

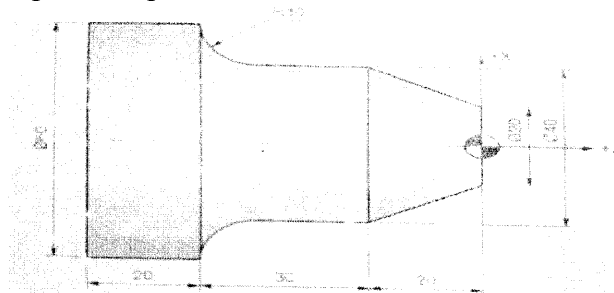
S.E. (Mech) (Sem-IV) (CB) (P-20-21) (C Scheme)

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 What are the applications of 3D solid CAD model.  
 b Determine the coordinate of a 3D point P (5, 7, 9) when rotated by 30 degree in CCW direction about Z axis.  
 c Explain the use of RP in biomedical field.  
 d Briefly explain the elements of NC Machine Tool System with neat sketch.  
 e Compare Bezier Curve and B-Spline Curve.
- 2 a A cubic Bezier curve is defined by the control points as (20,20), (60,80), (120,100) and (150, 30). Find the equation of the curve and its midpoint. [10]  
 b Explain Fused Deposition modelling with its advantages, disadvantages and applications. [10]
- 3 a A triangle PQR with vertices P (2,5), Q (6,7) and R (2,7) 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 Explain the major steps involved in rapid prototyping, list the various rapid prototyping techniques and explain any one of them with neat sketch in brief. [10]
- 4 a Explain in brief the elements of CNC machine tool system. Write down advantages, limitations and applications of CNC machine tool system. [10]  
 b Write short note on 3D printing with neat sketch. [10]
- 5 a Write complete part programing for the forged component shown in following figure by taking finishing cut of 1 mm. [10]



- b Explain the process of obtaining CAD solid model of body parts using CT output data. [10]
- 6 a Explain in brief Augmented Reality (AR) and Virtual Reality (VR). [10]  
 b Explain the concept of homogeneous co-ordinate system and its significance. [10]