M. Tech-2

TDD

Set-1

Full Marks : 70

Time : 3 hours

Answer any **six** questions including
Q. No. 1 which is compulsory

*The figures in the right-hand margin indicate marks*

1. Answer *all* the following :   2 × 10

   (a) What are the design consideration to select carbide as a tool material for turning operation ?

   (b) Why is it necessary to check the tool deflection ?

   (c) Write the name of a few typical high production cutting tool.

   (d) What are the function of a finishing teeth in a internal broach ?

   (e) What are the function of a pilot in a broach tool ?

   (f) How are form tool classified ?

(*Turn Over*)

(g) List the different die cavities necessary in the drop forging to produce a spanner.

(h) Explain the function of stipper and pilot with reference to blanking die in a press tool.

(i) What do you mean by "Limiting draw ratio" in a deep drawing operation ?

(j) What are the function of a setting block in a milling fixture ?

2. (a) Describe briefly, with the help of simple sketches, the different ways of breaking the machining chips. 4

(b) In cutting operation the tool overhanging is 30 mm. The magnitude of forces as recorded by a dynamometer is (i) cutting force $(P_z) = 2000$ N and (ii) feed force $(P_y) = 1200$ N. The tool material is H.S.S. Calculate the tool tip deflection and bending stress developed in the tool shank if the tool cross-section is 10×12 mm. Assume suitable data if necessary. 6

3. (a) What are the advantages and disadvantages of a form tool ? Discuss the application of these tools. 4

(b) The following product has to manufacture by a circular form tool. Design the form tool assuming the following data (i) Rake angle = $15°$ (ii) Clearance angle = $10°$. 6
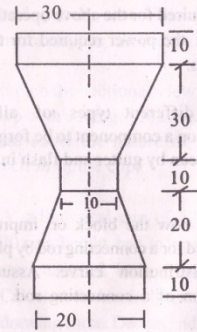
All dimension in mm

4. (a) Sketch an internal broach tool and name its different elements. Discuss the function of each element of the tool. 4

  (b) An internal broach to produce a key way of 4 × 6 mm inside a gear blank size of 25 mm (inside diameter). The width of the gear blank is 20 mm. Calculate the number of teeth required for the above operation. Also calculate the power required for the above operation. 6

5. (a) Discuss different types of allowances provided on a component to be forged. What do you mean by gutter and flash in forging die ? 4

  (b) Discuss how the block or impression is developed for a connecting rod by plotting the mass distribution curve. Assume the dimension of a connecting rod. 6

6. (a) Discuss and sketch different type of punch holder used in press tool. 4

  (b) Determine the die and punch size for producing a washer of 20 mm and 10 mm of outside and inside diameter respectively from C 20 steel sheet material whose thickness is 2mm. Calculate the punching force. The shearing strength of the material is 294 MPa. Draw a suitable diagram of die and punch assembly. Assume all data necessary for the design. 6

7. (a) Sketch the sectional view of a cylinderical cup with a flange produced by deep drawing and show the nature of stress in different section of the cup. 4

  (b) A cylinderical cup of 50 mm diameter and 70 mm height has to produce from a mild steel material having one mm thickness. Calculate the blank size, number of stages and drawing force. Design and sketch a suitable die and punch assembly diagram for the 1st stage drawing operation. 6

8. (a) Explain 3 - 2 - 1 principle of location with suitable diagram. 4

(b) Discuss the design principle of dril bushing in a drilling jig. 6

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