INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal, Hyderabad -500 043

MECHANICAL ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	Advanced CAD
Course Code	:	BCC001
Class	:	M. Tech I Semester CAD/CAM
Branch	:	Mechanical
Year	:	2017 – 2018
Course Coordinator	:	A VENU PRASAD

OBJECTIVES

Computer Aided Design / Computer Aided Manufacturing is a course of primary important to mechanical Engineering students. The aim is to impart the Over view of computer applications for design and manufacturing the aircraft components, assemblies and final product to meet the global competition. The course covers the Lifecycle of a product, describes the product model generation, analysis for structural, thermal, dynamic behaviours. Explains the creation of synthetic curves and surfaces. It impose the knowledge of latest manufacturing techniques using CNC/DNC Machine centres with different CNC programming methods, Manufacturing processes, group technologies .It make the student to understand the modern inspection methods and concepts of CIM.

S No	QUESTION BANK	Blooms taxonomy level	Course Outcomes
	UNIT – I **PRINCIPLE OF COMPUTER GRAPHICS**		
Part - A (Short Answer Questions)			
1	Explain the advantages to be gained by the adoption of CAD.	Remember	1
2	Explain the advantages to be gained by the adoption of CAM.	Remember	1
3	Explain the coordinate systems.	Understand	1
4	Explain the view port.	Understand	1
5	Explain the point plotting.	Understand	1
6	Explain the concept of reflection.	Understand	1
7	Explain the graphic primitives.	Understand	1
8	Explain the concatenation of transformation.	Understand	1
9	Explain the transformation of geometry.	Understand	1
10	Explain the concept hidden surface removal.	Understand	1
Part - B (Long Answer Questions)			
1	Explain the Bresenham's algorithm.	Remember	1
2	Explain the 2D Transformation.	Remember	1
3	Explain the concept of hidden surface removal process.	Remember	1
4	Explain the concept of reflection.	Remember	1
5	Explain the shading and generation character.	Remember	1

	Part - C (Problem Solving and Critical Thinking Questions)		
1.	Explain the various graphic transformations required for manipulating the geometric information.	Understand	1
2.	What is the need for concatenation of transformation? Explain the care to be taken in such cases.	Remember	1
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	1
4.	Explain the concept of obtaining a reflection about an arbitrary liner starting from the plain reflection about axis.	Understand	1
5.	Explain with neat sketches the different techniques for the hidden surface removal.	Understand	1
	UNIT-II **CAD TOOLS**		
Part – A (Short Answer Questions)			
1	Discuss the various wire frame entities.	Understand	2
2	Discuss the concept of parametric representation of curves.	Understand	2
3	Discuss the various geometrical modelling.	Remember	2
4	Explain about input and output devices.	Remember	2
5	Explain the components present in the graphic terminal.	Remember	2
6	Discuss the an interpolation of a curve.	Remember	2
7	Explain the Bezier curves.	Remember	2
8	Explain the B-Spline curves	Remember	2
9	Explain the wire frame modelling	Understand	2
10	Explain the input and output devices in CAD	Understand	2
Part - B (Long Answer Questions)			
1	Explain the parametric representation for Bezier curves.	Understand	2
2	Explain the parametric representation for B-spline curves .	Understand	2
3	Explain the parametric representation for hermite cubic curves .	Understand	2
4	Explain the curve Representation methods.	Understand	2
5	Explain the computation of rotational and transactional accuracy.	Understand	2
6	Distinguish between approximation and interpolation of curves.		
7	Distinguish between hermite cubic curves and B-spline curves .		
Part – C (Problem Solving and Critical Thinking)			
1	Explain with neat sketches about parametric representation for Hermite curves.	Remember	2
2	Explain with neat sketches about parametric representation for B-spline curves .	Remember	2
3	Explain the parametric curve continuity conditions.	Understand	2
4	Distinguish between 2D and 3D wireframe models	Remember	2
5	Explain with neat sketches about parametric representation for interpolated curves	Understand	2
	UNIT-III **SURFACE MODELING**		
Part - A (Short Answer Questions)			
1	Explain the different types of surfaces.	Understand	3
2	Explain the parametric representation for plane surface.	Understand	3
3	Define i) Single curved surface ii) Double curved surface.	Understand	3
4	Define i) Free form surface ii) Planar surface.	Understand	3
5	Explain about surface model.	Remember	3
6	Explain the parametric representation for tabulated cylinder.	Understand	3
7	Explain the parametric representation for surface of revolution.	Understand	3
8	Explain the parametric representation for ruled surface.	Understand	3
9	Explain the parametric representation for sculptured surface.	Understand	3

