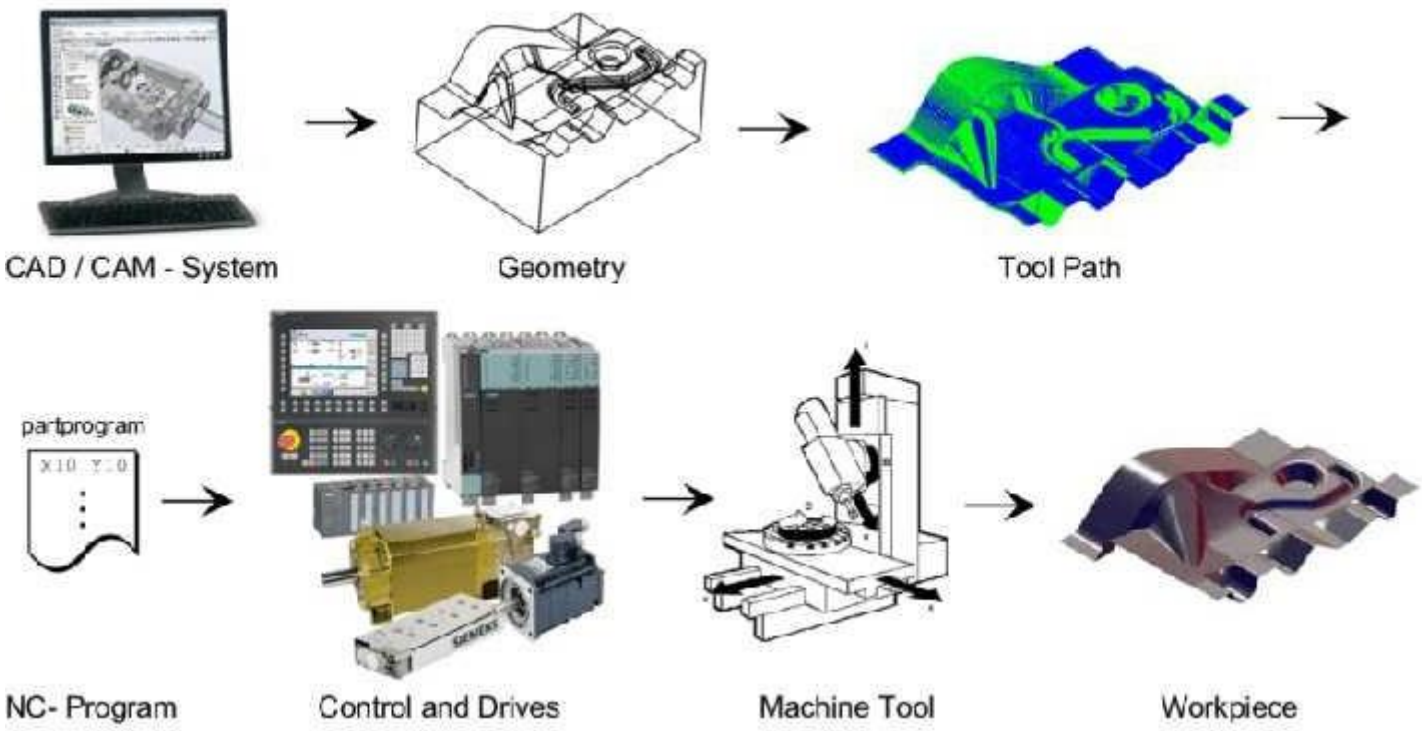
SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES
(AUTONOMOUS)

(18MEC323 CAD/CAM/CIM)

QUESTION BANK

III - B.TECH / II- SEMESTER REGULATION:R18



MECHANICAL ENGINEERING

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT of MECHANICAL ENGINEERING

QUESTIONBANK

III B.Tech II Semester

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18MEC323 CAD/CAM/CIM

Course Educational Objectives:

CEO1: To gain knowledge about the basic fundamental of CAD.
CEO2: To understand the requirements of Geometric modeling
CEO3: To gain knowledge about the basic fundamental of NC/CNC system and programming.
CEO4: To obtain the concepts, applications and components of Computer integrated manufacturing **CEO5**: To gain knowledge on advance manufacturing and flexible manufacturing system.

