INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

MECHANICAL ENGINEERING

TUTORIAL QUESTION BANK

Course Title	**ADVANCED COMPUTER AIDED DESIGN**				
Course Code	BCCB01				
Programme	M.Tech				
Semester	I				
Course Type	Core				
Regulation	**IARE - R18**				
Course Structure	**Theory**			**Practical**	
	Lectures	**Tutorials**	**Credits**	**Laboratory**	**Credits**
	3	-	3	-	-
Course Faculty	Dr. K Raghu Ram Mohan Reddy, Professor, ME				

COURSE OBJECTIVES:

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:

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

S No	QUESTION BANK	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes
	UNIT – I **PRINCIPLE OF COMPUTER GRAPHICS**			
Part - A (Short Answer Questions)				
1	Describe the various advantages to be gained by the adoption of CAD.	Remember	CO1	BCCB01.01
2	Discuss the advantages to be gained by the adoption of CAM.	Remember	CO1	BCCB01.01
3	Write short note on coordinate systems.	Understand	CO1	BCCB01.02
4	Write short note on view port.	Remember	CO1	BCCB01.02
5	Explain the point plotting.	Understand	CO1	BCCB01.02
6	Explain the concept of reflection.	Understand	CO1	BCCB01.02
7	Explain the graphic primitives.	Understand	CO1	BCCB01.02
8	Explain the concatenation of transformation.	Understand	CO1	BCCB01.03
9	What is transformation of geometry?	Remember	CO1	BCCB01.03
10	Explain the concept hidden surface removal.	Understand	CO1	BCCB01.03
11	What are the line drawing algorithms available?	Remember	CO1	BCCB01.03
12	Define Window ?	Remember	CO1	BCCB01.02
13	What do you mean by translation?	Remember	CO1	BCCB01.02
14	Define rotation?	Remember	CO1	BCCB01.02
15	What is computer Graphics?	Understand	CO1	BCCB01.03
16	Explain the advantages of computer graphics	Understand	CO1	BCCB01.03
17	Explain the application of computer graphics	Understand	CO1	BCCB01.02
18	What is point clipping	Understand	CO1	BCCB01.02
19	What is line clipping	Understand	CO1	BCCB01.02
20	What is polygon clipping	Understand	CO1	BCCB01.03
Part - B (Long Answer Questions)				
1	Explain the Bresenham's algorithm.	Understand	CO1	BCCB01.01
2	Explain the 2D transformations with examples	Understand	CO1	BCCB01.01
3	Explain the concept of hidden surface removal process.	Understand	CO1	BCCB01.01
4	Explain the concept of reflection.	Understand	CO1	BCCB01.01
5	Explain the shading and generation character.	Remember	CO1	BCCB01.01
6	How the interactive graphics display works?	Remember	CO1	BCCB01.01
7	Explain Bresenham's algorithm for line drawing	Remember	CO1	BCCB01.02

