INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MECHANICAL ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Name	:	Computer Aided Design/ Computer Aided Manufacturing
Course Code	:	AME018
Program	:	B.Tech
Semester	:	VII
Branch	:	Mechanical Engineering
Section	:	A & B
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Course Faculty	:	Mr. M. Sunil Kumar, Assistant Professor Dr. K Raghu Ram Mohan Reddy, Professor

OBJECTIVES:

I	Understand the concepts of implementation of automation and PLMS in industries practicing CIM.
II	Recognize the need of computer graphics in seamless manufacturing environment.
III	Summarize the historical development of CAD/CAM software and CNC Technology.
IV	Categorize the creation of group technology of part families and end-end utility.

DEFINITIONS AND TERMINOLOGY QUESTION BANK

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		UNIT-I				
1	What are the activities of CAD?	CAD activities include product design, engineering analysis and drafting	Understand	CO1	CLO1	AME018.01
2	Define CAD. Mention areas of application of CAD	The computers help in design and draft is commonly expressed by the term "Computer Aided Design" (CAD). A CAD system helps designer in various ways 1. Invites and promotes interaction through various input/output devices. 2. Allows manipulation of image (such as scalling, translation, rotation) in the computer screen. 3. Enable the designer to carry out the engineering analyses for stress, vibration, noise thermal distortions and more using FEA. 4. Design optimization through simulation and animation. 5. Automated drafting.	Understand	CO1	CLO1	AME018.01
3	What are the benefits of CAD?	1. New products are designed faster. CAD can drastically reduce the number of steps involved in the design process	Remember	CO 1	CL02	AME018.01

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		for a particular product and can also make each design step much easier and less tedious for designer to perform. 2. Hard copy of the drawings are of better quality. hence there will be less ambiguity and better quality. 3. Errors during change of design will be less.				
4	What is meant by Clipping?	Clipping is the process of determining the visible portion of a drawing lying within a window and discarding the rest.	Understand	CO 1	CLO1	AME018.01
5	State the hidden line elimination	The hidden line elimination can be stated as, "For a given three dimensional scene, a given viewing point and a given direction, eliminate from an appropriate two dimensional projection of the edges and faces which the observer can not see".	Understand	CO 1	CLO1	AME018.01
6	List the types of interfacing in CADCAM environment	a.Hardware-hardware interfacing. b.Hardware-software interfacing. c.Software-software interfacing.	Understand	CO 1	CLO1	AME018.02
7	Define Product cycle.	Product cycle is the process of managing the entire lifecycle of a product from starting, through design and manufacture, to repair and removal of manufactured products	Remember	CO 1	CLO1	AME018.02
8	List out fundamentals of product life cycle management.	1. Customer Relationship Management (CRM) 2. Supply Chain Management (SCM) 3. Enterprise resource planning (ERP) 4. Product Planning and Development (PPD)	Understand	CO 1	CLO2	AME018.02
9	Define NURBS.	In computer graphics, a powerful extension of B-splines is non-uniform rational B-splines is NURBS. NURBS are basically B-splines in uniform coordinates. Like B-splines, they are described by their order, and a knot vector, and a set of control points, but unlike B-splines, the control points have a weight.	Remember	CO 1	CLO2	AME018.02
10	What is hidden line removal?	Hidden line removal (HLR) is the method of computing which edges are not hidden by the faces of parts for a specified view and the display of parts in the projection of a model into a 2D plane.	Remember	CO 1	CLO3	AME018.02

