

**Duration: 3hrs**

**Max Marks: 80**

N.B. : (1) Question No 1 is Compulsory.

(2) Attempt any three questions out of the remaining five.

(3) All questions carry equal marks.

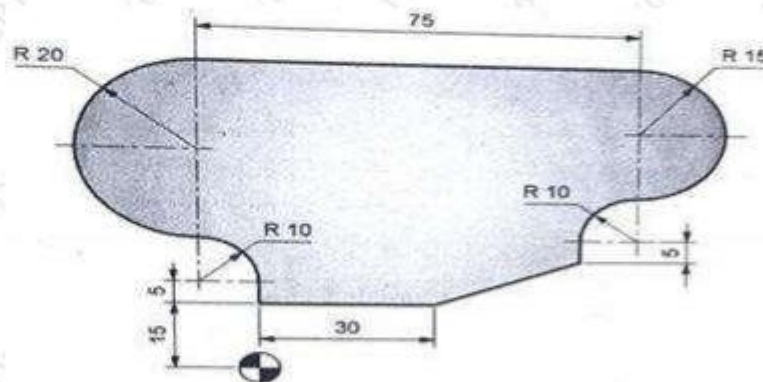
(4) Assume suitable data, if required and state it clearly.

**1 Attempt any FOUR**

**[20]**

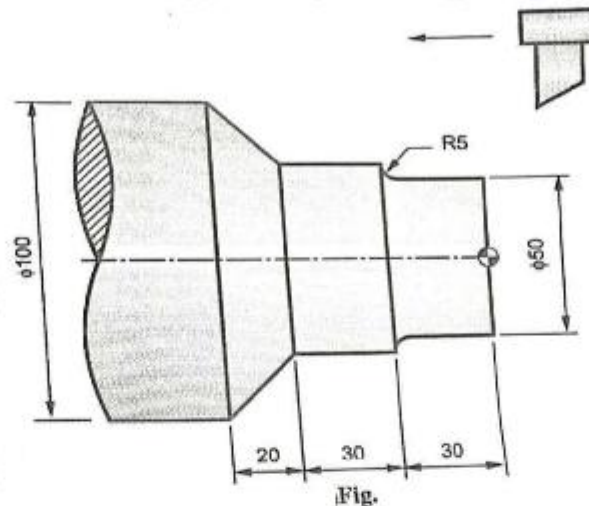
- a Write short note on scope of Virtual Manufacturing [5]
- b Write short note on Homogeneous Coordinate system [5]
- c Explain translation, scaling, rotation and reflection with suitable examples [5]
- d Briefly explain the elements of NC Machine Tool System with neat sketch. [5]
- e What are the applications of 3D solid CAD model? [5]

- 2 a Write the complete manual part program using G and M codes to machine the outline of geometry for the part as shown in figure. The thickness of the plate is 3mm thick. The end mill is 10mm in diameter. Assume suitable speed and feed for machining parameters. [10]



- b A Triangle ABC having vertices A (10,5), B(20,15) and C (25,30 ) is rotated by 40 degree CCW about a point P (5, 5). Determine the composite transformation matrix and the new coordinate of the triangle. [10]
- 3 A A triangle PQR with vertices P (2, 2), Q (5, 2) and R (4, 7) is to be reflected about the line  $y=0.5x+3$ . Determine (i) the concatenated transformation matrix and (ii) co- ordinates of the vertices for the reflected triangle. [10]

- b Write a manual part program for the finishing of a forged component as shown in the figure. Assume the speed and feed on the turning center are 400rpm and 0.35mm/revolution respectively. Assume 1mm material is to be removed radially from the external diameter. [10]



- 4 a Explain the characteristics of the Bezier curve and plot a Bezier curve having control points as  $P_0 (1, 2)$ ,  $P_1 (3, 4)$ ,  $P_2 (6, -6)$  and  $P_3 (10, 8)$ . Take a step size of 0.1. Mid-point. [10]
- b Explain Selective Laser Sintering in detail with neat and clean diagram [10]
- 5 a a. Explain in brief Augmented Reality (AR) and Virtual Reality (VR). [10]
- b Write difference between Wireframe, Solid and surface Modeling
- b The hermit cubic spline curve has the endpoints  $P_0 (1, 1)$  and  $P_1 (7, 4)$ . The tangent vector for the endpoint  $P_0$  is defined by the line between  $P_0$  and another point  $P_2 (8, 7)$  whereas the tangent vector for the endpoint  $P_1$  is defined by the line between  $P_1$  and point  $P_2 (8, 7)$ . Plot the curve for the points at the values of  $u=0, 0.2, 0.4, 0.6, 0.8$ , and  $1.0$ . [10]
- 6 a Explain turning canned cycle with a suitable example [05]
- b Write a short note on tool length compensation [05]
- c Write a short note on scope of CAD CAM in product life cycle. [10]

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