UNIT – 1: COMPUTER GRAPHICS AND DRAFTING

Computers in industrial manufacturing – Design process – Product cycle. **CAD / CAM hardware:** Basic structure – CPU – Memory types – Input devices – Display devices – Hard copy devices – Storage devices – System software – System configuration. **Computer Graphics:** Raster scan graphics – Coordinate system – Database structure for graphics modeling – Engineering data management system – Transformation of geometry – 3D transformations – Clipping – Surface removal – Colour and shading – Geometric commands, layers, display control commands, editing and dimensioning – Standardization in graphics – Graphical kernel system – Exchange of modeling data.

UNIT – 2: GEOMETRIC MODELING

Requirements – Geometric models – Geometric construction models – Constraint based modeling – Wire frame modeling – Curve representation – Surface representation – Modeling facilities desired.

UNIT – 3: NC/CNC SYSTEMS

NC – NC modes – NC elements. **Structure of CNC:** Spindle, drives, actuation system, feedback device and axis standards. **CNC Tooling and Centre:** Tool geometry – Tool presetting – ATC – CNC machining centre – CNC turning centre – Machine control unit. **CNC Programming:** Fundamentals – Manual part programming methods (preparatory methods and miscellaneous functions) – Tool length compensation – Canned cycle – Simple CNC programs for turning, milling and drilling operations – Computer aided part programming.

UNIT – 4: COMPONENTS OF CIM

CIM as a concept and a technology – CASA/SME model of CIM, CIM II – Benefits of CIM – Communication matrix in CIM – Computer communication in CIM – CIM data transmission methods – Series, parallel, asynchronous, synchronous, modulation, demodulation, simplex and duplex – Types of communication in CIM – Point to point (PTP), star and multiplexing – Computer networking in CIM – Seven layer OSI model, LAN model, MAP model, network topologies – Star, ring and bus, advantages of networks in CIM.

UNIT – 5: GROUP TECHNOLOGY, PROCESS PLANNING AND FMS

Group Technology: Role of G.T in CAD/CAM integration – Part families classification and coding – DCLASS, MCLASS and OPTIZ coding systems – Facility design using G.T – Benefits of G.T – Cellular manufacturing. **Process Planning**: Process planning in CAD/CAM integration – Approaches to computer aided process planning – Variant approach and generative approaches. **FMS**: Components of FMS – Types – FMS workstation – Material handling and storage system – FMS layout.

Course Outcomes:

On successful completion of the course, Students will be able to		POs related to COs
CO1	Explain about computer basic components, necessity in design and manufacturing. Know advanced tools in computer aided design and analyze their transformations effects.	**PO1, PO2, PO3, PO5, PO12.**
CO2	Acquire knowledge on Requirements of geometric modeling and design different models using methodologies'.	**PO1, PO2, PO3, PO5**
CO3	Know the basics of computerized numerical programming by using modern tools.	**PO1, PO2, PO3, PO5, PO12.**
CO4	Obtain the knowledge on elements of an automated manufacturing environment, compare effective type's communication.	**PO1, PO2, PO10**
CO5	Knowledge of Automated planning to manufacture custom specific components and Evaluate basics of variability and its role in the performance of a production system.	**PO1, PO2, PO3, PO4, PO5, PO10**