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11	Explain Central Processing Unit (CPU)	There is a main part of computer that takes input, processes the data and gives output. This part is called central processing unit (CPU). It is a highly complex electronic circuitry. All the computers have a central processing unit. CPU has direct relationship with Primary memory. The CPU interacts closely with primary storage, or main memory, for instructions and data. Data is stored in main memory temporarily, while the CPU is executing a program	Remember	CO 1	CLO2	AME018.03
12	Explain Control Unit	They are the in charge of computer. The control unit directs the flow of information to entire computer system or to execute the instructions. Control unit is like a leader of the music concert. In the music concert, leader does not plays the music but controls and instruct the group to perform. Similarly, the control unit does not execute program instructions; it directs the other parts of the system to do so. The control unit communicates with both the arithmetic/logic unit and memory	Understand	CO 1	CLO1	AME018.03
13	Explain RAM	When we enter data from keyboard, the data is first read by the RAM. The output is also stored in RAM. But the information will be stored in it as long as computer is on. When the computer is switched off, all the data stored in it is lost. That is why it is called temporary or volatile memory. It is called Random Access Memory because the computer can pick out or access any piece of data from any location of memory.	Understand	CO 1	CLO1	AME018.03
14	Explain Primary memory?	Primary storage, or memory, is directly accessible to the CPU. The CPU continuously reads instructions stored in the memory and executes them. It has two parts: Read Only Memory(ROM) and Random Access Memory(RAM).	Remember	CO 1	CLO2	AME018.03
15	Explain Output Devices	Output devices can be categorize into following types: Image/video output devices: Printer, Monitor Audio output devices: Speaker, headphones	Understand	CO 1	CLO1	AME018.03

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UNIT-II						
1	Define geometric modeling?	The geometric modeling concerned with computer compatible mathematical description of geometry of an object. The mathematical description should be such that the image of the object can be displayed and manipulated in computer terminal, modification on the geometry can be done easily and the image can be stored in computer memory retrieve back to display in computer screen for review, analysis or alternation.	Understand	CO 1	CLO 6	AME018.06
2	Classify geometric modeling.	1.wireframe modeling. 2.Surfacemodeling. 3.solid modeling.	Understand	CO 1	CLO 6	AME018.06
3	List the common entities of a typical surface modeler?	1.Plane surface. 2. Ruled (lofted) surface. 3. Surface of revolution. 4. Tabulated surface. 5. Bezier surface. 6. B- spline surface. 7. Cones patch. 8. Fillet surface. 9. Offset surface.	Understand	CO 1	CLO 6	AME018.06
4	Name the two basic approaches followed in solid modeling.	1. Constructive solid geometry (CSG) or (C-rep). 2. Boundary representation (B - rep).	Understand	CO 1	CLO 6	AME018.06
5	List the basic entities available in CSG approach of solid modeling.	(1) Cuboids (2) Cylinder (3) Sphere (4) Cone (5) Wedge (6) Torus.	Understand	CO 2	CLO 6	AME018.06
6	Define parametric modeling	An approach to model parts belong to a family, rather than modeling the exact parts, a generic part is modeled with its dimensions as variable. The designer or application program simply specifies the variables value parameters) to develop a specific part model from the generic model.	Understand	CO 2	CLO 6	AME018.06
7	What are the types of parametric modeling?	1.Geometrically parameterized model: - in which dimensions of the shape only be changed, but not the structure of the model. (2) Topologically (or) structural parameterized model: - in which arrangement of the model along	Understand	CO 2	CLO 6	AME018.06

