

- N.B. (1) Question no. 1 is compulsory.**  
**(2) Attempt any three questions out of remaining five questions.**  
**(3) illustrate your answer with necessary sketch wherever necessary.**  
**(4) Figures to the right indicate full marks.**

1. Attempt any FOUR of the following : (20)
- (a) State the limitations of using press tools.
  - (b) Compare between shaving and trimming die.
  - (c) What are the various materials used in press tools and how are these materials selected?
  - (d) What is press tonnage? How it is decided?
  - (e) Explain why is it necessary to calculate the developed length of the part?
2. (a) Define centre of pressure. Considering a suitable component, explain the steps to find the centre of pressure. (10)
- (b) Describe with sketch the construction and working of a three stage progressive die considering a suitable example. (10)
3. (a) Explain the possible causes of the following defects in bending and also state the precautions to be taken to prevent or minimise these defects: (10)  
i) Cracking ii) Warping iii) Marring. Also list the defects in drawn parts.
- (b) Discuss methods of feeding the strip/coil material in the press. (10)
4. (a) Explain with suitable sketches the different methods to reduce cutting force. (10)
- (b) A cup without flange is manufactured by using deep drawing operation. It should have a height of 85 mm and 100 mm outer diameter , and is to be made from 2 mm thick sheet metal. Determine i) Blank size, ii) Percentage reduction, iii) Number of draws, iv) Radius on punches and dies, v) Die clearance, punch diameter and die opening size at each draw v) Drawing force and blank holding force. The Yield strength for sheet material is  $350 \text{ N/mm}^2$ . The bottom corner of cup is round having radius as  $3 R$ .
5. (a) Explain the different safety devices used in a press for the safety of operator. (10)
- (b) Give reasons for the following: (10)
- i) Correct orientation of grain direction is necessary in arranging the strip layout.
  - ii) Shaving operation is needed after blanking operation.
  - iii) Shear is provided on die in blanking operation
  - iv) Clearance is provided on punch in blanking operation.
  - v) Cutting and non-cutting operations are not combined in one station of progressive die.
6. Attempt any FOUR of the following : (20)
- (a) Enlist the factors considered while selecting press for a particular application.
  - (b) Explain the different defects in bent parts.
  - (c) Explain overloading of press and how to avoid it.
  - (d) What is a load-stroke curve? Describe with different stages during the sheet metal cutting operation.
  - (e) Explain automatic stock feeding mechanism in a press.