between a setting block and stepping block.

6. Write the work holding devices used for the following operations :

(a) Eccentric turning

(b) Cylindrical grinding

(c) Surface grinding

(d) T slot milling.

7. Distinguish between a blanking die and a bending die.

8. What is spring back in bending?

9. Mention the methods of reducing cutting forces in piercing operation.

10. Estimate the force required for a 90° bending of C 50 steel of 1.5 mm hav width of 1 m to be bent in wiping die. Take the die radius as 3 mm.

PART B — (5 × 16 = 80 marks)

11. (a) Design and draw any two views of a jig for drilling 4 holes of diam ϕ 4 mm at 90 mm PCD on the 3 sides of a '*Y*' flange as shown in F Prepare part list and number the parts.

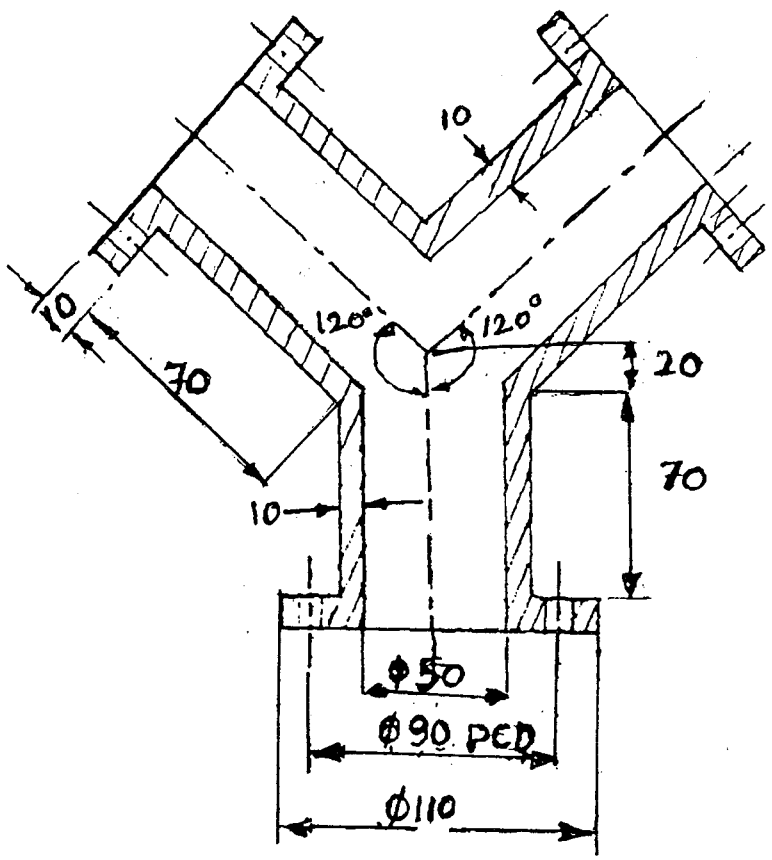


Fig. 1 *Y* Flange

Or

(b) Design and draw atleast 2 views of a jig for drilling 4 holes of size ϕ 12 on the Boss shown in Fig. 2. Number the parts and prepare part list.

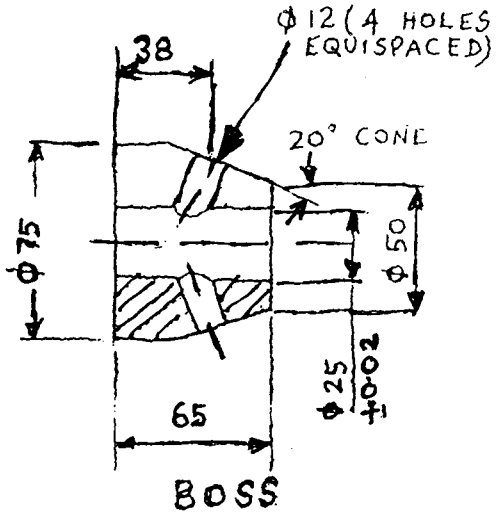


Fig. 2

12. (a) Design and draw two views of a jig/fixture for machining the boss of size. ϕ 50 on the bearing bracket shown in Fig. 3.