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		with dimensional change will be incorporated in the model.				
8	List some of the solid modeling softwares?	Pro/E, IDEAS. Unigraphics, CATIA, Solid works, Solid Edge, AutoCAD etc.	Understand	CO 2	CLO 6	AME018.06
9	Write down two important solid modeling technique.	The solid modeling techniques permit for the automation of some complicated engineering calculations that are approved as a part of the design progression. Simulation, planning, and confirmation of processes such as machining and assembly were one of the initiations for the development of solid modeling technique.	Understand	CO 2	CLO 6	AME018.06
10	What is CGS?	Constructive solid geometry (CSG) is a method used in solid modeling for creating 3D models in CAD. Constructive solid geometry permits a modeler to make a complex surface by applying Boolean operators to join objects. Frequently CSG presents a model/surface that appears visually complex, but is essentially little more than cleverly combined.	Remember	CO2	CLO 7	AME018.07
11	What Is B-rep – Boundary Representation	B-rep construction consists of entering all boundary edge for all surfaces. This is similar or copying an engineering drawing into the computer, line by line, surface by surface, with one important qualification. The lines must be entered and surfaces oriented in such a way that they create valid volumes.	Remember	CO 2	CLO 7	AME018.07
		UNIT-III				
1	Define NC system?	NC is defined as a form of programmable automation in which the process is controlled by alphanumeric data.	Understand	CO 4	CLO 14	AME018.14
2	What is MCU?	MCU is a hardware system which reads, interprets and translates the program of instructions into mechanical action of machine tool.	Remember	CO 4	CLO 16	AME018.16
3	List out any four advantage of using NC?	Increased flexibility. Reduced setup time. Production of complex part.	Remember	CO 3	CLO 13	AME018.13
4	What are the limitations of using NC	Relatively high price. More complicated maintenance, a special crew is desirable. Highly skilled and properly trained programmers are needed	Remember	CO 3	CLO 13	AME018.13
5	What are all the	Part programming mistakes. Non-optional speeds and feeds.	Understand	CO 3	CLO 13	AME018.13

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	problems encountered with NC system	Problem with punched tape and tape reader. Problem with controller and management information.				
6	Define CNC?	CNC is defined as a NC system that utilizes a dedicated, stored computer program to perform some or the entire basic NC functions.	Remember	CO4	CLO 14	AME018.14
7	Write the main functions of CNC?	1. Machine tool control. 2.In-process compensation. 3.Improved programming and operating features. 4.Diagnostics	Understand	CO4	CLO 14	AME018.14
8	What are the functions of diagnostic system in NC machine tools?	To identify the reason for a down time occurrence so that maintenance personal should make repairs fast. To alert to signs that indicate the imminent failure of certain component which are considered unreliable	Remember	CO4	CLO 14	AME018.14
9	Write any four application of NC system?	Application are in aero equipment; printed circuit boards; coil winding; automobile parts; and blue print of complex shapes.	Remember	CO4	CLO 14	AME018.14
10	List the differences between NC and CNC system?	**NC system**: Programming and punched tape is read every time / Moderate manual work. / Medium flexible. / Part programming is used — **CNC system**: Only one time the tape is read and stored. / Less manual work. / More flexible / Reprogramming is easy	Remember	CO 4	CLO 15	AME018.15
11	Write the various types of MCU used in CNC machines?	Three types of MCU are Housed MCU Swing around MCU Stand alone MCU.	Understand	CO 4	CLO 15	AME018.15
12	Define DNC?	Direct numerical control system is defined as a manufacturing system in which a number of machine tools are controlled by a computer through direct connection and in real time.	Understand	CO 4	CLO 15	AME018.15
13	List the main component of DNC	Main component are a. Central computer. b. Bulk memory. c. Telecommunication lines. d. Machine tools.	Understand	CO4	CLO 15	AME018.15
14	Write the functions of DNC	It will take some of the burden of the main computer. Each satellite computer.	Understand	CO4	CLO 15	AME018.15

