Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – May / June 2026

Date: 25-05-2026 **Time:** 01:00pm – 04:00pm

School: SOE	**Program:** B. Tech (Mechanical Engineering)	
Course Code: MEC3017	**Course Name:** CAD for Additive Manufacturing	
Semester: VI	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**C06**
Marks	**14**	**14**	**24**	**10**	**19**	**19**

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

1.	List out application of CAD for Additive manufacturing.	2 Marks	L1	CO1
2.	Define Murphys law?	2 Marks	L1	CO1
3.	What is Scaling transformation?	2 Marks	L1	CO2
4.	What is the application of homogenous coordinates in CAD?	2 Marks	L1	CO2
5.	Define patch?	2 Marks	L1	CO3
6.	What are analytical surfaces in surface modelling?	2 Marks	L1	CO3
7.	What are the limitations of wireframe modelling?	2 Marks	L1	CO5
8.	List out the solid model representation schemes.	2 Marks	L1	CO5
9.	What is Instance in solid Modelling?	2 Marks	L1	CO6
10.	What are the uses of Primitives in solid modelling?	2 Marks	L1	CO6

Part B

Answer the Questions. **Total Marks 80M**

11.	Explain the different coordinate systems used in CAD. With the simple diagram show components and various view positions.	10 Marks	L2	CO1
	Or			
12	Explain the six general steps used in design process for development of product.	10 Marks	L2	CO1

13.	Given a triangle with coordinate points A (3,4), B (6,4) C (5,6). Apply the reflection on the X axis and obtain the new coordinates of the objects in analytical and matrix methods. Plot the output in graph.	10 Marks	L3	CO2
	Or			
14.	Given a square with coordinates points A (0,4), B (4,4) C (4,0) D (0,0). Apply the translation with distance 2 towards X axis and 2 towards Y axis. Obtain the new coordinates of the square in analytical and matrix methods. Plot the output result in graph.	10 Marks	L3	CO2

15.	Apply the principles of tabulated surface generation to design a component with uniform cross-section, and incorporate offset surfaces at plane intersections. Explain how these surfaces improve strength, manufacturability, and service life.	10 Marks	L3	CO3
	Or			
16.	Given sixteen surface points distributed uniformly in the (u, v)parameter space, apply the sixteen-point form of a bi-cubic surface patch to generate the surface equation and explain its role in geometric modeling.	10 Marks	L3	CO3

17.	Apply the concept of a Bezier surface to approximate a given set of input data using control points and explain how the control net governs the final surface shape.	10 Marks	L3	CO3
	Or			
18.	Apply the concept of B-spline surfaces to generate a free-form surface with local control from a given set of input data points for automobile or aerospace or any other manufacturing application.	10 Marks	L3	CO3

19.	Write the desirable properties of solid modelling with its applications	10 Marks	L2	CO4
	Or			

20.	Explain Boundary Representation (B-rep) and its key elements, including geometric and topological information.	10 Marks	L2	CO4

21.	Analyze the behavior of regularized Boolean set operations when applied to two overlapping solid objects	15 Marks	L4	CO5
	Or			
22.	Examine how different sweep paths (linear, non-linear, and hybrid) influence the geometry and complexity of the resulting solid.	15 Marks	L4	CO5

23.	Using the cubic Bazier curve formulation, design a smooth curve that models a 2-D profile controlled by the points $\mathbf{B_0}(\mathbf{1},\mathbf{0}), \mathbf{B_1}(\mathbf{2},\mathbf{2}), \mathbf{B_2}(\mathbf{5},\mathbf{2})$and $\mathbf{B_3}(\mathbf{7},\mathbf{1})$.Compute at least five points on the curve for suitable parameter values and plot the resulting Bézier curve along with its control polygon.	15 Marks	L3	CO6
	Or			
24.	Using cubic Bézier curve principles, design and plot a smooth two-dimensional curve controlled by the points A(1,1), B(1,2), C(3,2)and D(5,3).Evaluate suitable parametric values to compute at least five points on the curve and illustrate the curve along with its control polygon.	15 Marks	L3	CO6