**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   **[10]**
examples.

b   Explain in brief the elements of CNC machine tool system. Write down advantages,   **[10]**
limitations and applications of CNC machine tool system.

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   **[10]**
Stereolithography Apparatus (SLA)

b   Write classification of RP processes its advantages & disadvantages. Also explain RP   **[10]**
applications in design.

5   a   Write short note on   **[10]**

i) Homogeneous Coordinate system.

ii) Non Contact surface scanning in medical imaging

5467219F1080B95368193950FB1F5BC1

b   Write a CNC part program using G and M codes for contouring a component of   **[10]**
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.
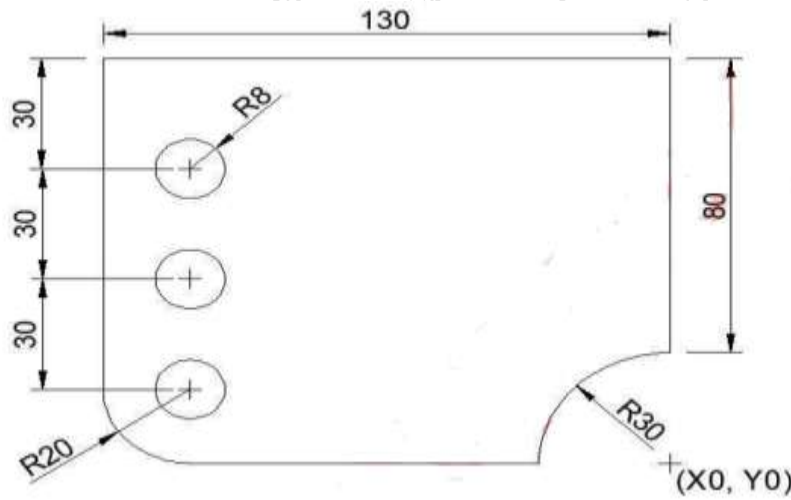
6   a   Explain the characteristics of the Bezier curve and plot a Bezier curve having control   **[10]**
points as P_0 (1, 2), P_1 (3, 4), P_2 (6, -6) and P_3 (10, 8). Take a step size of 0.2.

b   A triangle PQR with vertices P (2,5), Q (6,7) and R (2,7) is to be reflected about the   **[10]**
line y=0. 5x+3.Determine (i) the concatenated transformation matrix and (ii) co-
ordinates of the vertices for the reflected triangle.

****