S 4934

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Seventh Semester

(Regulation 2004)

Mechanical Engineering

ME 1009 — DESIGN OF JIGS, FIXTURES AND PRESS TOOLS

(Common to Automobile Engineering)

(Common to B.E.(Part-Time) Sixth Semester Regulation 2005)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by angular location?

2. Where should locators contact the part? Why?

3. What class of jig would normally be used to tap holes?

4. What is the primary function of a linear bushing?

5. How are cutters set in relation to the work in a milling fixture?

6. List any three basic types of jigs used for welding?

7. What is meant by clearance? Why is it important in shearing operation?

8. What is the purpose of the shear angle found on a punch or die?

9. Why is the wheel dressing often attached directly to the grinding fixture?

10. What is a progressive die? When should a progressive die be used?

11. (a) What are the various location devices? Explain any four of them in with the aid of suitable sketches.

Or

(b) Explain with the help of suitable sketches the operation principles of power clamping systems. Also, state its advantages.

12. (a) Design and draw to scale any two views of a suitable drill jig to drill two ϕ 10 mm hole on the component shown in fig.1.
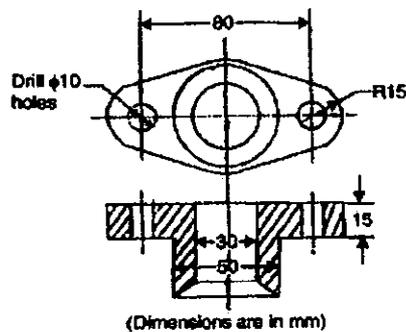

Fig. 12 (a)

Or

(b) Design and sketch any two views of a suitable drill jig to drill an oil hole of size 3 mm for the given job shown in fig.2.
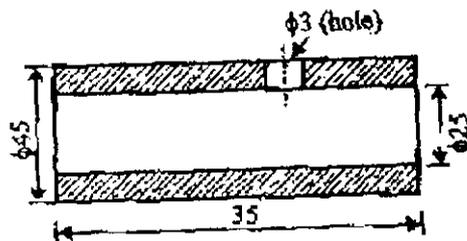

Fig. 12 (b)

13. (a) Design a suitable milling fixture to cut a keyway of size 3 × 3 mm on a solid shaft of ϕ 30 mm diameter and 100 mm length.

Or

(b) With proper sketch explain the operation of a modular fixture with example used in practice.

14. (a) (i) Differentiate between progressive die and a compound die.

   (ii) Calculate the maximum punch force necessary to blank a steel washer 44 mm outside diameter and 22.25 mm inside diameter and 1.6 mm thick, if $\tau_s = 400$ N/mm^2.   (8+8)

Or

(b) What is strip layout? What are the different ways of making strip layout for regular and irregular shaped blanks?

15. (a) A rectangular steel component of size 20 mm × 60 mm is to be made from 4 mm thick sheet. Sketch the scrap strip by layout and determine the percentage of stock used.

Or

(b) Design and draw any two view of a progressive die to make a steel washer of 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.

———————

        S 4934