Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

V SEMESTER B.TECH. (MECHANICAL / I&P ENGINEERING)

END SEMESTER Make-Up EXAMINATIONS, DECEMBER 2019

SUBJECT: CAD-CAM [MME 3103] REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- > Answer **ALL** the questions.
- Missing data may be suitably assumed.
- Draw the sketches using PENCIL only

1A	With a block diagram explain how the mechanical components were getting	
	designed using Shigley's conventional design process.	4M
1 P	Using the recursive relation evaluate the points on the ellipse for one	

	quadrant with an angle increment of 30°. The center of the ellipse is at (16, 24) with major and minor axis length being 24 and 16 units respectively.	3M
1C	What are work cell control and interlocks	3M
2A	Derive the equation of tangents at the first and last points for Bezier curve defined by four control points.	4M
2B	How 3D modelling with booleon operation differs from 3D modelling using boundary representation	3М
2C	Explain three network configurations used in CAD-CAM system	3M
3A	Derive an expression for the position vector of a hermite cubic spline curve in the parametric form by applying appropriate boundary conditions	5M

- 3B A ruled surface is defined by two Bezier curves. One curve has control points [2 9 5]^T, [5 6 1]^T, [9 3 3]^T. The other curve has control points [3 5 6]^T, [5 4 8]^T, [9 2 9]^T and [11 1 10]^T. Assume the origin of the ruled surface parameters at the lower left corner of the surface, compute the coordinates of the point on the surface at v=0.25 and u=0.50.
 5M
- **4A**Explain any 4 specifications that is helpful to design a robot**4M**
- **4B** Sketch the work volume of any 3 robot configurations
- 4C A scaling factor of 2.5 is applied in the Y direction while no scaling factor is applied in the X direction to a line whose end points coordinates are (2, 4) and (5, 9). Then the line is to be rotated subsequently through an angle of 40°. All the transformation operations takes place about the origin. Determine the necessary transformation matrix for these sequential operations and find the new coordinates of the end points of the line.
 3M

3M

- 5A With examples explain how Adaptive Control Optimization and Adaptive Control Constraints aid in improving the productivity
 4M
- **5B** Write a part program to perform the contour slotting operation on the component as shown in the Figure 5B. Depth of the contour = 1mm.



Billet Size : 100 x 100 x 10 mm

Cutter Dia: 8 mm

5C Explain any 3 types of FMS layouts with the schematic diagrams

3M