TE/mech/SemV/PTD/CBCS

31 MAY 2019

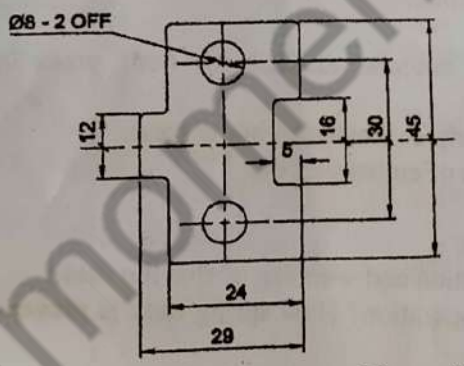
Time: 3 Hours

Total Marks: 80

Note: (1) **Question No. 1** is compulsory.
(2) Attempt **any three** questions out of the remaining five questions.
(3) Assume suitable data wherever necessary and justify it.
(4) Figures to the right indicates full marks.

1. (a) Give Reasons for **any five** of the following statements. **15**
   i) Segmental (insert type) die construction is preferred over solid die.
   ii) Cutting and non-cutting operations are not combined in one station of progressive die.
   iii) Heel is provided for notching punch in a progressive die.
   iv) Hydraulic press is preferred over mechanical press.
   v) Rigid press is required for coining operation.
   vi) Provision of shear on punch and die reduces maximum cutting force requirement.
   (b) Explain the effect of insufficient clearance and excessive clearance on the edge of blank with neat sketches. **5**

2. A component shown in figure no. 1 is to be produced on a progressive die. Determine following.
   (a) Economic stock strip layout considering the sheet size of 350 mm x 1200 mm. (Material: copper sheet, ultimate Shear strength = 35 kgf/mm^2, sheet thickness = 1.6 mm) **8**
   (b) Calculate the press tonnage required for manufacturing the component and suggest suitable press. **4**
   (c) Draw the following views of designed progressive die. **8**
   i) Sectional front view
   ii)Top view of bottom assembly of die set



Material: Copper Sheet
Thickness: 1.6 mm
All the dimensions are in mm
Ultimate Shear Strength: 35 kgf/mm^2
Unspecified Radii: 1 mm

Figure No: 1

3. (a) A circular cup as shown in figure no. 2 is manufactured by using deep drawing operation. (Material: MS Cup, Thickness: 2mm, Yield Strength: 35 kgf/mm^2). Determine following. **20**
   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
   vi) Drawing force and blank holding force

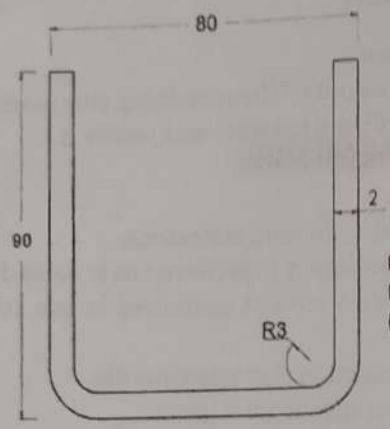


Fig No.2
Deep Drawn Component
(All Dimensions are in mm)

4. (a) Calculate the developed length of the part shown in fig no. 3. 5
(Material: Steel, Ultimate tensile strength: 450 N/mm^2, thickness: 3mm)

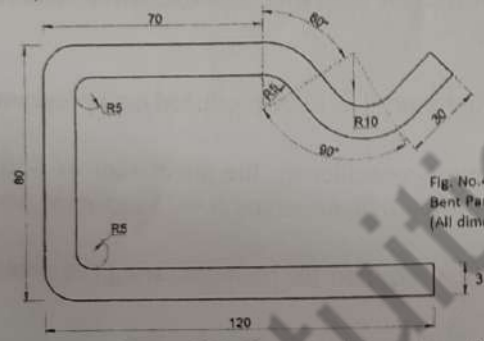


Fig. No.4
Bent Part
(All dimensions are in mm)

(b) With your own example explain how to determine the coordinates of the centre of pressure of blanked part. 5

(c) Explain the condition of energy overloading of press. 5

(d) Differentiate between stopper and pilot. 5

5. (a) Discuss safety procedures and devices adopted for both press operator and equipment. 7

(b) Discuss methods of feeding the strip/coil material in the press. 7

(c) Explain working and construction of embossing die. 6

6. Answer the following **(Any four)**: - 20

(a) Explain with neat sketch construction and working of shaving dies.

(b) What is spring back in bending operation? How spring back is prevented in V dies and wiping dies.

(c) List drawing defects, also explain probable causes for the development of any four defects.

(d) Explain the following terms in relation to mechanical press:
i) press tonnage ii) throat iii) distance between uprights.

(e) Draw a neat and dimensioned sketch of Acron type pilot to be used in locating hole of 18mm diameter.

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