1T01436 - T.E.(Mechanical Engineering)(SEM-VI)(Choice Base Credit Grading System) ((R- 19) (C Scheme) / 89425 - Press Tool Design (DLOC)

QP CODE: 10038044 DATE: 20/12/2023

(3 Hours) **[Total Marks: 80**

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) Explain the automatic stock feeding mechanism in a press.

(b) Describe the different stages of load stroke curve during the various stages of sheet metal cutting operation.

(c) Enlist the factors considered while selecting press for a particular application.

(d) Sketch an inverted die and label all the parts.

(e) How does 'direction of burr' affect the strip layout?

2. **(a)** Enlist the different devices used in a press for the safety of operator. Also explain the how each device provides safety to the operator. **(10)**

(b) Give reasons for the following: **(10)**

i) Punch and die are always hardened.
ii) Punch control the hole size.
iii) Only two dowel pins are used in press tool assembly.
iv) Coil stock is not used for double pass strip.
v) For piercing operation shear is not provided on die.

3. **(a)** A cup without flange and of height 45 cm and outer diameter 65 cm is to be made from sheet metal 0.6 mm thick. Find the suitable number of draws. If the shear stress for sheet material is 427 N/mm^2, calculate the drawing pressure, blank holding pressure, press capacity. Also find the size of the blank required to draw the cup of given dimensions. The bottom corner of cup is round having radius as 1.4 R. **(10)**

(b) Explain with suitable sketches, the different stages in a shearing of a sheet metal. **(10)**

4. **(a)** A work piece in the form of rectangular stamping of size 50 mm x 50 mm is to be produced in 50,000 pieces. A circular hole of diameter 20 mm is to be cut at the centre of the blank. If a 2 mm thick material is used for the work piece with shear strength of 425 N/mm^2, calculate the following: i) cutting force ii) cutting clearance iii) Die and punch size iv) Shut height of press v) strip layout **(10)**

(b) 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.

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5. **(a)** Define centre of pressure. Explain the steps to find the centre of pressure. Take a suitable component and find its centre of pressure. **(10)**

(b) Describe with sketch the construction and working of a compound die considering a suitable example. **(10)**

6. Attempt any FOUR of the following : **(20)**

(a) State the important specifications of a press tool with its meaning.

(b) Compare between compound and combination die.

(c) Sketch a two-stage progressive die and punch arrangement for producing a washer and label all the parts.

(d) Compare between fixed and spring-loaded stripper.

(e) Define spring-back effect in relation to bending operation. Explain the reasons that develops spring-back in a sheet metal.

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