



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

MECHANICAL ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	CAD CAM
Course Code	:	JNTUH- R15-A70328
Class	:	IV B. Tech I Semester
Branch	:	MECHANICAL ENGINEERING
Year	:	2018– 2019
Course Coordinator	:	Mr. C. Labesh Kumar, Assistant Professor, Dept Of ME
Course Faculty	:	Mr. C. Labesh Kumar, Assistant Professor, Dept Of ME Mr. V. Mahidhar Reddy, Assistant Professor, Dept Of ME

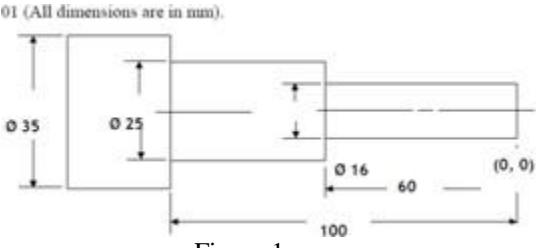
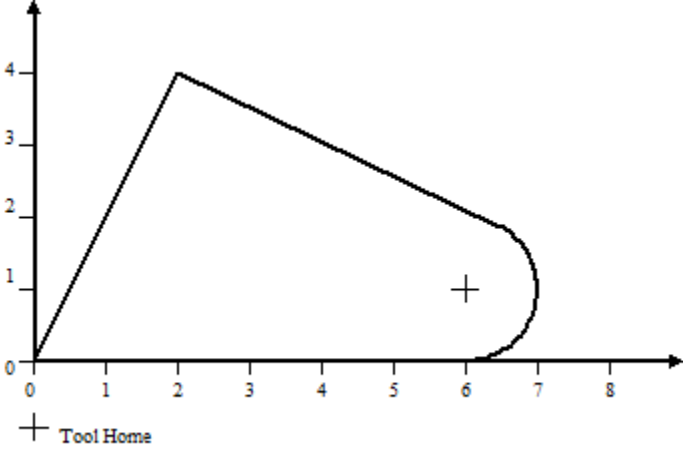
COURSE OBJECTIVES

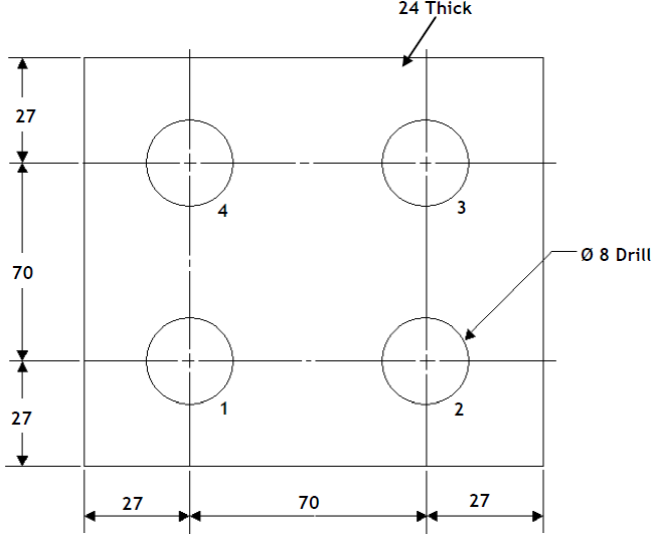
Computer Aided Design / Computer Aided Manufacturing is a course of primary important to Aeronautical Engineering students. The aim is to impart the Over view of computer applications for design and manufacturing the aircraft components, assemblies and final product to meet the global competition. The 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 ofCIM.