8	Explain Bresenham's algorithm for circle drawing	Remember	CO1	BCCB01.02
9	Explain Bresenham's algorithm for curve/ ellipse drawing	Remember	CO1	BCCB01.02
10	What is the use of frame buffers?	Remember	CO1	BCCB01.02
11	Explain the advantages and different applications of computer graphics	Understand	CO1	BCCB01.02
12	Explain the 3D transformations with examples	Remember	CO1	BCCB01.03
13	Locate the new position of a triangle [A (5, 4), B (8, 3), C (8, 8)] after its rotation by 90^0 clockwise about the origin.	Analyze	CO1	BCCB01.03
14	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.	Analyze	CO1	BCCB01.03
15	Shear the unit square in Y direction with shear parameter ½ relative to line X= -1.	Analyze	CO1	BCCB01.03
16	Translate the given point P (10,10,10) into 3D space with translation factor T (10,20,5)	Analyze	CO1	BCCB01.03
17	Find the final result when a point (5,5,5) rotate about Z axis with an angle of 30^0	Analyze	CO1	BCCB01.03
18	Find the final result when a point (5,5,1) rotate about Y axis with an angle of 60^0	Analyze	CO1	BCCB01.03
19	Find the final result when a point (5,2,5) rotate about X axis with an angle of 45^0	Analyze	CO1	BCCB01.03
20	Scale the line AB with coordinates (10,20,10) and (20,30,30) respectively with scale factor S(3,2,4)	Analyze	CO1	BCCB01.03
Part - C (Problem Solving and Critical Thinking Questions)				
1.	Explain the various graphic transformations required for manipulating the geometric information.	Understand	CO1	BCCB01.01
2.	What is the need for concatenation of transformation? Explain the care to be taken in such cases.	Remember	CO1	BCCB01.01
3.	Explain why homogeneous coordinate system is generally used in graphic in place of a normal coordinate system, in particular for software implementation. Give an example to illustrate the advantage.	Understand	CO1	BCCB01.01
4.	Explain the concept of obtaining a reflection about an arbitrary liner starting from the plain reflection about axis.	Understand	CO1	BCCB01.02
5.	Explain with neat sketches the different techniques for the hidden surface removal.	Understand	CO1	BCCB01.02
6	Explain the two dimensional transformations available	Understand	CO1	BCCB01.02
7	Write notes on windowing and viewing transformations.	Understand	CO1	BCCB01.02
8	How shading helps to visual realism	Remember	CO1	BCCB01.03
9	How reflection of a line in computer graphics will execute	Remember	CO1	BCCB01.03
10	Explain shading and generation of character.	Understand	CO1	BCCB01.03
UNIT-II CAD TOOLS				
Part – A (Short Answer Questions)				
1	Discuss the various wire frame entities.	Understand	CO2	BCCB01.04
2	Discuss the concept of parametric representation of curves.	Understand	CO2	BCCB01.04
3	Discuss the various geometrical modeling.	Remember	CO2	BCCB01.04
4	Explain about input and output devices.	Remember	CO2	BCCB01.04
5	Explain the components present in the graphic terminal.	Remember	CO2	BCCB01.04
6	Discuss interpolation of a curve.	Remember	CO2	BCCB01.05
7	Explain the Bezier curves.	Remember	CO2	BCCB01.06
8	Explain the B-Spline curves	Remember	CO2	BCCB01.06
9	Explain the wire frame modeling	Understand	CO2	BCCB01.05
10	Write short notes on input and output devices in CAD	Remember	CO2	BCCB01.05
11	What is wire frame modeling?	Understand	CO2	BCCB01.05
12	What is surface modeling?	Understand	CO2	BCCB01.05
13	What is solid modeling?	Understand	CO2	BCCB01.05
14	What are the solid primitives?	Understand	CO2	BCCB01.05