10	Explain about blending.	Remember	3
Part – B (Long Answer Questions)			
1	Explain the types of surfaces that CAD/CAM systems use.	Understand	3
2	Discuss the parametric properties of plane surface and its industrial applications.	Understand	3
3	Describe with the help of neat sketches the major surface entities provided by CAD/CAM systems.	Understand	3
4	Discuss about the parametric properties of sculptured surface and its industrial applications.	Understand	3
5	Explain briefly the requirements of a graphic database.	Understand	3
6	Explain about the parametric properties of tabulated cylinder and its industrial applications.		
7	Explain about the parametric properties of surface of revolution and its industrial applications.		
Part - C (Problem Solving and Critical Thinking Questions)			
1	Distinguish between ruled surface and plane surface	Understand	3
2	Explain the parametric properties of Ruled surface and its industrial applications	Understand	3
3	Explain the parametric properties of plane surface and its industrial applications	Remember	3
4	Discuss about the parametric properties of sculptured surface and its industrial applications.	Remember	3
5	Distinguish between ruled surface and sculptured surface	Understand	3

<div align="center">

UNIT-IV
PARAMETRIC REPRESENTATION OF SYNTHETIC SURFACES

</div>

Part - A (Short Answer Questions)			
1	Explain the parametric representation for Bezier surface .	Remember	4
2	Explain the parametric representation for B-spline surface .	Remember	4
3	Explain the parametric representation for hermite cubic surface .	Remember	4
4	Explain the parametric representation for coons surface .	Remember	4
5	Explain the parametric representation for NURBS surface.	Remember	4
6	What are the advantages and disadvantages of surface modelling.	Remember	4
7	What are the advantages and disadvantages of Bezier surface modelling.	Remember	4
8	What are the advantages and disadvantages of B-spline surface modelling.	Remember	4
9	What are the advantages and disadvantages of hermite cubic surface modelling.	Remember	4
10	What are the advantages and disadvantages of NURBS surface. modelling.	Remember	4
Part – B (Long Answer Questions)			
1	Explain the parametric properties of Bezier surface and its industrial applications.	Understand	4
2	Explain the parametric properties of B-spline surface and its industrial applications.	Understand	4
3	Explain the parametric properties of hermite cubic surface and its industrial applications.	Understand	4
4	Distinguish between Bezier surface and hermite cubic surface.	Create	4
5	Distinguish between Bezier surface and bi-cubic plane patch	Create	4
6	Distinguish between Bezier surface and B-spline surface	Create	4
7	Explain the parametric properties of bi-cubic plane patch and its industrial applications.	Understand	4
Part - C (Problem Solving and Critical Thinking Questions)			
1	Distinguish between interpolation and approximation approaches used in design of surfaces.	Create	4
2	Explain the procedure to ensure convex hull property in Bezier surface. Describe the effect of characteristic polyhedron over the resulting Bezier surface.	Create	4
3	Explain the blending functions required in practical solid modeling Applications.	Create	4
4	Explain in detail about data structure and its importance.	Create	4
5	Discuss blending function. Explain reparametrisation of a surface.	Create	4

UNIT- V GEOMETRIC MODELLING -3D		
Part - A (Short Answer Questions)		
1 Explain the isoparametric elements.	Remember	5
2 Explain the non linear elements.	Remember	5
3 Explain the flexibility methods used in FEA.	Remember	5
4 Explain the stiffness methods used in FEA.	Remember	5
5 List various exchange formats	Remember	5
6 Explain the IGES data representations	Remember	5
7 Explain the STEP Architecture	Remember	5
8 Define Mechanical tolerances	Remember	5
9 Explain the Collaborative design	Remember	5
10 Explain about various principles of collaborative engineering	Remember	5
Part – B (Long Answer Questions)		
1 Explain about the capabilities of a typical general purpose FEA package?	Understand	5
2 Explain briefly the various data exchange systems currently in use.	Understand	5
3 Explain briefly the requirements of a graphic database.	Understand	5
4 Explain the importance of a programming language within a modeling system	Understand	5
5 Distinguish between flexibility and stiffness methods used in FEA.	Understand	5
6 Distinguish between isoparametric and non linear elements.	Understand	5
7 Describe the step by step procedure in solving a design problem using a FEA package.	Remember	5
Part - C (Problem Solving and Critical Thinking Questions)		
1 Explain in details about STEP architecture with neat diagram.	Create	5
2 Explain about the ACIS and DXF formats in the implementation of CAD	Create	5
3 Explain about the various techniques in Solid modelling	Create	5
4 Explain about the different approaches used in implementation of collaborative engineering.	Create	5
5 Explain in detail about the principles involved in collaborative engineering	Create	5

Prepared By:
A Venu Prasad
Assistant Professor
Mechanical Dept

.