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Question No	Questions			
	UNIT-I COMPUTER GRAPHICS AND DRAFTING			
	PART-A(TWO MARK QUESTIONS)	**CO**	**BL**	**PO**
1.	What is meant by product cycle?	**CO1**	**1,2**	**1,2**
2.	Mention any four stages of design process.	**CO1**	**2**	**1,3**
3.	State different types of memories used in computers.	**CO1**	**1**	**1,3**
4.	Mention any 4 types of data storage devices used in CAD/CAM.	**CO1**	**1,2**	**1,2**
5.	State the principle of Rasterscan graphics..	**CO1**	**1,2**	**2,3**
6.	What is clipping?	**CO1**	**1,2**	**1,2,3**
7.	Mention any 4 input as well as output devices used for computers.	**CO1**	**2,3**	1,3
8.	What is co-ordinate transformation matrix?	**CO1**	**1**	**1,3**
9.	Give any 2 reasons for standardization in Graphics.	**CO1**	**1**	**1,3**
10	Enumerate any two reasons for the use of layers in AutoCAD.	**CO1**	**1,2**	**1,3**
11	Why Standardization is important in graphics?	**CO1**	**1**	**1,3**
12	State any two reasons for graphical data exchange.	**CO1**	**1,2,3**	**1,3**
13	Define Geometric Kernal.	**CO1**	**1**	**1,3**
	PART-B (TEN MARKS QUESTIONS)			
1.	Explain product cycle model with flow chart.	**CO1**	**1,3**	**1,2,3,4**
2.	Describe various stages of design process.	**CO1**	**2,3**	**1,2**
3.	Explain CAD system architecture with neat sketch.	**CO1**	**1,2,3**	**1,3**
4.	Discuss the applications of CAD and CAM in the manufacturing environment with examples.	**CO1**	**1,3**	**2,3,4**
5.	Explain the COMPUTER hardware in details with a neat diagram.	**CO1**	**1,2**	**1,2**
6.	Elaborate Raster Scan Graphics scanning method with sketches in details.	**CO1**	**1,2,4**	**1,2,5**
7.	Briefly explain various methods of clipping.	**CO1**	**1,2,3**	**1,2**
8.	Explain co-ordinate transformation matrix with neat sketch.	**CO1**	**1,2,3**	**2,3,5**
9.	Write down any 10 AutoCAD commands and explain their use.	**CO1**	**1,2,3**	**1,2**
10	Explain 2D and 3D transformation with matrix	**CO1**	**1,2**	**1,2,5**
11	Enumerate various desired modeling facilities required for Industries.	**CO1**	**1,2**	**1,2,3**

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QUESTIONBANK **CAD/CAM/CIM (18MEC323)**

Question No	Questions			
UNIT-2: GEOMETRIC MODELLING				
PART-A(TWO MARK QUESTIONS)		**CO**	**BL**	**PO**
1.	What is a Geometric Model?	**CO2**	**1,2**	**1,2**
2.	What are the famous methods to create geometric model?	**CO2**	**1,2,4**	**1,2,5**
3.	Give any 2 reasons for creating geometric models.	**CO2**	**1,2,3**	**1,2**
4.	Define constraint based modeling.	**CO2**	**1,2,3**	**2,3,5**
5.	What is a wireframe model?	**CO2**	**1,3**	**1,2,5**
6.	State any two uses of wireframe model.	**CO2**	**1,2**	**1,3**
7.	Enumerate any two reasons for the use of solid model.	**CO2**	**1,2,3**	**1,3**
8.	Why representation of curves is important in graphics?	**CO2**	**1,2**	**1,2**
9.	What is Bezier curve?	**CO2**	**1,2**	**1,3**
10.	Mention any two modeling facilities desired.	**CO2**	**1,3**	**3,12**
PART-B (TEN MARKS QUESTIONS)				
1.	Explain Hermite curve with neat sketch.	**CO2**	**2,3**	**1,3**
2.	Elaborate different types of Bezier Curves in detail.	**CO2**	**1,2,4**	**1,2,3**
3.	Explain Bezier equation with algorithm and the method of construction of curve from trajectory lines.	**CO2**	**1,2,4**	**1,2,5**
4.	Describe construction of “Coons patch”.	**CO2**	**1,2,3**	**1,2,5**
5.	Compare line, surface and solid modeling in every aspect for industrial applications with examples.	**CO2**	**1,2,3**	**2,3,5**
6.	Describe various surface modeling with neat sketch.	**CO2**	**1,2**	**1,2,5**
7.	Describe the Bicubic patches with mathematical functions.	**CO2**	**1,2**	**2,3**
8.	Explain the construction of B – Spline surface with neat sketch.	**CO2**	**1,2**	**1,2,3 ,5**
9.	Detail out the CSG model with suitable example.	**CO2**	**1,2**	**1,2,3**
10	Enumerate various desired modeling facilities required for Industries.	**CO2**	**1,3**	**3,4,5**