15	What are the Boolean operations?	Understand	CO2	BCCB01.05
16	List out various graphic standards.	Remember	CO2	BCCB01.05
17	What are the CAD software packages available in market?	Understand	CO2	BCCB01.06
18	What is meant by Engineering analysis?	Understand	CO2	BCCB01.06
19	What do you understand by the term “Design Review and Evaluation”	Understand	CO2	BCCB01.06
20	What is meant by curve degree in splines?	Understand	CO2	BCCB01.06
Part - B (Long Answer Questions)				
1	Explain the parametric representation for Bezier curves.	Understand	CO2	BCCB01.04
2	Describe in detail about the parametric representation for B-spline curves	Understand	CO2	BCCB01.04
3	Explain the parametric representation for hermite cubic curves.	Understand	CO2	BCCB01.04
4	Write briefly the curve Representation methods.	Remember	CO2	BCCB01.04
5	Explain the computation of rotational and transactional accuracy.	Understand	CO2	BCCB01.06
6	Distinguish between approximation and interpolation of curves.	Understand	CO2	BCCB01.06
7	Distinguish between hermite cubic curves and B-spline curves.	Understand	CO2	BCCB01.06
8	Explain the advantage and difficulties associated in wire frame modeling	Understand	CO2	BCCB01.04
9	Explain the evolution criteria of CAD.	Understand	CO2	BCCB01.04
10	Explain the order of continuity of curves with neat sketches	Understand	CO2	BCCB01.05
11	Discuss in detail about modeling and viewing with neat diagrams	Remember	CO2	BCCB01.05
12	What are the characteristics of B spline curves? Explain with neat sketches.	Remember	CO2	BCCB01.05
13	How Bezier curves are different from B-Spline curves	Understand	CO2	BCCB01.06
14	How graphic exchange formats are useful in CAD data exchange	Understand	CO2	BCCB01.06
15	For the position vectors P1[1,2] and P2[4,3] . Determine the parametric representation of the line segment between them. Also determine the slope and tangent of line segment.	Analyze	CO2	BCCB01.06
16	The end points of line are P1(1,3,7) and P2(-4, 5, -3). Determine i) Tangent vector of the line. ii) Length of the line. iii) Unit vector of the line	Analyze	CO2	BCCB01.06
17	Two end points of a diameter of a circle are P1(13,15,17) and P2(35,40,7). Determine the center and radius of circle	Analyze	CO2	BCCB01.06
18	A cubic spline curve has start point P0(16,0) and end point P1(3,1). The tangent vector for end point P0 is give by the line joining P0 and point P2(14,8). Tangent vector for end point P1 is given by the line joining and point P2. 1. Determine the parametric equation of the hermite cubic curve 2. Plot the hermite cubic curve	Analyze	CO2	BCCB01.06
19	The end points of a cubic spline curve are P0(1,2) and P1(7,1). The tangent vector for end point P0 is give by the line joining P0 and point P2(-2,1) .The tangent vector for end point P0 is given by the line joining P3(9,-2) and point P1. 1.Determine the parametric equation of the hermite cubic curve 2. Determine the parametric equation for tangent vector 3.Plot the hermite cubic curve	Analyze	CO2	BCCB01.06
20	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	Analyze	CO2	BCCB01.06
Part – C (Problem Solving and Critical Thinking)				
1	Explain with neat sketches about parametric representation for Hermite curves.	Remember	CO2	BCCB01.04
2	Explain with neat sketches about parametric representation for B-spline curves .	Remember	CO2	BCCB01.04
3	Explain the parametric curve continuity conditions.	Understand	CO2	BCCB01.04
4	Distinguish between 2D and 3D wireframe models	Remember	CO2	BCCB01.05
5	Explain with neat sketches, parametric representation for interpolated curves.	Understand	CO2	BCCB01.05
6	Explain GKS systems to implement data exchange in CAD	Understand	CO2	BCCB01.05

