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Instructions : (1) All Questions are *compulsory*.

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

Marks

1. **[A] Attempt any THREE :**   **12**

    (a) What are the characteristics of tool materials ? Explain in brief.

    (b) Draw a geometry of single point cutting tool.

    (c) State the specification of OBI press. Describe the function of flywheel in it.

    (d) What is spring back ? How it can be overcome ?

  [B] Attempt any ONE :   **8**

    (a) Compare orthogonal and oblique cutting.

    (b) Compare compound die and combination die.

2. **Attempt any FOUR :**   **16**

    (a) Define :

      (i) Chip thickness ratio

      (ii) Shear angle

    (b) What is tool life ? State tool life equation. Write the factors on which tool life depends.

    (c) What is strip layout ? What are the factors which influence the stock layout ?

    (d) How the metal flows during drawing ? What are variables affecting metal flow during drawing ?

    (e) Explain metal extrusion dies.

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3. **Attempt any TWO :** 16
   (a) List the various types of chips produced during metal cutting. Explain the condition in which these types of chips are produced. Why continuous chips are preferred over the dis-continuous type ?
   (b) What is material utilization factor ? Explain die operations blanking, piercing, shearing, drawing.
   (c) Explain bending dies, band allowance.

4. **Attempt any FOUR :** 16
   (a) What are different tool materials ? State its applications.
   (b) What are different types of cutting fluid ? State its applications.
   (c) State the function of (i) Pilots (ii) Strippers (iii) Feed stop (iv) Stock guide.
   (d) Draw a neat sketch of spanking & label it. State the factors on which bending pressure depends.
   (e) Explain constructional features of forging dies.

5. **Attempt any FOUR :** 16
   (a) Explain Merchant circle
   (b) Explain heat treatment process of tool steels.
   (c) What is meant by clearance ? Why is it important in shearing operation ?
   (d) Calculate the bending force for channel bending using following data :
   Thickness of blank = 3.2 mm
   Bending length = 900 mm
   Die radius = Punch radius = 9.5 mm
   Ultimate tensile strength of materials = 400 N/mm^2.
   Use K = 0.67 for channel bending.
   (e) Explain pressure die casting dies.

6. **Attempt any TWO :** 16
   (a) What are the different types of ceramic coatings ? Write the specification of carbide tips. Why heat treatment is given to tool steels ?
   (b) State the factors on which bending pressure depends ? How the size of a blank is calculated for drawing a cup ?
   (c) (i) Explain bending terminology with the help of a suitable sketch.
       (ii) State the two products each manufactured by using
            (1) Metal extrusion dies
            (2) Forging dies

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