Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent Institution of Manipal University

## V SEMESTER B.TECH. (MECHANICAL ENGINEERING) END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: CAD-CAM (MME-3103)

## REVISED CREDIT SYSTEM (26/11/2016)

## Time: 3 Hours

MAX. MARKS: 50

## Instructions to Candidates:

- ✤ Answer ALL the questions.
- Draw neat sketches using PENCIL only
- Missing data may be suitable assumed.

1A.	With a block diagram explain how the application of computers made the	
	mechanical component design more powerful.	4 marks
1B.	Differentiate C-rep from B-rep method of solid model creation in CAD.	3 marks
<b>1C</b> .	Classify the end effectors and sketch any two mechanical grippers	3 marks
	A revolved surface is generated by revolving a hermite cubic spline curve	
	defined by the position vectors $P_0=[4 \ 7 \ 0]^T$ and $P_1=[5 \ 9 \ 0]^T$ and tangent vectors	
2A.	$P_0'=[6 \ 8 \ 0]^T$ and $P_1'=[6 \ 11 \ 0]^T$ respectively. The curve is revolved about an axis	
	parallel to X axis measured at a height of 3 units along global Y axis. Evaluate	
	the coordinates of the point on the revolved surface at u=0.65 and v= $\pi/4$ .	4 marks
<b>a b</b>	Explain any 3 LAN configurations applied for networking computer graphics	
2B.	terminals with neat sketches.	3 marks
	Using parametric equations find the coordinates of points on the circumference	
2C.	of an origin centered ellipse with major diameter of 24 units and minor	
	diameter of 18 units. $0 \le u \le 120^\circ$ . Take $\Delta u=30^\circ$	3 marks
3A.	A square is defined with the vertices (2,2), (4,2), (4,4) and (2,4). Find the	5 marks
	coordinates of the square after reflecting it about the line $y = 1.5x + 6$ .	
	A ruled surface is defined by two Bezier curves. One curve has control points	
3B.	[-2 9 -5] <sup>T</sup> , [5 4 -1] <sup>T</sup> , [9 3 3] <sup>T</sup> . The other curve has control points [3 5 6] <sup>T</sup> , [5 4 8] <sup>T</sup> ,	
	$[9\ 2\ 9]^T$ and $[11\ 1\ 10]^T$ . Assuming the origin of the surface parameter at $[3\ 5\ 6]^T$ ,	
	compute the coordinates of the point on the surface at v=0.22 and u=0.62	5 marks

Derive an expression for the position vector of a hermite cubic spline curve in 4A.

- the parametric form by applying appropriate boundary conditions 4 marks Derive the equation of tangents at the first and last points for Bezier curve 4B. 3 marks defined by four control points. 3 marks
- **4C**. Sketch the work volume of any 3 robot configurations
- 5A. Define FMS. Explain any three types of FMS layout with neat sketches. 4 marks
- 3 marks 5B. Explain Adaptive Control Optimization and Adaptive Control Constraints. Write a part program to perform the mirroring operation on the component as shown in the Figure 5c. Depth of the contour = 1mm. Take cutter diameter = 10 mm