7	A line is represented by the end points P1 (2,4,6) and P2(3,6,9), if the value of parameter u at P1 and P2 is 0 and1 respectively. Determine the tangent vector of the line, Also determine the coordinates of the point represented by u equal to 0,0.25,-0.025,1 and 1.5. Also find length and unit vector of the line between two points P1 and P2	Analyze	CO2	BCCB01.06
8	Plot a Bezier curve using the following control points (2,0), (4,3),(5,2),(4,-2),(5,-3) and (6,-2)	Analyze	CO2	BCCB01.06
9	A Bezier curve is to be constructed using control point P(15,20) , P1(25,10) P2(35,25) and P3(45,10). 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	Analyze	CO2	BCCB01.06
10	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	Analyze	CO2	BCCB01.06
	UNIT-III **SURFACE MODELING**			
Part - A (Short Answer Questions)				
1	Explain the different types of surfaces.	Remember	CO3	BCCB01.07
2	Explain the parametric representation for plane surface.	Remember	CO3	BCCB01.07
3	Define i) Single curved surface ii) Double curved surface.	Remember	CO3	BCCB01.07
	Define i) Free form surface ii) Planar surface.	Remember	CO3	BCCB01.07
5	Explain about surface model.	Remember	CO3	BCCB01.07
6	Explain the parametric representation for tabulated cylinder.	Understand	CO3	BCCB06.08
7	Write the parametric representation for surface of revolution.	Understand	CO3	BCCB06.08
8	Explain the parametric representation for ruled surface.	Understand	CO3	BCCB06.08
9	Write the parametric representation for sculptured surface.	Understand	CO3	BCCB06.08
10	Explain about blending.	Remember	CO3	BCCB06.08
11	What is ruled surface?	Remember	CO3	BCCB06.08
12	Discuss about plane surface?	Remember	CO3	BCCB06.08
13	What is surface of revolution?	Remember	CO3	BCCB06.08
14	What is tabulated cylinder surface?	Remember	CO3	BCCB06.08
15	What do you understand by parametric surface?	Understand	CO3	BCCB06.08
16	What do you understand by non-parametric surface?	Understand	CO3	BCCB06.08
17	What are the advantages of surface modeling compared to wire frame modeling?	Understand	CO3	BCCB06.08
18	Writ any two applications of tabulated cylinder surface	Understand	CO3	BCCB06.08
19	Writ any two applications of ruled surface	Understand	CO3	BCCB06.08
20	Writ any two applications of surface of revolution	Understand	CO3	BCCB06.08
Part – B (Long Answer Questions)				
1	Explain the types of surfaces that CAD/CAM systems use.	Understand	CO3	BCCB01.07
2	Discuss the parametric properties of plane surface and its industrial applications.	Remember	CO3	BCCB01.07
3	Describe with the help of neat sketches the major surface entities provided by CAD/CAM systems.	Understand	CO3	BCCB01.07
4	Discuss about the parametric properties of sculptured surface and its industrial applications.	Remember	CO3	BCCB01.07
5	Explain briefly the requirements of a graphic database.	Understand	CO3	BCCB01.07
6	Explain about the parametric properties of tabulated cylinder and its industrial applications.	Understand	CO3	BCCB01.07
7	Explain about the parametric properties of surface of revolution and its industrial applications.	Understand	CO3	BCCB06.08
8	Explain Coons patch with neat diagrams	Understand	CO3	BCCB06.08
9	Discuss the practical applications of coons patch	Remember	CO3	BCCB06.08
10	How fillet surface is useful in industrial designs	Understand	CO3	BCCB06.08
11	Explain surface models with neat sketches	Remember	CO3	BCCB06.08
12	How CAD surface models are useful in medical field	Understand	CO3	BCCB06.08

