

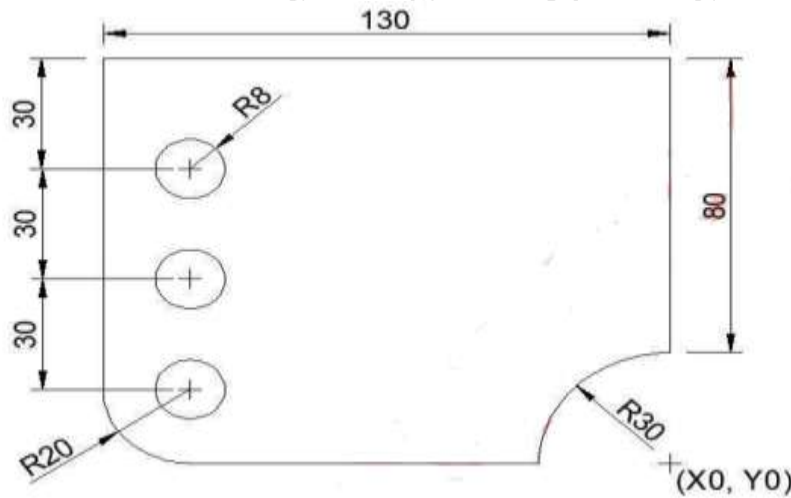
Duration: 3hrs

[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
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]
