UNIT I INTRODUCTION

LECTURER 1
Part – A (2 Marks)
1. Name any four activities of a manufacturing plant which can be carried out through computer control.
2. Describe the features of CAD?
3. What are the advantages and disadvantages of CAD?

Part - B (16 Marks)
1. Explain the concept of design and CAD facility.
2. Explain the advantages and disadvantages of a CAD.
3. Explain the features of CAD.

LECTURER 2
Part – A (2 Marks)
1. Define CAD/CAM.
2. Define concurrent engineering.

LECTURER 3
Part – A (2 Marks)
1. What is CIM?
2. What are the main elements of a CIM system?
3. What is the role of CIM in manufacturing?
4. How the CIM is differs from CAM?
5. List some CIM hardware and CIM software?
6. Bring out some benefits of implementing a CIM system?

Part - B (16 Marks)
1. Briefly explain the nature and role of the elements of CIM system. (16)
2. Describe the need for CIM and issues addressed by CIM. (16)
3. Draw the CIM wheel and explain its different segments in relation to CIM scope?

LECTURER 4
Part – A (2 Marks)
1. What is production system?
2. List the types of production system.

Part - B (16 Marks)
1. Explain different types of production systems. Differentiate between them. (16)

LECTURER 10
Part – A (2 Marks)
1. What do you mean by JIT?
2. Explain Kanban system in detail.

Part - B (16 Marks)
1. Explain the various elements of JIT
Unit II PRODUCTION PLANNING & CONTROL AND COMPUTERIZED PROCESS PLANNING

LECTURER 1

Part – A (2 Marks)

1. What is meant by process planning?
2. Explain process planning activates.
3. State the general approaches to process planning?
4. What are the advantages of manual process planning?
5. What are the disadvantages of manual process planning?

Part – B (16 Marks)

1. List the information required for process planning. (16)
2. What are the factors that influence process planning? (16)

LECTURER 2

Part – A (2 Marks)

1. What is CAPP?
2. What are the advantages of CAPP?

Part – B (16 Marks)

1. (i) What is meant by CAPP? (4) (ii) List out the benefits of CAPP systems. (12)
2. Explain the two approaches commonly used in CAPP system bringing out their advantages and limitations. (16)
3. Compare and contrast the features of variant and generative CAPP systems. (16)

LECTURER 3 & 4

Part – A (2 Marks)

1. What is production planning?
2. Define master scheduling.

Part – B (16 Marks)

1. Explain the procedure by which scheduling 2 jobs in m machines can be done with suitable example (16)

LECTURER 5

Part – A (2 Marks)

1. Define Material requirements planning.

Part – B (16 Marks)

1. Discuss the concepts, inputs, characteristics, working, outputs, and benefits of MRP. (16)

LECTURER 7

Part – A (2 Marks)

1. Define SFC.
2. What are the primary functions of SFC?
3. What are the phases of SFC?

Part – B (16 Marks)

1. Explain three phases of shop floor control. (16)

LECTURER 8

Part – A (2 Marks)

www.studentsfocus.com
1. What do you mean by inventory control?
2. What do you mean by EOQ?
3. Name the costs involved in EOQ.

**Part - B (16 Marks)**
1. Derive the EOQ model with the different rates of demand in different production cycles.

**LECTURER 9**

**Part – A (2 Marks)**
1. State the objective of MRP.

**Part - B (16 Marks)**
1. Explain concept MRP-II in detail.

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**Unit III CELLULAR MANUFACTURING**

**LECTURER 1**

**Part – A (2 Marks)**
1. Define Group Technology (GT).
2. Define Part families.
3. What are the benefits of group technology?
4. What is PFA?
5. What are the applications of GT?

**Part - B (16 Marks)**
1. Briefly discuss the various benefits of implementing a GT in a firm. Also bring out the advantages and limitations of using GT.
2. Explain the role G.T. in CAD/CAM integration.

**LECTURER 2**

**Part – A (2 Marks)**
1. Explain the two categories of attributes of parts.

**Part - B (16 Marks)**
1. Explain about Optiz classification and coding system. (16)
2. Discuss about MICLASS and DCLASS classification and coding system. (16)

**LECTURER 4**

**Part – A (2 Marks)**
1. What is PFA?
2. What is the weakness of PFA?

**Part - B (16 Marks)**
1. Explain in brief PFA with suitable example.

**LECTURER 5**

**Part – A (2 Marks)**
1. List the advantages of cellular manufacturing.

**Part - B (16 Marks)**
1. Briefly write about Composite part concept.
2. Describe the composite part concept in cellular manufacturing.

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**Unit IV FLEXIBLE MANUFACTURING SYSTEM (FMS) AND AUTOMATED GUIDED VEHICLE SYSTEM (AGVS)**

**LECTURER 1**

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www.studentsfocus.com
Part – A (2 Marks)
1. What is meant by FMS?
2. Difference between FMS and FMC.
3. What are the Objectives of FMS?
4. How does FMS classified based on level of flexibility?
5. How does FMS classified based on number of machines?

Part - B (16 Marks)
1. What is meant by FMS and how it differs from other manufacturing systems?