13	Explain the surface models for ship building designs	Understand	CO3	BCCB06.08
14	What is the significant role of surface modeling compared to solid modeling	Remember	CO3	BCCB06.08
15	Explain the domestic design surface models	Understand	CO3	BCCB06.08
16	Explain the characteristics of Bezier curves	Understand	CO3	BCCB01.09
17	What are the advantages of Bezier curves over B spline curves?	Understand	CO3	BCCB01.09
18	How control points can be modified as per the design requirements	Understand	CO3	BCCB01.09
19	What are the problems with sculptured surfaces? Explain with an examples if any.	Understand	CO3	BCCB01.09
20	Explain the advantages of ruled surface and sculptured surface	Understand	CO3	BCCB01.09
Part - C (Problem Solving and Critical Thinking Questions)				
1	Distinguish between ruled surface and plane surface	Understand	CO3	BCCB01.07
2	Explain the parametric properties of Ruled surface and its industrial applications	Understand	CO3	BCCB01.07
3	Explain the parametric properties of plane surface and its industrial applications	Remember	CO3	BCCB01.07
4	Discuss about the parametric properties of sculptured surface and its industrial applications.	Remember	CO3	BCCB01.07
5	Distinguish between ruled surface and sculptured surface	Understand	CO3	
6	A Bezier surface constructed using control point P(25,20) , P1(35,10) P2(45,25) and P3(55,10). The Bezier curve is anchored at P0 and P3. Find the equation of the Bezier curve and plot the curv e for u=0,0.2,0.4,0.6,0.8 and 1	Analyze	CO3	BCCB01.09
7	Plot a Bezier surface using the following control points (4,0), (6,3),(5,3),(4,-2),(5,-3) and (6,-2)	Analyze	CO3	BCCB01.09
8	Plot a Bezier surface using the following control points (6,0), (4,3),(7,3),(4,-3),(5,-3) and (7,-2)	Analyze	CO3	BCCB01.09
9	Explain blending functions in details with neat sketches	Understand	CO3	BCCB01.08
10	Explain the characteristics of B spline surfaces with neat sketches	Understand	CO3	BCCB01.08
UNIT-IV PARAMETRIC REPRESENTATION OF SYNTHETIC SURFACES				
Part - A (Short Answer Questions)				
1	Explain the parametric representation for Bezier surface .	Understand	CO4	BCCB01.10
2	Explain the parametric representation for B-spline surface .	Remember	CO4	BCCB01.10
3	Discuss the parametric representation for hermite cubic surface .	Remember	CO4	BCCB01.10
4	Explain the parametric representation for coons surface .	Remember	CO4	BCCB01.10
5	Illustrate the parametric representation for NURBS surface.	Understand	CO4	BCCB01.10
6	What are the advantages and disadvantages of surface modeling?	Remember	CO4	BCCB01.10
7	What are the advantages and disadvantages of Bezier surface modeling?	Remember	CO4	BCCB01.10
8	What are the advantages and disadvantages of B-spline surface modeling?	Remember	CO4	BCCB01.10
9	What are the advantages and disadvantages of hermite cubic surface modeling?	Remember	CO4	BCCB01.10
10	List out the advantages and disadvantages of NURBS surface modeling.	Remember	CO4	BCCB01.10
11	How rational BSpline curves are useful in CAD	Understand	CO4	BCCB01.11
12	How synthetic surfaces are better than analytical surfaces	Understand	CO4	BCCB01.11
13	Name synthetic surfaces	Understand	CO4	BCCB01.11
14	What is meant by control point of a hermite surface	Understand	CO4	BCCB01.11
15	Expand NURBS	Understand	CO4	BCCB01.12
16	What are the characteristics of NURBS	Understand	CO4	BCCB01.12
17	What is the basic difference between uniform and non-uniform rational surfaces	Understand	CO4	BCCB01.12
18	How coons patch will be chosen for industrial applications	Understand	CO4	BCCB01.12
19	What is curve degree of synthetic surface?	Remember	CO4	BCCB01.12
20	What will happen if curve degree increases in Splines?	Remember	CO4	BCCB01.12