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QUESTIONBANK **CAD/CAM/CIM (18MEC323)**

Question No	Questions			
UNIT-3: NC/CNC SYSTEMS				
PART-A(TWO MARK QUESTIONS)		**CO**	**BL**	**PO**
1.	Define Numerical Control.	**CO2**	**1,2**	**1,2**
2.	Enumerate various NC elements.	**CO2**	**2**	**1,2,3**
3.	What are the structures of CNC?	**CO2**	**1,2**	**1,2,4**
4.	Why ATC is used?	**CO2**	**2**	**1,3**
5.	Differentiate between CNC lathe and Machining center.	**CO2**	**1,3**	**1,2,5**
6.	Mention any two drives for operation of ATC.	**CO2**	**1,2**	**1,3**
7.	What is hydraulic power pack in CNC?	**CO2**	**2**	**1,3**
8.	What is G code? Give any 4 codes with their meaning.	**CO2**	**1,2**	**1,2,5**
9.	What is M code? Give any 4 codes with their meaning.	**CO2**	**1,2**	**1,3,5**
10.	What is the command used for tool length compensation?	**CO2**	**1,3**	**2,3**
11	Define Canned cycle.	**CO2**	**2**	**1,2**
12	Write simple CNC program to drill 4 linear holes along X axis.	**CO2**	**1**	**1,3**
PART-B (TEN MARKS QUESTIONS)				
1.	Elaborate different types Numerical Control of machine tools with historical development.	**CO2**	**2,3**	**1,3**
2.	Explain the Structure of CNC like Spindle, drives, actuation system, feedback device and axis standards.	**CO2**	**1,3**	**1,2,5**
3.	Describe CNC Tooling including Tool geometry, Tool presetting methods.	**CO2**	**1,2**	**1,3**
4.	Compare machining centres and CNC lathes t for industrial applications with examples.	**CO2**	**2,3**	**1,2,3**
5.	Explain a typical CNC machining centre with neat sketch.	**CO2**	**1,2**	**1,2,5**
6.	Step by step discuss CNC Manual part programming methods	**CO2**	**2,3**	**1,3**
7.	Elaborate tooling setup, offset, tool length compensation for CNC in details.	**CO2**	**1,2,3**	**1,2,3**
8.	Explain Canned cycle with an example part.	**CO2**	**1,2**	**1,2,5**
9.	Write down simple CNC programs for turning, milling and drilling operations .	**CO2**	**1,2,3**	**1,2,5**
10	Decribe Computer aided part programming.	**CO2**	**1,2**	**2,3,5**

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QUESTIONBANK **CAD/CAM/CIM (18MEC323)**