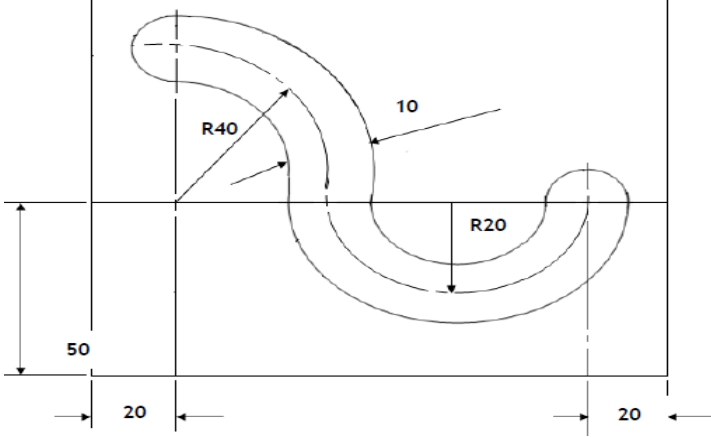
S No	Question	Blooms Taxonomy level	Course Outcomes
UNIT - I			
FUNDAMENTALS OF CAD CAM AUTOMATION			
Part - A (Short Answer Questions)			
1	List out the various computer aided applications in CAD/CAM.	Understand	1
2	List out the advantages to be gained by the adoption of CAD.	Understand	1
3	List out the advantages to be gained by the adoption of CAM.	Understand	1
4	List out the various types of semiconductor memory units.	Understand	3
5	List the different types of industrial manufacturing.	Understand	2
6	Describe the organization of a typical computing system using a flowchart.	Remember	1
7	Discuss the Wire frame entities.	Remember	2
8	List the different types of curves.	Remember	2
9	Distinguish between system software and Application software.	Remember	2
10	Identify the types of printers that would be useful for printing graphic information.	Remember	2
Part - B (Long Answer Questions)			
1	Explain the 3-D Wire frame modelling	Understand	1
2	Describe the general configuration of a CAD computer system.	Remember	1
3	Explain the various computer peripherals used in CAD applications.	Remember	2
4	Describe Various data base model which are generally used in CAD.	Remember	2

5	List out the various types of Graphical Terminals in CAD systems and explain any one.	Understand	2
6	List and briefly describe the different Wire frame entities with their definitions.	Understand	2
7	Discuss the following terms in relation with the software: (a) Operating System (b) Utilities (c) Programming languages.	Remember	2
8	Distinguish between interpolation and approximation of a curve.	Understand	2
9	List out the important requirements of geometric modelling.	Understand	2
10	Distinguish between Bezier curve and B-Spline curve	Understand	2
Part - C (Problem Solving and Critical Thinking Questions)			
1	Represent a circle with centre (0,0) and radius of 50mm through the implicit form as well as the parametric form.	Understand	2
2	Describe the various types input devices used in CAD Work station.	Understand	2
3	Summarize your understanding of synthesis and engineering analysis in the field of design. Explain how CAD helps to synthesize a product design and do engineering analysis for getting optimal design.	Understand	2
4	Define Bezier curve and Discuss the important characteristics of a Bezier curve.	Remember	2
5	Explain with suitable flow diagram the various steps involved in Design process.	Remember	2
6	List the advantages of computer aided design. State clearly the difficulties a design engineer has to face at each of the design stages if they are carried out manually.	Understand	2
7	Discuss the different types of curvature continuity with suitable sketches.	Remember	2
8	Write briefly about the secondary storage devices used in CAD System.	Understand	2
9	Discuss the various types of curve fitting techniques in detail.	Remember	2
10	Draw & Explain the block diagram of product cycles in a computerized manufacture environment.	Remember	2
UNIT - II			
SURFACE MODELING			
Part – A (Short Answer Questions)			
1	Distinguish between geometric form and algebraic form of surface representation	Remember	4
2	Define i) Free form surface ii) Planar surface.	Remember	3
3	Name different types of Analytical surfaces and synthetic surfaces.	Understand	3
4	List the different types of databases used to store model data.	Remember	3
5	Define i) Single curved surface ii) Double curved surface.	Understand	3
6	List the modeling facilities to be considered while selecting a CAD/CAM system for any application.	Remember	3
7	Distinguish between Geometry and Topology	Remember	3
8	List out the three modeling schemes.	Remember	3
10	Write the mathematical representation of a cylindrical surface and its applications.	Remember	3
Part - B (Long Answer Questions)			
1	Explain the types of surfaces that CAD/CAM systems use. Distinguish between Analytical and Synthetic surface	Remember	3
2	Describe Subdividing with respect to a surface patch	Remember	4
3	Explain briefly the Regenerative surface	Understand	4
4	Describe with the help of neat sketches the major surface entities provided by CAD/CAM systems.	Remember	4
5	Discuss cell composition in a solid modeling.	Understand	3
6	Explain spatial occupancy enumeration.	Remember	3