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15	List out the types of CNC machine?	CNC machine can be classified as: ➢ Machining centers ➢ Lathe machines ➢ Drilling machine ➢ Turning centers ➢ Milling machines ➢ Gear shaping ➢ CNC gear hobbling	Understand	CO4	CLO 15	AME018.15
16	What is machining center? Write the different types of machining centre. How it differs from conventional CNC milling machines?	The centers which consists of multi function CNC machines equipped with ATC which are capable of carrying out milling, reaming, tapping, boring, counter boring and allied operations without operator intervention is called machining centre. Different types of machining centers are: a. Horizontal machining centre, b.Vertical machining centre, c.Universal machining centre.	Understand	CO4	CLO 16	AME018.16
17	Define numerical control.	Numerical control is a form of programmable automation in which the mechanical action of machine tool or other processing equipment are controlled by a program containing alphanumeric data numbers, letters and symbols.	Understand	CO 4	CLO 16	AME018.16
18	How tapes are standardized ? List some of them.	Tape standardization covers two important categories. a.Physical dimensions, and b..Character coding	Remember	CO 4	CLO 16	AME018.16
19	What is block? Write the significance of it?	Block is the basic unit of a part program input to the control. It contains adequate information for the machine to perform a movement and for functions.	Understand	CO4	CLO 14	AME018.14
20	What Is G code? How G codes are represented?	It is the series of combination of '1's and '0's.It represents a number or an alphabet or any symbol.	Understand	CO4	CLO 14	AME018.14
21	Write the different types of tape programming format?	The following are the types of tape programming format. a.Word address format, b.Table sequential format, c.Fined block format.	Remember	CO4	CLO 15	AME018.15
22	Explain the functions of codes G28 and M30.	G28 = Mirroring M30 = End of data.	Remember	CO4	CLO 15	AME018.15
23	List out some of the important NC languages.	a.APT b. ADAPT c.EXAPT d.Compact II e.PROMPT f.CINTURNII	Understand	CO4	CLO 15	AME018.15

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24	What are the four statements used in APT language	a.Geometric statements b.Motion statements c.Post processor statements d.Auxiliary statements.	Remember	CO4	CLO 14	AME018.14
25	List any four post processor statements.	a. COOLANT/ON,OFF,MIST b. RAPID c. TURRET d. MACHIN	Understand	CO4	CLO 14	AME018.14
26	Write any four auxiliary statements	a. INTOL b. OUTTOL c. CLPRNT d. PARTNO e. FINI	Remember	CO4	CLO 14	AME018.14
UNIT-IV						
1	Define Group Technology (GT).	Group Technology (GT) is a manufacturing methodology in which identical or similar components grouped processed together during design, process planning and manufacturing so that a wide variety of components can be manufactured, at the least expense of time, inventory, man hours and material handling.	Remember	CO 4	CLO 17	AME018.17
2	List out the stages in Group Technology.	Production planners to setup the GT database. Grouping the parts or components into part-families with some similar characteristics. Re-design the shop-floor arrangement according to common shape, function or manufacturing process and tooling	Remember	CO 4	CLO 17	AME018.17
3	Define Part family	Part-family is defined as" collection of parts which are similar in terms of geometric shape, size, and similar processing steps required in manufacturing, so flow of materials through the plant improves"	Remember	CO 4	CLO 17	AME018.17
4	List the general methods used for grouping parts into families.	Visual Inspection Parts classification and coding system. Production flow analysis.	Remember	CO 4	CLO 17	AME018.17
5	List the activities and associated with process planning.	a. Analysis finished part requirements b.Determining operating sequence c.Selecting "machines" d.Selecting material parameters e.Calculating processing times f.Documenting process planning	Remember	CO 4	CLO 17	AME018.17
6	What is meant by	CAPP refers to computer-aided process planning. CAPP is used to	Remember	CO 4	CLO 17	AME018.17

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	CAPP?	overcome the drawbacks of manual process planning. With the use of computers in the process planning, one can reduce the routine clerical work of manufacturing engineers. Also it provides the opportunity to generate rational, consistent and optimal plans..				
7	What are the basic approaches of CAPP	a.Retrieval (or variant) CAPP system, and b.Generative CAPP system.	Understand	CO 4	CLO 17	AME018.17
8	Differentiate the underlying concepts of variant and generative CAPP systems.	In variant CAPP system, a process plan for new part is created by recalling, identifying and retrieving an existing plan for a similar part, and making the necessary modifications for the new part. Whereas the generative CAPP system automatically generates the process plan based on decision logics and pre coded algorithms.	Remember	CO 4	CLO 16	AME018.16
9	List the various components of a generative CAPP system.	A part description. A subsystem to define the machining parameters. A subsystem to select and sequence individual operations. A database A report generator	Remember	CO 4	CLO 16	AME018.16
10	List some commercial variant and generative CAPP software systems	Some of the commercial variant CAPP systems include CUTPLAN, COMCAPP V, DCLASS, and INTELLICAP Some of the commercial generative CAPP systems include AUTAP, CMPP, GENPLAN, and LOCAM	Remember	CO 4	CLO 16	AME018.16
11	List any six coding systems that are widely recognised in industries.	1.Optiz classification system 2. MICLASS system 3. DCLASS system 4. KK-3 System 5. CODE system 6. CUTPLAN system	Remember	CO 4	CLO 17	AME018.17
12	What is meant by CAPP?	CAPP refers to computer aided process planning. CAPP is used to overcome the drawbacks of manual process planning. With the use of computers in the process planning, one can reduce the routine clerical work of manufacturing engineers. Also it provides the opportunity to generate rational, consistent and optimal plans.	Understand	CO4	CLO 17	AME018.17
13	Give the main component	CAPP system contains of two main components. Manufacturing data base (part description,	Understand	CO4	CLO 16	AME018.16

