

Duration: 3hrs

[Max Marks:80]

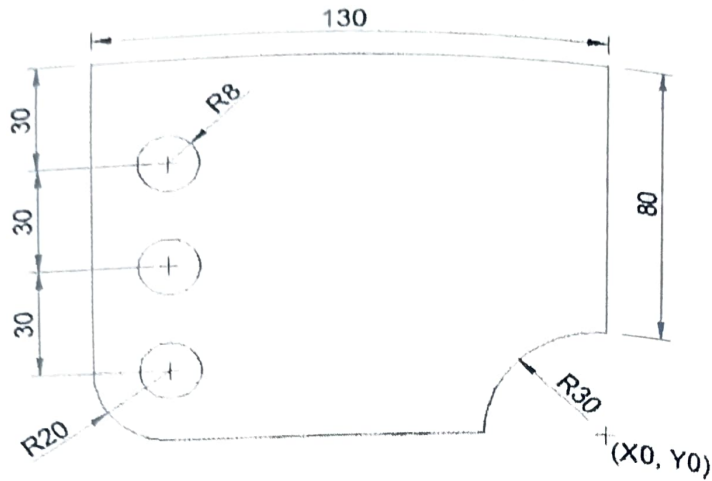
- N.B. : (1) Question No 1 is Compulsory.  
(2) Attempt any three questions out of the remaining five.  
(3) All questions carry equal marks.  
(4) Assume suitable data, if required and state it clearly.

Attempt any **FOUR**

[20]

- 1 a Write short note on scope of Virtual Manufacturing [20]  
b Explain use of following words in manual part programming  
i) N ii) S iii) F iv) T v) X,Y,Z and U,V,W.  
c Explain translation, scaling, rotation and reflection with suitable examples.  
d Write difference between Wireframe, Solid and surface Modeling  
e What do you mean by interpolation and approximation curve?
- 2 a Write the difference between Bezier curves, Hermite Curves and B-spline curves with examples. [10]  
b Explain in brief the elements of CNC machine tool system. Write down advantages, limitations and applications of CNC machine tool system. [10]
- 3 a Explain the process of obtaining CAD solid model of body parts using CT output data. [10]  
b Explain in detail Virtual Manufacturing, its socio-economic aspects, and future trends. [10]
- 4 a Explain working principle, application, advantages & disadvantages of Stereolithography Apparatus (SLA) [10]  
b Write classification of RP processes its advantages & disadvantages. Also explain RP applications in design. [10]
- 5 a Write short note on [10]  
i) Homogeneous Coordinate system.  
ii) Non Contact surface scanning in medical imaging

- b Write a CNC part program using G and M codes for contouring a component of thickness 10mm. Also drill holes of 16mm diameter as shown in figure. Assume cutter speed as 15m/min and feedrate as 0.2 mm/rev. [10]



- 6 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 0.2. [10]
- b 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) coordinates of the vertices for the reflected triangle. [10]

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