Hall Ticket No    Question Paper Code: AME018

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

### MODEL QUESTION PAPER-I

B.Tech VII Semester End Examinations, November-2019
**Regulations: IARE-R16**
**Computer Aided Design/ Computer Aided Manufacturing**
(ME)

**Time: 3 hours**                                                     **Max. Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

## UNIT– I

1.  a) Briefly explain the conventional process of the product cycle in the conventional manufacturing environment. **[7M]**
    b) What are the various memories used in a computer? **[7M]**

2.  a) Elaborate on the basic requirements that CAD software has to satisfy. **[7M]**
    b) 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. **[7M]**

## UNIT – II

3.  a) What is meant by a Geometric Entity? Explain the common entities used in Geometric Modelling. **[7M]**
    b) A scaling factor of 2 is applied in the Y direction while no scaling is applied in the X direction to the line whose two endpoints are at coordinates (1, 3) and (3, 6). The line is to be rotated subsequently through 300, in the counter clockwise direction. Determine the necessary transformation matrix for the operation and the new coordinates of the end points **[7M]**

4.  a) Deduce the condition for C0 and C1 continuity in a cubic Bezier composite surface of two patches **[7M]**
    b) Find the degree of Bezier curve controlled by three points (4, 2), (0, 0) and (2, 8). Also find the equation of the Bezier curve in parametric format with parameter "μ"? **[7M]**

## UNIT – III

5.  a) Design the manual part programming manuscript sheet and explain how the entries are made in the sheet with the help of an example. **[7M]**
    b) Describe the types of electrical drives used for speed and feed control in CNC machine tools. **[7M]**

6.  a) With a block diagram, explain the various sub-systems and functions of a modern CNC controller. **[7M]**
    b) Discuss the difficulties encountered in using conventional numerical control. Enumerate the advantages of Computer Assisted Part Programming when compared to Manual Part Programming. **[7M]**

**UNIT – IV**

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| 7. | a) | What is computer aided process planning? Discuss variant process planning in detail with an example? | **[7M]** |
| | b) | Discuss the different stages of a group technology plan. Discuss the types of work that are to be conducted at each stage of the plan. | **[7M]** |
| 8. | a) | Explain the application and advantages of integration of CAQC with CAD/CAM systems | **[7M]** |
| | b) | Discuss the objectives of CAQC. Explain the different computer aided inspection methods. | **[7M]** |

**UNIT– V**

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| 9. | a) | Explain in detail the integration of CAD, CAM, CAE and CAPP systems in CIM Environment. | **[7M]** |
| | b) | Why are the unskilled labors replaced with skilled labors in computer integrated manufacturing systems? | **[7M]** |
| 10. | a) | Explain in the details the different data files in CIM and the system reports generated by CIM. | **[7M]** |
| | b) | Discuss the possible computer applications in Manufacturing Planning activities, Explain the Applying and advantages of integration of CIM with CAD/CAM systems | **[7M]** |

## COURSE OBJECTIVES:

**The course should enable the students to:**

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|---|---|
| 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. |

## COURSE OUTCOMES (COs):

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| CO 1 | Understand the basic foundation in computer aided design / manufacturing. |
| CO 2 | Understand the fundamentals used to create and manipulate geometric models |
| CO 3 | Learn working principles of NC machines CNC control and part programming. |
| CO 4 | Understand concept of Group Technology, FMS, CAPP. |
| CO 5 | Understand the concept of Computer integrated manufacturing. |

## COURSE LEARNING OUTCOMES (CLOs):

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|---|---|
| AME018.01 | Describe basic structure of CAD workstation, Memory types, input/output devices and display devices and computer graphics. |
| AME018.02 | Demonstrate the ability to create concepts design solutions through CAD tools that can be manufactured using CNC machinery. |
| AME018.03 | Understand the Computers in industrial manufacturing, product cycle, CAD / CAM Hardware. |
| AME018.04 | Generate and interpret engineering technical drawings of parts and assemblies according to engineering design standards. |
| AME018.05 | Understand of the principles of CAD/CAM, including engineering drawing, geometric and surface modeling, and feature-based design. |
| AME018.06 | Create accurate and precise geometry of complex engineering systems and use the geometric models in different engineering applications. |
| AME018.07 | Compare the different types of modeling techniques and explain the central role solid models play in the successful completion of CAD/CAM-based product development. |
| AME018.08 | Explain Synthetic curves andthe concept of NURBS |
| AME018.09 | Explain the basic concepts of CNC programming and machining |
| AME018.10 | Develop CNC programs to manufacture industrial components. |
| AME018.11 | Generate tool path for part and to create CNC manual part program and APT part program |
| AME018.12 | Apply the concepts of machining for the purpose of selection of appropriate machining centers, machining parameters, select appropriate cutting tools for CNC milling and turning. |
| AME018.13 | Understand grouping of similar parts through group technology and developing automated process plans through computer aided process planning. |

