[Time: 3 Hours]   [Total Marks:80]

N.B: 1.   Question **No.1** is **compulsory**. Attempt **any three** out of the remaining **five** questions.
2.   Assume and state suitable data wherever necessary.
3.   All dimensions are in mm.
4.   Figures to the right indicate full marks.

1. (a) Write the sequence of operations for the component shown in the Figure 1.   **[5]**
   (b) Design a Drill Jig for drilling 2, dia. 10mm holes in the component. Draw minimum two views **[15]**
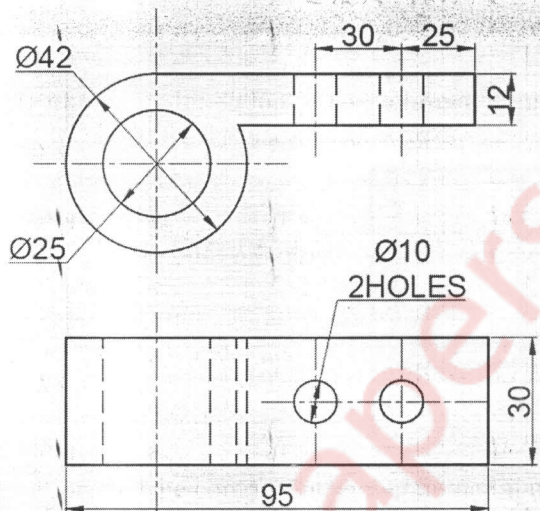   of the Drill Jig.

<u>Figure 1</u>

2. (a) i)   Explain Spring back effect in bending operation. What are the methods to reduce spring   **[5]**
             back effect?
        ii) Explain different methods to reduce cutting load in a shearing die.   **[5]**

   (b) Differentiate between **(any two)**: -   **[10]**
        i) Slip Bush & Renewable bush.
        ii) Equalizer & Centralizer.
        iii) Allen Screws and Dowels.

3. (a) i)   What are the benefits and limitations of jigs and fixtures?   **[5]**
        ii) Explain fool proofing with example   **[5]**

   (b) i)   Calculate the blank length of the bent
             part shown in **Figure 2**.   **[5]**

        ii) Explain defects and remedies in   **[5]**
             bending operations.
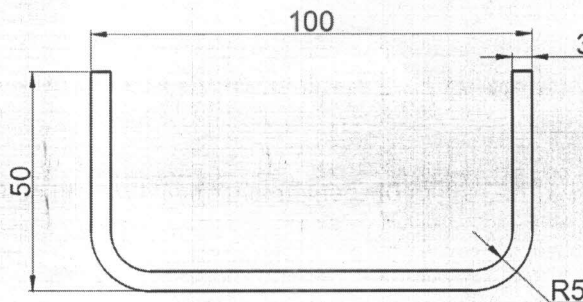

<u>Figure 2</u>

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4. (a) i) Shearing in press working operations. [5]

      ii) Clearance between punch and die. [5]

  (b) i) Explain requirement of setting block and Tenon in milling fixture with neat sketches. [5]

      ii) Explain benefits and limitations of Jigs and Fixtures. [5]

5. (a) Explain principles for the design of Clamping elements. Explain any two clamping devices with neat sketches. [10]

  (b) For a drawn cup shown in **Figure 3**, Calculate the following: - [10]
Developed blank size, Number of draws required to get the final part, Drawing forces, blank holding forces and % age reduction in each draw.
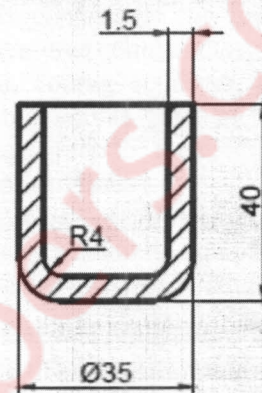
    Yield Strength = 40 Kg/mm²

Figure 3

6. (a) A mild steel washer with single row feeding, OD 30 mm, ID 18 mm and thickness 2 mm, is to be manufactured in a progressive die ,

    i) Calculate economic strip layout assuming suitable bridge values, consider sheet size of 800mm x 600mm. [5]

    ii) Calculate the press tonnage required for component manufacturing. [5]
Shear strength: 40 kg/mm².

    iii) Draw Sectional Front view of the tool & Top view of bottom half of the tool. [10]

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