B.E. Seventh Semester (Mechanical Engineering) (C.B.S.)
Elective - I : Tool Design

_____

Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Explain the importance of various elements on a single point cutting tool. Draw neat sketches. **7**

b) What is tool life ? Explain various factors affecting tool life. **6**

OR

2. a) A high speed steel tool is used for machining a work piece of mild steel. While machining at a cutting speed of 2.5 m/min the useful life of the tool is found to be one hour. What will be the tool life if the same tool is used to cut at a speed of 4 m/min, other parameter remaining the same ? Assume the value of exponent of standard Tailory's tool life equation = 0.125. **8**

b) Derive the relationship between chip thickness ratio, shear angle and rake angle. **5**

3. a) Describe the geometry of a Twist drill stating the significance of Helix angle, Rake angle and Point angle with neat sketch. **7**

b) What is Broach ? Describe its geometry and explain its various design elements. **7**

OR

4. a) Describe tool geometry of milling cutter. How will you select each parameter ? Explain. **7**

b) A hole of 30 mm diameter & 56 mm depth is to be drilled. The suggested feed is 1.5 mm per rev. and cutting speed is 50 rpm. What are the feed speed, spindle speed and cutting time. Assume the clearance height is 4 mm. Also find MRR. **7**

5. a) Explain shearing action in die cutting operation. How is the clearance applied ? Explain. **7**

b) Explain the difference between progressive and compound dies with neat sketches. **6**

OR

www.solveout.in

6. a) A blank is to be produced from SAE 1020 steel plate of thickness 2.5 mm outside **8**
diameter of blank is 80 mm
Determine :
i) Total tonnage required & press capacity.
ii) Dimensions of punch and die block.
iii) Amount of shear on punch if cutting force is to be reduced by 15%.

b) Distinguish between Bending, Forming and Drawing operation. Also explain the material **5**
flow in drawing.

7. a) Explain the various bending methods. Draw neat sketches. **6**

b) A cut is to be made having inside diameter of 40 mm and height of 85 mm. **7**
Determine :
i) number of draws
ii) Dimensions of punch and die block for successive draws.

OR

8. a) Explain in brief various forming operation. State the application of each. **7**

b) Explain difference between curling die and embossing die. **6**

9. a) Explain the detail procedure for designing forgind die. **7**

b) Explain preliminary forging operation with neat sketch. **7**

OR

10. a) Explain difference between open and closed die forging with neat sketch. **7**

b) Write short notes on **any two.** **7**

i) Fullering.

ii) Edging

iii) Flattering

11. a) What is a Jig and a fixture ? Discuss the design principles for Jig and fixtures. **7**

b) Describe with neat sketch of 3-2-1 principle of location. **6**

OR

12. a) Explain with neat sketch of drilling fixtures. **6**

b) Describe the different type of locators with neat sketches ? **7**

****

www.solveout.in