7	Write a note on: i. NURBS ii. B-splines.	Remember	4
8	Explain re-parameterization of a surface	Remember	4
9	Differentiate between weighing function and blending function	Understand	3
10	Describe the Mathematical representation and application of ruled surface.	Remember	4
Part – C (Problem Solving and Critical Thinking)			
1	Explain the concept of parametric surface and Discuss the various boundary conditions of parametric surface	Remember	4
2	Distinguish between Synthetic and analytical surfaces.	Remember	4
3	Explain the procedure to ensure convex hull property in Bezier surface. Describe the effect of characteristic polyhedron over the resulting Bezier surface.	Understand	4
4	Explain the blending functions required in practical solid modeling Applications.	Remember	4
5	Distinguish between Boundary representation and CSG in solid modeling	Understand	4
6	Describe the Euler Point care for boundary representation of solid modeling with example.	Remember	4
7	Discuss blending function. Explain re parameterization of a surface.	Remember	4
8	Deduce the condition for C0 and C1 continuity in a cubic Bezier composite surface of twopatches.	Understand	4
9	Explain different methods of solid modeling using sweeping	Understand	4
10	Differentiate between Bezier and B- spline surface with reference to number of control points, order of continuity and surface normal.	Remember	4
UNIT-III			
NC CONTROL PRODUCTION SYSTEMS			
Part - A (Short Answer Questions)			
1	Write the purpose of Numerical Control in cad cam.	Remember	5
2	List out the different numerical control modes.	Remember	5
3	Write any three miscellaneous functions codes.	Understand	5
4	List the different types of Practical NC machines.	Remember	5
5	Write the purpose of a tool pre-setter.	Understand	5
6	What is adaptive control explain its importance.	Remember	5
7	Write advantages of adaptive control systems.	Remember	5
8	List the elements of NC machine tool. .	Remember	5
9	Write any three preparatory function codes.	Remember	5
10	Write word address tape format in manual part programming.	Understand	5
Part – B (Long Answer Questions)			
1	Discuss briefly the Numerical Control coordinate systems.	Understand	5
2	Discuss the merits and demerits of Numerical Control system.	Understand	5
3	Explain the features of Computer Numerical Control Machine Centre.	Remember	5
4	Design the Manual Part Programming manuscript sheet and explain how the entries are made in the sheet with the help of an example.	Remember	5
5	Discuss the salient features of a machining center.	Understand	5
6	Design the block diagram of Adaptive Control Machining System and explain briefly.	Remember	6
7	Explain adaptive control system. Discuss its advantages to the manufacturing technology.	Understand	6
8	Explain the various important statements in APT language.	Understand	6
9	Compare between NC, DNC and CNC machines and explain it briefly.	Understand	6

10	Discuss the various advantages of DNC system.	Understand	6
Part – C (Problem Solving and Critical Thinking)			
1	Discuss the difficulties encountered in using conventional numerical control. Enumerate the advantages of Computer Assisted Part Programming when compared to Manual Part Programming.	Understand	6
2	Describe the axis representation system used for CNC Milling machines. Discuss the various interpolation methods used in NC machines.	Understand	6
3	Discuss the several word functions in Numerical Control systems. Discuss the advantages of DNC over NC/CNC.	Remember	6
4	Differentiate between i. Absolute and Incremental positioning system. ii. Fixed and Floating zero method.	Remember	6
5	Discuss the special features of NC machine tool when compared to the conventional machine tools	Understand	6
6	Explain any two important DNC system architecture.	Understand	6
7	Generate a CNC Turning Programming for the figure 1 <div style="text-align: center;">  <p>Figure 1</p> </div>	Understand	6
8	An APT program for the profiling of the part in Figure 2 is to be generated. The processing parameters are: (a) feed rate is 5.39 inches per minute; (b) spindle speed is 573 revolutions per minute; (c) a coolant is to be used to flush the chips; (d) the cutter diameter is to be 0.5 inches, and (e) the tool home position is (0, -1,0). <div style="text-align: center;">  <p>Figure 2. APT Program Workpiece</p> </div>	Remember	6

9	<p>Generate CNC drilling Programming for the Figure 3 using canned cycles. The spindle Speed is 800rpm and feed rate is 10 mm/minute. The thickness of plate is 10mm.</p>  <p style="text-align: center;">Figure 3</p>	Understand	6
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10	<p>Generate a CNC milling Programming for the Figure 4</p>  <p style="text-align: center;">Figure 4</p>	Understand	6
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**UNIT-IV
GROUP TECHNOLOGY**

Part – A (Short Answer Questions)

1	Define Group Technology Flexible Management System Equipment.	Understand	7
2	Define Computer Aided Process Planning Flexible Management System.	Understand	7
3	List two advantages of Group Technology Flexible Management System.	Understand	7
4	List out the different approaches to CAPP in Flexible Management System.	Remember	7
5	Define capacity resource planning in computer aided designs.	Remember	7
6	Describe ISO Standards for coding Narrate the Preparatory Functions G codes.	Understand	7
7	Describe ISO Standards for coding Narrate the Preparatory Functions M codes.	Remember	7
8	Write the functions of ERP and write its uses.	Understand	7
9	Define Coding and classification and discuss about it.	Remember	8
10	Define Part family in Group Technology.	Understand	7