Question No	Questions			
	UNIT-4: COMPONENTS OF CIM			
	PART-A(TWO MARK QUESTIONS)	**CO**	**BL**	**PO**
1.	What is CIM?	**CO2**	**1,2**	**1**
2.	What are the main elements of a CIM system?	**CO2**	**1,2,3**	**1,2**
3.	Name any four activities of manufacturing plant through computer systems	**CO2**	**2**	**1,2**
4.	Define Product development cycle.	**CO2**	**1,2**	**2,3**
5.	Differentiate between CIM-I and CIM-II.	**CO2**	**1,3**	**1,3,5**
6.	Affirm any two uses of CIM in manufacturing.	**CO2**	**1,2**	**1,3**
7.	What is modulation? How many layers are there in OSI?	**CO2**	**1,3**	**1**
8.	Define Simplex system.	**CO2**	**1,2**	**1,2**
9.	Draw Bus network topology.	**CO2**	**1,2**	**1,3**
10.	State any two uses of networking in industries.	**CO2**	**1,3**	**2,3**
	PART-B (TEN MARKS QUESTIONS)			
1.	Briefly explain the nature and role of the elements of CIM system.	**CO2**	**1,2,3**	**2,3,5**
2.	Draw and explain CIM Wheel indicating various elements and benefits of CIM..	**CO2**	**1,2**	**1,2,5**
3.	Discuss the stages in the product development cycle and the importance of each stage.	**CO2**	**1,2**	**2,3**
4.	Describe the need for CIM and issues addressed by CIM.	**CO2**	**1,2**	**1,2,3 ,5**
5.	Describe the basic activities that must be carried out in a factory to convert raw materials into finished product. Co-relate them with CIM.	**CO2**	**1,2,3**	**2,3**
6.	Explain the Communication matrix in CIM and discuss Series, parallel, asynchronous, synchronous data transmission.	**CO2**	**1,2**	**1,2,5**
7.	Describe simplex and duplex systems. How modulation, demodulation are useful in communication?	**CO2**	**1,2**	**2,3**
8.	Explain the LAN model, MAP mode. ,	**CO2**	**1,2**	**1,2,3**
9.	Detail out the Ring, Star, Bus, Tree network topologies.	**CO2**	**2**	**1,2,3**
10	Enumerate various networking facilities required for Industries.	**CO2**	**1,3**	**3,4,12**

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Question No	Questions			
UNIT-5: GROUP TECHNOLOGY, PROCESS PLANNING AND FMS				
PART-A(TWO MARK QUESTIONS)		**CO**	**BL**	**PO**
1.	Define Group Technology (GT).	**CO2**	**1,2**	**1,2**
2.	List out the stages in Group Technology.	**CO2**	**1,2,4**	**2**
3.	Define Part families.	**CO2**	**1,2,3**	**1,2**
4.	What are the DCLASS and OPTIZ methods of coding in GT?	**CO2**	**1,2,3**	**2,3,5**
5.	Explain the two benefits of GT.	**CO2**	**1,3**	**1,2,5**
6.	What is Computer Aided Process Planning?	**CO2**	**1,2**	**1,2**
7.	What is the strength and weakness of Flexible Manufacturing Systems?	**CO2**	**1,2,3**	**1,3**
8.	Mention various types of FMS.	**CO2**	**1,2**	**1,2**
9.	What are the applications of FMS?	**CO2**	**1,2**	**1,3**
10.	Mention any two types of material handling systems.	**CO2**	**1,3**	**1**
PART-B (TEN MARKS QUESTIONS)				
1.	Explain Part families and classification methods in Group Technology.	**CO2**	**2**	**2,3**
2.	Discuss about MICLASS and DCLASS classification and coding system.	**CO2**	**1,3,4**	**1,2,5**
3.	Briefly discuss the various benefits of implementing a GT in a firm. Also bring out the advantages and limitations of using GT.	**CO2**	**1,2,3**	**2,3**
4.	Describe the process of Cellular Manufacturing.	**CO2**	**1,2**	**1,2,3**
5.	Explain computer aided process planning with steps involved.	**CO2**	**1,2,3**	**1,2,3**
6.	Detail out the Variant approach and generative approaches in CAPP.	**CO2**	**1,2**	**1,2**
7.	Draw a typical FMS layout for automobile manufacturing.	**CO2**	**1,2,3**	**2,3,5**
8.	Discuss the strength and weakness of Flexible Manufacturing Systems.	**CO2**	**1,2**	**1,2,3 ,5**
9.	Elaborate the various areas of applications of FMS.	**CO2**	**1,2**	**1,2,3**
10	Mention any two types of material handling systems.	**CO2**	**1,3**	**1,3**