



## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

**Sixth Semester, B.E. - Industrial and Production Engineering**

**Semester End Examination; June - 2017**

**Tool Engineering and Design**

*Time: 3 hrs*

*Max. Marks: 100*

*Note: Answer FIVE full questions, selecting ONE full question from each unit.*

### UNIT - I

- 1 a. Explain the design consideration for single point cutting tool for rectangular and circular cross section and check for rigidity. 10
- b. Design a single point cutting tool for machining M.S. bar with a cutting speed of 40 mt/min on a lathe equipped with cutting power of 7 kW. Assume rectangular cross section  $H/B = 1.6$ , tool overhang 70 mm, allowable stress of tool shank  $250 \text{ N/mm}^2$ , young's modulus of the tool material  $20 \times 10^3 \text{ N/mm}^2$ . Check for rigidity. Assume any missing data. 10
- 2 a. With a neat sketch, explain different types of chip breakers. 8
- b. With a neat sketch, explain continuous broaching. 4
- c. With a neat sketch, explain forces acting on drill bit. 8

### UNIT - II

- 3 a. With a neat sketch, explain :
- i) Crank and connecting rod drive 15
- ii) Knuckle joint drive
- iii) Toggle drive mechanisms of power press drive.
- b. With a neat sketch, explain adjustable bed press. 5
- 4 a. With a neat sketch, explain power press. 11
- b. With a neat sketch, explain :
- i) Lancing      ii) Slitting      iii) Notching. 9

### UNIT - III

- 5 a. With a neat sketch, explain knockout and pressure pad in die accessories. 10
- b. With a neat sketch, explain progressive die to carry out piercing and blanking operation. 10
- 6 a. With a neat sketch, explain combination die. 12
- b. With a neat sketch, explain pilot and stripper in die accessories. 8

### UNIT - IV

- 7 a. With a neat sketch, explain cutting action in a die. 10
- b. A component made of C30 steel with shear stress of  $73.2 \text{ N/mm}^2$ . Determine the force required to blank the component, if sheet thickness is 4.8 mm and perimeter to be cut in 167 mm. 10

- 8 a. Sketch the piercing punch size and blanking die size to make a steel washer of outside diameter 30 mm and inside diameter 15 mm hole from 1.6 mm thickness steel sheet. The ultimate shear strength of the material is 310 N/mm<sup>2</sup>. Also determine the cutting force required to blank. 15
- b. What are the points to be considered during press tool design? 5

**UNIT - V**

- 9 a. Define Jig and Fixture. 6
- b. Outline the essential factors to be considered while designing the Jig and Fixture. 10
- c. Explain "FOOL-PROOFING" in Jigs and Fixture. 4
- 10 a. With a neat sketch, explain the 3-2-1 principle of location. 10
- b. With a neat sketch, explain :
- i) Diameter jig 10
- ii) Leaf jig.

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