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Question Paper Code : 51047

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014

Seventh Semester

Mechanical Engineering

080120043 – DESIGN OF JIGS, FIXTURES, PRESS TOOLS AND MOULDS

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

(Use of Approved Design Data Book is permitted)

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by redundant location?
2. Name any four types of bushes used in jigs.
3. What is the use of an indexing jig?
4. What are modular fixtures?
5. What is the shut height of a press?
6. What is the difference between piercing and blanking?
7. What is meant by ironing?
8. What is the difference between single action and double action dies?
9. What is the use of venting?
10. Name the materials used for making moulds.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss the principles of location and clamping. (10)
(ii) Draw two locating devices used for locating cylindrical parts. (6)
- Or
- (b) (i) Draw any five types of clamping devices used in jigs and fixtures. (10)
(ii) Explain 3-2-1 principle of location. (6)

12. (a) (i) Draw a turn over jig with a component of your choice and explain its working. (10)
(ii) What are quick change fixtures? Give their applications. (6)

Or

- (b) (i) A key way of 12 mm width, 6 mm depth and 40 mm long is to be milled on a 50 mm diameter shaft 100 mm long, at the middle of its length. Sketch a suitable fixture and indicate all the parts. (10)
(ii) Explain the methods of mounting parts in grinding fixture. (6)
13. (a) (i) Design and draw a blanking die for blanking a 50mm circular part in 1.5 mm thick C20 steel. (12)
(ii) Discuss the various methods of reducing the cutting forces in a press. (4)

Or

- (b) (i) Find the tonnage required to produce a washer of diameter of 30mm with a hole of 12 mm diameter using a progressive die. Calculate the tonnage required from 1.5 mm thick steel sheet. The ultimate shear strength of the material is 320 N/mm². (10)
(ii) Discuss the effects of clearance between the punch and die in blanking operation. (6)
14. (a) (i) Design a drawing die to draw a cup of diameter 25 mm and a height of 60 mm. with a corner radius of 3 mm. The material is of mild steel having a thickness of 2 mm. Given $f_y = 200\text{N/mm}^2$ and $f_s = 120\text{N/mm}^2$. (10)
(ii) Discuss the variables that affect metal flow during drawing operation. (6)

Or

- (b) (i) A steel sheet having 240 mm length, 16 mm wide and 2 mm thick is to be bent in a V shaped die. Calculate the bending force necessary, if the steel has 650 N/mm² tensile strength. (8)
(ii) State the procedure for the design and development of a bending die. (8)
15. (a) (i) Discuss the guidelines to be followed in design of ejection system. (8)
(ii) Discuss the de-moulding techniques in detail. (8)

Or

- (b) (i) Discuss briefly the steps involved in mould construction. (8)
(ii) Describe the elements of feed system with a neat sketch and discuss the design aspects briefly. (8)