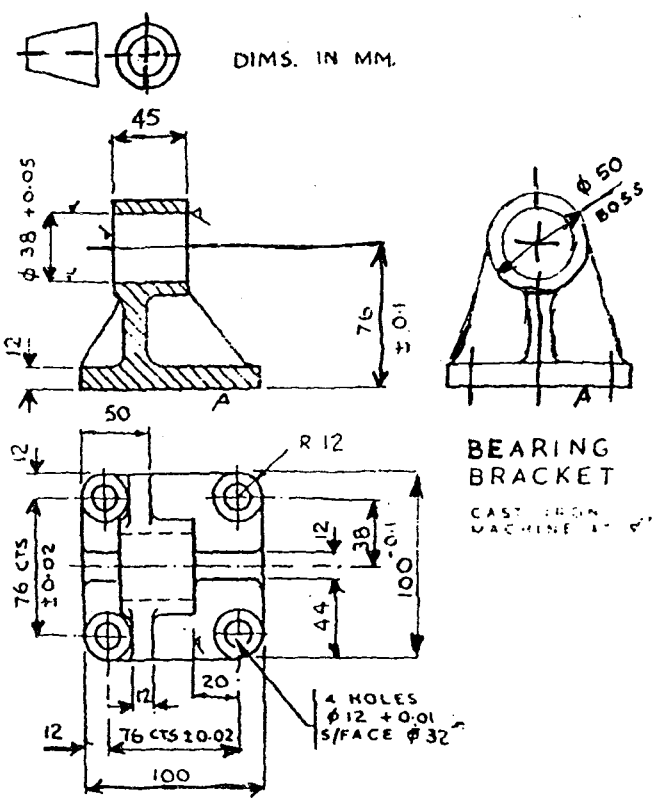


Fig. 3

Or

(b) Design and draw atleast two views of a milling fixture for making a slot of 8 mm wide × 15 mm deep on a dome pin as shown in Fig. 4. Number the parts and prepare part list.

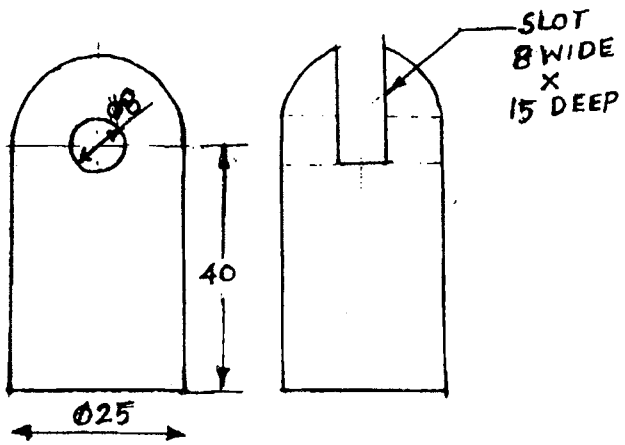


Fig. 4

13. (a) Design and draw any two views of a jig for drilling 4 holes of ϕ 6 mm diameter at the 4 corners of a rectangular flange as shown in Fig. 5. Number the parts and prepare part list.

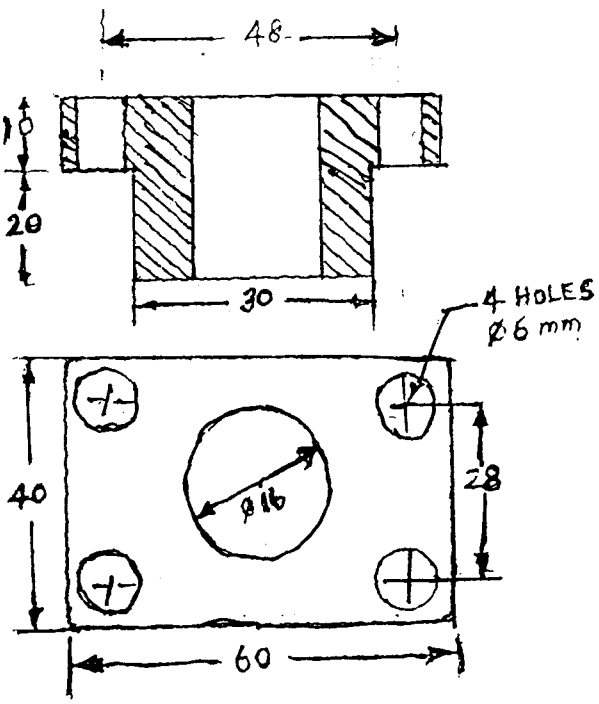
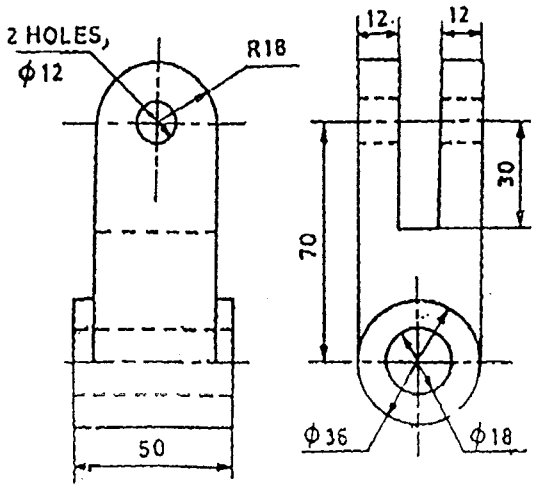


Fig. 5

Or

(b) Design and draw any two views of a jig to make two holes of ϕ 12 mm on the fork given. Number the parts and prepare bill of material.



Fork

Fig. 6

14. (a) Sketch and design a progressive die to make a steel washer 30 mm outside diameter with 15 mm hole from 1.6 mm thick steel sheet. The ultimate shear stress of the material is 320 N/mm^2.

Or

(b) Design a drawing die set for the production of cylindrical cups having a outer diameter of 50 mm and shell height of 40 mm. The thickness of the sheet metal is 0.75 mm. Material – Mild Steel.

15. (a) (i) What is 3–2–1 principle of location? (4)

(ii) Explain briefly about the welding fixtures. (6)

(iii) What are the factors to be considered while designing grinding fixture. (6)

Or

(b) Write short notes on the following :

(i) Materials used in jigs and fixtures

(ii) Compound and combination dies

(iii) Stretch forming

(iv) Stripper and pilots.