Part – B (Long Answer Questions)				
1	Explain the parametric properties of Bezier surface and its industrial applications.	Understand	CO4	BCCB01.10
2	Explain the parametric properties of B-spline surface and its industrial applications.	Understand	CO4	BCCB01.10
3	List out the parametric properties of hermite cubic surface and its industrial applications.	Understand	CO4	BCCB01.10
4	Distinguish between Bezier surface and hermite cubic surface.	Understand	CO4	BCCB01.11
5	Compare and contrast the differences between Bezier surface and bi-cubic plane patch	Remember	CO4	BCCB01.11
6	Distinguish between Bezier surface and B-spline surface	Understand	CO4	BCCB01.11
7	Explain the parametric properties of bi-cubic plane patch and its industrial applications.	Understand	CO4	BCCB01.11
8	Explain synthetic surfaces with neat sketches	Understand	CO4	BCCB01.11
9	Plot a Bezier surface using the following control points (4,0), (5,3),(6,2),(4,-2),(5,-3) and (6,-2)	Analyze	CO4	BCCB01.12
10	Plot a Bezier surface using the following control points (2,-2), (4,3),(5,2),(4,-2),(5,-3) and (-6,2)	Analyze	CO4	BCCB01.12
11	Plot a Bezier surface using the following control points (-2,-10), (4,-3),(-5,2),(4,-2),(5,-3) and (6,-2)	Analyze	CO4	BCCB01.12
12	A cubic spline surface has start point P0(16,1) and end point P1(3,0). The tangent vector for end point P0 is give 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. 1. Determine the parametric equation of the hermite cubic surface 2. Plot the hermite cubic surface	Analyze	CO4	BCCB01.12
13	The end points of a cubic spline surface are P0(-1,2) and P1(5,1). The tangent vector for end poit P0 is give by the line joining P0 and point P2(-2,1) .The tangent vector for end point P0 is giveb by the line joining P3(-9,2) and point P1. 1.Determine the parametric equation of the hermite cubic surface 2. Determine the parametric equation for tangent vector 3.Plot the hermite cubic surface	Analyze	CO4	BCCB01.12
14	Plot a Bezier surface using the following control points (5,0), (1,3),(6,-2),(4,-2),(5,-3) and (3,-2)	Analyze	CO4	BCCB01.12
15	Explain how surfaces are manipulated with neat sketches	Understand	CO4	BCCB01.11
16	How surfaces are formed with interpolation and approximation technique	Understand	CO4	BCCB01.11
17	What are the advantages of B spline surfaces over hermite surfaces?	Understand	CO4	BCCB01.11
18	Is coons patch applicable for damaged drawings	Understand	CO4	BCCB01.11
19	What are the limitations of B spline curves?	Understand	CO4	BCCB01.11
20	Plot a Bezier surface using the following control points (8,-2), (1,3),(6,-2),(4,-2),(5,-3) and (3,-2)	Analyze	CO4	BCCB01.12
Part - C (Problem Solving and Critical Thinking Questions)				
1	Distinguish between interpolation and approximation approaches used in design of surfaces.	Understand	CO4	BCCB01.10
2	Explain the procedure to ensure convex hull property in Bezier surface. Describe the effect of characteristic polyhedron over the resulting Bezier surface.	Understand	CO4	BCCB01.10
3	Explain the blending functions required in practical solid modeling Applications.	Remember	CO4	BCCB01.10
4	Explain in detail about data structure and its importance.	Understand	CO4	BCCB01.11
5	Discuss in detail about blending function. Explain re-parameterization of a surface.	Understand	CO4	BCCB01.11
6	Plot a Bezier surface using the following control points (3,0), (5,3),(6,2),(4,-2),(5,-3), (7,-2) and (6,-3)	Remember	CO4	BCCB01.12
7	A cubic spline surface has start point P0(14,-1) and end point P1(-3,0). The tangent vector for end point P0 is give by the line joining P0 and	Understand	CO4	BCCB01.12

	point P2(12,8). Tangent vector for end point P1 is given by the line joining and point P2. 1. Determine the parametric equation of the hermite cubic surface 2. Plot the hermite cubic surface			
8	The end points of a cubic spline surface are P0(-1,3) and P1(-5,1). The tangent vector for end point P0 is give by the line joining P0 and point P2(-2,1) .The tangent vector for end point P0 is given by the line joining P3(-9,2) and point P1. 1.Determine the parametric equation of the hermite cubic surface 2. Determine the parametric equation for tangent vector 3.Plot the hermite cubic surface	Understand	CO4	BCCB01.12
9	Plot a Bezier surface using the following control points (3,-10), (5,-3),(-5,2),(4,-2),(9,-3) and (6,-2)	Understand	CO4	BCCB01.12
10	Plot a Bezier surface using the following control points (-2,-2), (4,-3),(-1,2),(4,-2),(5,-3) and (6,-2)	Understand	CO4	BCCB01.12
UNIT- V GEOMETRIC MODELLING -3D				
Part - A (Short Answer Questions)				
1	What is solid modeling?	Remember	CO5	BCCB01.13
2	What are the solid primitives?	Remember	CO5	BCCB01.13
3	How boolean operations are useful in solid modeling	Understand	CO5	BCCB01.13
4	What is meant by B-Rep?	Remember	CO5	BCCB01.13
5	What is meant by CSG?	Remember	CO5	BCCB01.13
6	What is the basic difference between B-Rep and CSG	Remember	CO5	BCCB01.13
7	Name some CAD data exchange standards	Remember	CO5	BCCB01.13
8	Explain the isoparametric elements.	Understand	CO5	BCCB01.13
9	What are non linear elements?	Remember	CO5	BCCB01.13
10	Explain the flexibility methods used in FEA.	Understand	CO5	BCCB01.13
11	Explain the stiffness methods used in FEA.	Understand	CO5	BCCB01.13
12	List out various exchange formats	Remember	CO5	BCCB01.14
13	Explain the IGES data representations	Remember	CO5	BCCB01.14
14	Explain the STEP Architecture	Remember	CO5	BCCB01.14
15	Define Mechanical tolerances	Remember	CO5	BCCB01.15
16	How mechanical tolerance is considered in CAD	Understand	CO5	BCCB01.15
17	What is the advantage of CAD assembly module	Understand	CO5	BCCB01.15
18	Explain the Collaborative design	Remember	CO5	BCCB01.15
19	List out various tools in collaborative design	Remember	CO5	BCCB01.15
20	Explain briefly about various principles of collaborative engineering	Remember	CO5	BCCB01.15
Part – B (Long Answer Questions)				
1	Explain about the capabilities of a typical general purpose FEA package?	Understand	CO5	BCCB01.13
2	Explain briefly about the various data exchange systems currently in use.	Understand	CO5	BCCB01.13
3	Explain briefly the requirements of a graphic database.	Understand	CO5	BCCB01.13
4	What is the importance of a programming language within a modeling system?	Remember	CO5	BCCB01.13
5	Distinguish between flexibility and stiffness methods used in FEA.	Understand	CO5	BCCB01.13
6	Distinguish between isoparametric and non linear elements.	Understand	CO5	BCCB01.13
7	Describe the step by step procedure in solving a design problem using a FEA package.	Remember	CO5	BCCB01.13
8	Explain the concept of FEM briefly and outline the steps involved in FEM along with applications with neat diagrams.	Understand	CO5	BCCB01.13
9	The model database can be organized in various ways. Briefly explain the following possible data structures (i) Storing the coordinates of geometry (ii) Including the graph based model (iii) Using Boolean operations	Understand	CO5	BCCB01.13

