Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY

V SEMESTER B.TECH. (MECHANICAL / I&P ENGINEERING) END SEMESTER MAKE-UP EXAMINATIONS DEC 2016/JAN 2017

SUBJECT: CAD-CAM (MME-3103)

REVISED CREDIT SYSTEM (29/12/2016)

	Time: 3 Hours MAX. MARKS	50
	Instructions to Candidates:	
	 Answer ALL the questions. Draw neat sketches using PENCIL only Missing data may be suitably assumed. 	
1A.	With a block diagram explain Shigley's conventional design process.	 04
1B.	Differentiate C-rep from B-rep method of solid model creation in CAD.	03
1C.	Explain any three robot configurations with neat sketches.	03
2A.	A tabulated surface is generated by extruding a hermite cubic spline curve defined by position vectors $P_0=[3 \ 5 \ 0]^T$, $P_1=[6 \ 8 \ 0]^T$, $P_0'=[7 \ 9 \ 0 \]^T$, $P_1'=[2 \ 4 \ 0]^T$. The unit vector is defined by P_2 - P_0 where $P_2=[7 \ 9 \ 0]^T$. Compute the coordinates on the surface for u=0.77 and v=0.33	04
2B.	Explain any 3 types of registers used in computer graphics.	03
2C.	Using parametric equations find the coordinates of points on the circumference of an origin centered circle with diameter of 24 units. $90^{\circ} \le u \le 180^{\circ}$. Take $\Delta u=30^{\circ}$	03
3A.	A line is defined by the equation $Y=0.5(x+4)$. The vertices of a triangle are (2,4), (4,6) and (3,6) respectively. Get the coordinates of the vertices of the transformed triangle when the triangle is reflected about the line.	05
3B.	A ruled surface is defined by two Bezier curves. One curve has control points $[2 \ 3 \ 1]^T$, $[4 \ 5 \ 2]^T$, $[7 \ 7 \ 3]^T$ and $[9 \ 8 \ 4]^T$. The other curve has control points $[3 \ 4 \ 6]^T$, $[5 \ 7 \ 7]^T$, $[9 \ 2 \ 9]^T$ and $[7 \ 8 \ 8]^T$. Assuming the origin of the surface parameter at $[3 \ 5 \ 6]^T$, compute the coordinates of the point on the surface at $u=0.25$ and $v=0.75$	05

- 4A. Derive the equation of tangents at the first and last points for Bezier curve defined by five control points. 04 4B. List the properties of the Bezier curve 03 4C. Explain robot programming methods 03 5A. Define FMS. Explain any three components of FMS. 04 5B. Explain Adaptive Control Optimization and Adaptive Control Constraints. 03
- **5C.** Write a part program to perform the contour slotting operation on the component as shown in the Figure 5C. Depth of the contour = 1mm.



03

Billet Size : 100 x 100 x 10 mm

Cutter Dia: 8 mm

Figure 5C.