

Code: 22MEMD1T4

I M.Tech - I Semester – Regular Examinations - MARCH - 2023**GEOMETRIC MODELLING
(MACHINE DESIGN)**

Duration: 3 hours

Max. Marks: 60

Note: 1. This paper contains 4 questions from 4 units of Syllabus. Each unit carries 15 marks and have an internal choice of Questions.

2. All parts of Question must be answered in one place.

BL – Blooms Level

CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	Explain Concatenation and homogenous transformations.	L3	CO1	7 M
	b)	Vertices of a triangle are situated at points (15, 30), (25,35) and (5, 45). Perform the following transformations on it: i) Rotation by an angle of 10°CCW about the origin ii) Scaling by twice its size. Obtain the concatenation transformation and plot the new positions of triangle in each transformation.	L3	CO1	8 M
OR					
2	a)	Derive the parametric representation of a Hermite Cubic Spline curve.	L3	CO1	8 M
	b)	Explain truncating and subdividing of curves.	L2	CO1	7 M

UNIT-II					
3	a)	Discuss the properties of Bezier curves.	L2	CO2	8 M
	b)	Explain the significance of increasing the flexibility of Bezier curves.	L2	CO2	7 M
OR					
4	a)	Discuss the characteristics of a B-Spline curve.	L2	CO2	7 M
	b)	Given vertices of a polygon are given as P0 [1 1], P1 [2 3], P2 [4 3] and P3 [3 1]. Calculate both second and fourth order open B-spline curves.	L3	CO2	8 M
UNIT-III					
5	a)	Differentiate between Hermite bi-cubic spline surface and B-Spline surface with reference to number of control points and order of continuity.	L2	CO3	8 M
	b)	Derive the parametric representation of Tabulated Cylinder.	L3	CO3	7 M
OR					
6		Derive the relationship between the position, tangent and twist vectors at the corner points of a Bezier surface patch and write boundary conditions and co-efficient matrix.	L3	CO3	15 M
UNIT-IV					
7	a)	Describe various commonly used primitives for solid modeling and explain the Boolean operations.	L2	CO4	8 M

	b)	Apply Euler's law and Validate a simple rectangular block with a blind hole using Euler's law.	L3	CO4	7 M
OR					
8		Illustrate CSG representation scheme. Draw a CSG Tree for the following figure.	L3	CO4	15 M
					