10	Discuss about CSG representation in solid modeling? Explain the importance in the construction of the topology models with examples.	Understand	CO5	BCCB01.13
11	Differentiate among bar element, truss element and beam element indicating degree of freedom and geometry characteristics for determining stiffness matrix.	Understand	CO5	BCCB01.15
12	Describe the considerations in selecting elements to model the following: i. Column of a machine tool ii. Connecting rod of an engine iii. Spindle of a lathe iv. Flywheel of a diesel engine	Understand	CO5	BCCB01.15
13	Categorize different types of data exchange formats used in CAD systems. Also Write a brief note on Mechanical tolerances and mass property calculations.	Understand	CO5	BCCB01.13
14	Summarize about B- representation in solid modeling and the importance in the construction of the B-rep solid models with examples.	Understand	CO5	BCCB01.13
15	Organize the structure of collaborative engineering and its applicability in industrial sectors. Explain how data exchange formats are useful in the collaborative engineering applications.	Understand	CO5	BCCB01.14
16	Describe the evaluation of data and exchange format in detail	Understand	CO5	BCCB01.14
17	Explain the data recovery procedure during data transfer in CAD	Understand	CO5	BCCB01.14
18	Explain the following: i) IGES ii) STEP iii) ACIS iv) DXF	Understand	CO5	BCCB01.14
19	Explain top down assembly method	Understand	CO5	BCCB01.15
20	Explain bottom up assembly method	Understand	CO5	BCCB01.15
Part - C (Problem Solving and Critical Thinking Questions)				
1	Explain how data exchange formats are useful in CAD assembly	Remember	CO5	BCCB01.13
2	Describe in detail about STEP architecture with neat diagram.	Understand	CO5	BCCB01.13
3	Explain about the ACIS and DXF formats in the implementation of CAD	Understand	CO5	BCCB01.13
4	Explain about the various techniques in Solid modelling	Understand	CO5	BCCB01.14
5	Explain about the different approaches used in implementation of collaborative engineering.	Understand	CO5	BCCB01.15
6	Explain in detail about the principles involved in collaborative engineering	Understand	CO5	BCCB01.15
7	How can you find the best assembly sequence	Remember	CO5	BCCB01.15
8	Explain assembly sequence analysis with neat sketch	Understand	CO5	BCCB01.15
9	Explain the mechanical tolerancing with an example	Remember	CO5	BCCB01.15
10	Derive the governing equation for mass property calculation	Understand	CO5	BCCB01.15

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