| | | AME018.14 | Illustrate group technology, computer aided quality control. |

| AME018.14 | Illustrate group technology, computer aided quality control. |
|---|---|
| AME018.15 | Understand different elements of robotic systems. Also understand the different components and design of FMS. |
| AME018.16 | Apply the contact and non-contact types inspection with computer aided testing with integration of computer aided quality with CAD/CAM |
| AME018.17 | Understand automated material handling systems and integration of material handling and storage |
| AME018.18 | Analyze various automated flow lines and line balancing problem. |
| AME018.19 | Design automated material handling and storage systems for a typical production system |
| AME018.20 | Apply the concepts/components of computer integrated manufacturing and integrate them. |

## MAPPING OF SEMESTER END EXAMINATION - COURSE OUTCOMES

| SEE Question No | | | Course Learning Outcomes | Course Outcomes | Blooms Taxonomy Level |
|---|---|---|---|---|---|
| 1 | a | AME12.02 | Demonstrate the ability to create concepts design solutions through CAD tools that can be manufactured using CNC machinery. | CO 1 | Understand |
| | b | AME12.03 | Understand the Computers in industrial manufacturing, product cycle, CAD / CAM Hardware. | CO 1 | Understand |
| 2 | a | AME12.04 | Generate and interpret engineering technical drawings of parts and assemblies according to engineering design standards. | CO 1 | Understand |
| | b | AME12.04 | Generate and interpret engineering technical drawings of parts and assemblies according to engineering design standards. | CO 1 | Understand |
| 3 | a | AME12.06 | Create accurate and precise geometry of complex engineering systems and use the geometric models in different engineering applications. | CO 2 | Understand |
| | b | AME12.07 | Compare the different types of modeling techniques and explain the central role solid models play in the successful completion of CAD/CAM | CO 2 | Remember |
| 4 | a | AME12.07 | Compare the different types of modeling techniques and explain the central role solid models play in the successful completion of CAD/CAM | CO 2 | Understand |
| | b | AME12.07 | Compare the different types of modeling techniques and explain the central role solid models play in the successful completion of CAD/CAM-based product development | CO 2 | Understand |
| 5 | a | AME12.09 | Explain the basic concepts of CNC programming and machining. | CO 3 | Understand |
| | b | AME12.10 | Develop CNC programs to manufacture industrial components. | CO 3 | Understand |
| 6 | a | AME12.09 | Explain the basic concepts of CNC programming and machining | CO 3 | Understand |
| | b | AME12.10 | Develop CNC programs to manufacture industrial components. | CO 3 | Understand |
| 7 | a | AME12.13 | Understand grouping of similar parts through group technology and developing automated process plans through computer aided process planning. | CO 4 | Understand |
| | b | AME12.13 | Understand grouping of similar parts through group technology and developing automated process plans through computer aided process planning. | CO 4 | Understand |

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| 8 | a | AME12.16 | Apply the contact and non-contact types inspection with computer aided testing with integration of computer aided quality with CAD/CAM | CO 4 | Understand |
| | b | AME12.19 | Apply the contact and non-contact types inspection with computer aided testing with integration of computer aided quality with CAD/CAM | CO 4 | Understand |
| 9 | a | AME12.20 | Apply the concepts/components of computer integrated manufacturing and integrate them | CO 5 | Understand |
| | b | AME12.20 | Apply the concepts/components of computer integrated manufacturing and integrate them | CO 5 | Understand |
| 10 | a | AME12.20 | Apply the concepts/components of computer integrated manufacturing and integrate them | CO 5 | Understand |
| | b | AME12.20 | Apply the concepts/components of computer integrated manufacturing and integrate them | CO 5 | Understand |

**Signature of Course Coordinator**                                    **HOD, ME**