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Question Paper Code: BCCB01



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

## MODEL QUESTION PAPER-II

M.Tech I Semester End Examinations, January - 2020

**Regulations: IARE - R18**

## ADVANCED COMPUTER AIDED DESIGN

(CAD / CAM)

**Time: 3 hours**

**Max. Marks: 70**

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Answer ONE Question from Each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

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### UNIT-I

1. (a) Explain Bresenham's algorithm for curve/ ellipse drawing [7M]  
(b) Consider a square with left bottom corner with [2,2] and right top corner is [6,6], find the result when it scale to half and scaled to double. [7M]
2. (a) Explain the various graphic transformations required for manipulating the geometric information. [7M]  
(b) Write notes on windowing and viewing transformations. [7M]

### UNIT-II

3. (a) Explain the order of continuity of curves with neat sketches [7M]  
(b) How graphic exchange formats are useful in CAD data exchange [7M]
4. (a) A Bezier curve is to be constructed using control point P(35,30) , P1(25,0) P2(15,25) and P3(5,10). The Bezier curve is anchored at P0 and P3. Find the equation of the Bezier curve and plot the curve for  $u=0,0.2,0.4,0.6,0.8$  and 1 [7M]  
(b) Two end points of a diameter of a circle are P1(3,5,7) and P2(25,40,7). Determine the center and radius of circle [7M]

### UNIT-III

5. (a) Explain Coons patch with neat diagrams [7M]  
(b) Explain the characteristics of B spline surfaces with neat sketches [7M]
6. (a) How CAD surface models are useful in medical field [7M]  
(b) Explain the significant role of surface modeling compared to solid modeling [7M]

### UNIT-IV

7. (a) What are the advantages and disadvantages of hermite cubic surface modelling. [7M]  
(b) Explain the parametric properties of B-spline surface and its industrial applications. [7M]
8. (a) Explain synthetic surfaces with neat sketches [7M]  
(b) A cubic spline surface has start point P0(14,-1) and end point P1(-3,0). The tangent vector for end point P0 is given by the line joining P0 and point P2( 12,8). Tangent vector for end point P1 is given by the line joining and point P2. [7M]
  1. Determine the parametric equation of the hermite cubic surface
  2. Plot the hermite cubic surface

## UNIT-V

9. (a) Explain the concept of FEM briefly and outline the steps involved in FEM along with applications with neat diagrams. [7M]
- (b) Categorize different types of data exchange formats used in CAD systems. Also Write a brief note on Mechanical tolerances and mass property calculations. [7M]
- 10 (a) Organize the structure of collaborative engineering and its applicability in industrial sectors. Explain how data exchange formats are useful in the collaborative engineering applications. [7M]
- (b) Explain assembly sequence analysis with neat sketch [7M]



# INSTITUTE OF AERONAUTICAL ENGINEERING (Autonomous)

## COURSE OBJECTIVES (COs):

The course should enable the students to:

I	Understand of basic trends in design and modeling applicable to CAD/CAM.
II	Applying the CAD tools for designing.
III	Create surface and geometric models.

## COURSE OUTCOMES (COs):

CO1	Understand the principles of computer graphics with mathematical simulation
CO2	Understand the coordinate systems and transformation in graphics
CO3	Understand representations of surface modelling
CO4	Development of synthetic surface and its transformations
CO5	Analyze 3D - Geometric models to solve real time problems

## COURSE LEARNING OUTCOMES (CLOs):

Students, who complete the course, will have demonstrated the asking to do the following:

BCCB01.01	Understand the basic concepts of Computer graphics
BCCB01.02	Understand the basic primitives algorithms
BCCB01.03	Apply the 2D and 3D transformations
BCCB01.04	Understand the various CAD tools
BCCB01.05	Understand the various graphic standards associated to CAD
BCCB01.06	Understand the representation of curves
BCCB01.07	Understand the mathematical representation of analytical surfaces
BCCB01.08	Understand the parametric representation of analytical surfaces
BCCB01.09	Apply the analytical surfaces in CAD modeling
BCCB01.10	Understand the mathematical representation of synthetic surfaces
BCCB01.11	Understand the parametric representation of synthetic surfaces
BCCB01.12	Apply the synthetic surfaces in CAD modeling
BCCB01.13	Understand boundary representation and Constructive Solid Geometry
BCCB01.14	Apply the data exchange formats for data transfer
BCCB01.15	Design and analyze the engineering problems

**MAPPING OF SEMESTER END EXAMINATION TO COURSE LEARNING OUTCOMES**

<b>SEE Question No</b>	<b>Course Learning Outcomes (CLOs)</b>		<b>Course Outcomes</b>	<b>Blooms Taxonomy Level</b>	
1	a	BCCB01.01	Understand the basic concepts of Computer graphics	CO 1	Remember
	b	BCCB01.02	Understand the basic primitives algorithms	CO 1	Remember
2	a	BCCB01.01	Apply the 2D and 3D transformations	CO 1	Remember
	b	BCCB01.02	Understand the various CAD tools	CO 1	Remember
3	a	BCCB01.04	Understand the various graphic standards associated to CAD	CO 2	Remember
	b	BCCB01.03	Understand the representation of curves	CO 2	Remember
4	a	BCCB01.04	Understand the mathematical representation of analytical surfaces	CO 2	Understand
	b	BCCB01.07	Understand the parametric representation of analytical surfaces	CO 2	Understand
5	a	BCCB01.06	Apply the analytical surfaces in CAD modeling	CO 3	Remember
	b	BCCB01.07	Understand the basic concepts of Computer graphics	CO 3	Remember
6	a	BCCB01.06	Understand the basic primitives algorithms	CO 3	Understand
	b	BCCB01.07	Apply the 2D and 3D transformations	CO 3	Understand
7	a	BCCB01.08	Understand the various CAD tools	CO 4	Understand
	b	BCCB01.09	Understand the various graphic standards associated to CAD	CO 4	Understand
8	a	BCCB01.10	Understand the mathematical representation of synthetic surfaces	CO 4	Understand
	b	BCCB01.11	Understand the parametric representation of synthetic surfaces	CO 4	Understand
9	a	BCCB01.12	Apply the synthetic surfaces in CAD modeling	CO 5	Understand
	b	BCCB01.13	Understand boundary representation and Constructive Solid Geometry	CO 5	Understand
10	a	BCCB01.14	Apply the data exchange formats for data transfer	CO 5	Remember
	b	BCCB01.15	Design and analyze the engineering problems	CO 5	Remember

**Signature of Course Coordinator**

**HOD, ME**