Part – B (Long Answer Questions)

1	Explain guidelines and benefits of Group Technology.	Understand	7
2	Distinguish between Retrieval and Generative type CAPP.	Remember	8
3	Discuss the advantages of CAPP over Manual process planning.	Remember	7

4	Distinguish between MRP-I and MRP-II.	Understand	8
5	Explain the structure of MRP with a suitable diagram.	Understand	9
6	Distinguish between CRP inputs, ERP inputs and MRP inputs.	Understand	9
7	Explain machinability data system with respect to group technology.	Understand	10
8	Explain briefly the MICLASS system of codification.	Understand	7
9	Explain the concept of composite part with an example.	Understand	8
10	Differentiate between monocode and polycode.	Understand	9
Part – C (Problem Solving and Critical Thinking)			
1	Write the sequential stages of implementing the ERP system in an Industry.	Remember	9
2	Explain the steps involved in Production flow analysis. Explain the reason to carry out such analysis.	Remember	10
3	Describe the Opitz classification system in detail.	Remember	10
4	Explain machine cell design in group technology. Compare a process-type layout and group technology layout for batch production of a simple component.	Understand	9
5	Explain the CODE system of coding used in Group Technology.	Understand	10
6	Explain the retrieval type process planning system with the help of a block diagram.	Remember	9
7	Discuss about the various inputs and outputs of MRP systems in detail.	Remember	9
8	Discuss about cellular manufacturing. Explain the reduction of intra-cellular movement in Machine cells.	Understand	10
9	Compare process layout (inline layout), functional layout and group technology layout.	Remember	10
10	Discuss the possible computer applications in Manufacturing Planning activities.	Understand	9
UNIT-V			
FLEXIBLE MANUFACTURING SYSTEM			
Part - A (Short Answer Questions)			
1	Explain principles of material handling systems	Understand	11
2	Define TQM and explain briefly.	Remember	11
3	List the various types of Contact inspection methods.	Remember	11
4	List the various types of Non-Contact inspection methods.	Understand	11
5	Define SQC and give its limitations.	Remember	11
6	List out all the FMS layouts.	Understand	11
7	Describe C-Chart and explain briefly.	Remember	11
8	Describe P-Chart with neat sketch.	Understand	11
9	Write the characteristics of Flexible Manufacturing System.	Understand	12
10	List out various non-contact non optic computer aided inspections.	Remember	12
11	Define CIM as per SME and write its applications.	Remember	11
Part - B (Long Answer Questions)			
1	Describe briefly the functions performed by FMS computer control.	Understand	11
2	Distinguish between CIM and CAD / CAM.	Remember	12
3	Explain the important components in CIM.	Remember	12
4	Justify the requirement of CAQC in current advanced manufacturing.	Understand	11
5	Explain the working principle of Scanning Laser System.	Remember	13
6	Classify different types of computer aided quality control.	Understand	11

7	Discuss with suitable sketches the working principle of Machine vision system.	Remember	11
8	Discuss important components of CMM.	Understand	12
9	Outline the objectives of cellular manufacturing.	Understand	12
10	Narrate the benefits of CIM.	Understand	12
Part – C (Problem Solving and Critical Thinking)			
1	A flexible machining system consists of two machining workstations and a load/unload station. Station 1 is the load/unload station. Station 2 performs milling operations and consists of two servers (two identical CNC milling machines). Station 3 has one server that performs drilling (one CNC drill press). The stations are connected by a part handling system that has four work carriers. The mean transport time is 3.0 min. The FMS produces two parts, A and B. The part mix fractions and process routings for the two parts are presented in the table below. Determine, maximum production rate of the FMS, i. corresponding production rates of each product, ii. utilization of each station and iii. number of busy servers at each station	Remember	13
2	Describe a materials handling and system. Explain the three any materials handling system Describe the functions performed by the FMS control System.	Understand	13
3	Write the two important approaches for machine cell formation and explain.	Remember	14
4	Discuss the objectives and benefits of CAQC. Explain the different computer aided inspection methods	Understand	12
5	Discuss the various Analysis Methods for FMS	Remember	12
6	Explain the different types of CMM and its essential components with their functions with a neat sketch.	Understand	13
7	Evaluate which type of production systems, FMS is applied to. Discuss the advantages of FMS.	Understand	14
8	Explain the FMS equipment and write the benefits of FMS.	Remember	14
9	Discuss the different machine cell design with suitable block diagrams.	Remember	14
10	Explain in the details the different data files in CIM and the system reports generated by CIM.	Understand	14

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