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	of generative CAPP systems.	machine tool library etc.) Decision logic (to represent the process planner)				
15	What are the basic approaches of CAPP?	1.Retrieval (or variant) CAPP system 2. Generative CAPP system..	Understand	CO4	CLO 16	AME018.16
UNIT-V						
1	Define CIM.	CIM is the integration of the total manufacturing enterprising through the use of integrated systems and data communications coupled with new managerial philosophies that improve organisational and personal efficiency.	Remember	CO4	CLO 17	AME018.17
2	Is CIM a concept or a technology?	CIM is both a concept and technology. For top management, CIM is a concept, a blueprint for success. For middle managers and line managers, CIM is a technology, a physical realization of resources that are more capable and flexible.	Understand	CO4	CLO 17	AME018.17
3	List various components of CIM.	•Computer Aided Design •Computer Aided Manufacturing • CNC machines • Flexible manufacturing systems • Robotics • Automated material handling systems • Group Technology • Computer aided process planning • Manufacture resource planning • Computer control systems	Understand	CO4	CLO 17	AME018.17
4	What is the main objective of CIM?	The main aim of CIM is to use the advanced information processing technology into all areas of manufacturing industry in order to Make total process more process more productive and efficient. • Increase product reliability. • Decrease the cost of production and maintenance relating to the manufacturing system as • well as to the product Reduce the number of hazardous jobs and increase the involvement of well educated and •able humans in the manufacturing ability and design.	Understand	CO4	CLO 15	AME018.15
5	What is the role of CIM	CIM is most closely associated with functions in manufacturing	Understand	CO4	CLO 17	AME018.17

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	is manufacturing?	engineering such a process planning and numerical control (NC) part programming.				
6	What are the important applications of CIM in manufacturing control?	The applications of computer process control are pervasive today in automated production systems. Quality control includes a variety of approaches to ensure the highest possible quality levels in the manufactured product. Shop floor control refers to production management techniques.	Understand	CO4	CLO 15	AME018.15
7	What is MRP? What is the function of MRP?	It is a planning technique. It translated master production schedule (MPS) of the end products into a detailed schedule for the raw materials and parts used in those end products.	Remember	CO4	CLO 16	AME018.16
8	What is the main objective of CIM?	The main aim of CIM is to use the advanced information processing technology into all areas of manufacturing industry in order to: make the total process more productive and efficient; increase product reliability; decrease the cost of production and maintenance relating to the manufacturing system as well as to the product; and reduce the number of hazardous jobs and increase the involvement of well educated and able humans in the manufacturing ability and design.	Remember	CO5	CLO 18	AME018.18
9	What is the role of CIM in manufacturing	CIM is most closely associated with functions in manufacturing engineering such a process planning and numerical control (NC) part programming.	Understand	CO5	CLO 18	AME018.18
10	What are important applications of CIM in manufacturing planning?	The applications of CIM can be divided into two broad categories. 1) Manufacturing planning 2) Manufacturing control	Understand	CO4	CLO 17	AME018.17

Signature of the Faculty   **Signature of HOD**