Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, NOV / DEC 2024

MECHANICAL ENGINEERING
Third Semester
ME5351 COMPUTER AIDED DESIGN
(Regulation 2019)

Time: 3 hrs | Max. Marks: 100

CO1	Apply the fundamental concepts of computer graphics and its tools in a generic framework.
CO2	Create and manipulating geometric models using curves, surfaces and solids.
CO3	Apply concept of CAD systems for 3D modeling and visual realism.
CO4	Create and adding geometric tolerances in assembly modeling.
CO5	Apply standard CAD practices in engineering design.

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A (10x2=20 Marks)
(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	Define Product cycle.	2	1	1
2	How are homogeneous coordinates represented?	2	1	2
3	Describe the engineering applications of cubic splines.	2	2	2
4	What is a Coon surface?	2	2	1
5	Explain the depth-buffer algorithm.	2	3	2
6	Define computer animation.	2	3	1
7	What is Assembly Modeling?	2	4	1
8	When is Geometric Dimensioning and Tolerancing used?	2	4	2
9	Why are graphic standards necessary?	2	5	2
10	Draw the three layer architecture of STEP.	2	5	2

PART- B (5x 13=65 Marks)
(Restrict to a maximum of 2 subdivisions)

Q.No.	Questions	Marks	CO	BL
11 (a)	Illustrate the CAD process with a block diagram and relevant examples.	13	1	3
	OR			
11 (b)	Demonstrate the following 2D transformations with an appropriate example: (i). Scaling (ii). Translation (iii). Rotation.	4+4+5	1	3
12 (a)	Find the parametric equation of the Bezier curve whose end points are P_0 (0,0) & P_3 (7,0). The other control points are P_1 (7,0) &P_2(7,6). Also plot the curve for u = 0, 0.2, 0.4, 0.6, 0.8 and 1.	13	2	4
	OR			

12 (b)	Compare the CSG and B-Rep solid modeling techniques to describe how complex objects are created and represented.	**13**	2	4
13 (a)	Apply the Warnock algorithm to solve hidden surface problems in 3D graphics.	**13**	3	3
	OR			
13 (b)	Apply Phong and Gouraud shading techniques to render lighting effects in 3D models.	**13**	3	3
14 (a)	Analyze the different mass properties used in CAD/CAM systems and explain their significance in design.	**13**	4	4
	OR			
14 (b)	Evaluate the following traditional tolerance analysis methods, and illustrate their application with examples: (i) Worst Case Analysis (ii) Root Sum of Squares.	**7+6**	4	4
15 (a)	Analyze the key features of the Graphical Kernel System (GKS) in graphical applications.	**13**	5	4
	OR			
15 (b)	Examine the various approaches to DXF in data exchange.	**13**	5	4

PART- C (1x 15=15 Marks)

(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16.	Evaluate the importance of clipping algorithms in design applications and create a solution using Cohen Sutherland clipping algorithm to solve a specific design problem.	**15**	1	5