LECTURER 2 & 3
Part – A (2 Marks)
1. What are the components of FMS?
2. Mention different type of layout in FMS.
3. What are the functions of computers in FMS?

Part - B (16 Marks)
1. Explain various components of FMS?
2. Explain the FMS Layout and its application and benefits.

LECTURER 4
Part – A (2 Marks)
1. List out the advantages of implementing FMS.
2. List the applications of FMS.
3. Give the benefits of FMS.

Part - B (16 Marks)
1. List out the applications, advantages, disadvantages of FMS.

Unit V INDUSTRIAL ROBOTICS
LECTURER 1
Part – A (2 Marks)
2. What is work volume? (Nov/Dec-2008), (Nov/Dec 2011)
3. Sketch a robot and name its parts. (Nov/Dec-2007)
4. What are the four basic robot configurations available commercially? (Apr/May-2010)
5. What is meant by pitch, yaw and roll? (Nov/Dec-2008).
6. Name the important specifications of an industrial robot. (Nov/Dec-2012)

Part - B (16 Marks)
1. Describe in detail the anatomy of an industrial robot16 (May/Jun 2013)
2. Sketch and explain the following configuration of robot. (i) TRR ii) TRL:R iii) RR:R (8)
3. Sketch a robot wrist and explain it’s the joint movements. (8) (Nov/Dec 2007)
4. Explain the various parts of a robot with neat sketch. (Nov/Dec 2008)

LECTURER 2
Part – A (2 Marks)
1. Classify the robot as per the type of control and mobility (May/Jun 2013)
2. Which type of drive system is more suitable for heavy load robot application? (Nov/Dec 2012)

Part - B (16 Marks)
1. (i) With a neat sketch explain the three degrees of freedom associated with the robot wrist. (10) (Apr/May 2010) (ii) Discuss the four types robot controls.(6) (Apr/May 2010)
2. Classify the industrial robots and briefly describe it. (8)

LECTURER 3
Part – A (2 Marks)
2. What is the difference between internal grippers and external grippers? (Nov/Dec-2008)
3. List any TWO important advantages and disadvantages of a pneumatic gripper. (Nov/Dec-2007)

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4. What is a mechanical gripper? (May/apr 2010)
5. Give some examples of tool as robot end effector. (Nov/Dec 2011)

Part - B(16 Marks)
2. (i) discuss about magnetic and vacuum grippers. (8) (ii) with suitable illustration explain working on external and internal grippers. (8) (Nov/Dec 2007)
3. With neat sketch explain any five types of mechanical grippers (Nov/Dec 2007)
4. Describe the classification of sensors and the factors to be considered for it selection(May/Jun 2013)

LECTURER 4 & 5
Part – A(2 Marks)
2. How an AVG will differ with Robot? (Nov/Dec-2012)

Part – B(16 Marks)
1. Briefly explain the need for robots in industries. (Nov/Dec 2007)
2. Describe the industrial application of robots. (Nov/Dec-2012)

LECTURER 6 & 7
Part – A(2 Marks)
1. Write down the basic types of robot programming. (May/Jun 2013)
2. Write the meaning of the following command D MOVE (1,10), D MOVE (<4,5,6>,<30,-45,90>)(Apr/May 2010)

Part – B(16 Marks)
1. (i) Explain the manual lead through programming in robot application. (6)
   (ii) Write about end effectors command & sensor command. (10) (Apr/May 2010)
2. (i) write short notes on teach pendant. (8)
   (ii) Explain the various features robot programming languages. (8) (Nov/Dec 2012)

LECTURER 8
Part – A(2 Marks)
Part – B(16 Marks)
1. Briefly explain in the following terms with the suitable example: (i) Control Resolution (ii) Accuracy and (iii) Repeatability. (Nov/Dec 2012)
UNIT-I (INTRODUCTION)
PART-A (2 MARKS)
1. What is CIM?
2. What are the main elements of a CIM system?
3. Name any four activities of a manufacturing plant which can be carried out through computer control.
4. What is the role of CIM in manufacturing?
5. Define Islands of automation.
6. How the manufacturing industries can be grouped?
9. What is manufacturing automation protocol?
10. What is production planning?
11. What is meant by physical distribution?
12. What are plant operations?

UNIT-I (INTRODUCTION)
PART-B
1. Briefly explain the nature and role of the elements of CIM system. (16)
2. Describe the basic activities that must be carried out in a factory to convert raw materials into finished product. (16)
3. Describe the need for CIM and issues addressed by CIM. (16)
4. Discuss the stages in the product development cycle and the importance of each stage. (16)
5. What do you understand by term islands of automation? List and explain any six islands of automation. (16)
PLANNING)

PART-A (2MARKS)
1. Define Group Technology (GT).
2. List out the stages in Group Technology.
3. Define Part families.
4. What are the methods available for solving problems in GT?
5. Explain the two categories of attributes of parts.
6. List out the premises for the developed of DCLASS code.
7. What is PFA?
8. What is the weakness of PFA?
9. What are the applications of GT?
10. What is Process planning?
11. What are the results of Process Planning?

UNIT-II (GROUP TECHNOLOGY AND COMPUTER AIDED PROCESS PLANNING)

PART-B
1. Explain about Optiz classification and coding system. (16)
2. Explain retrieval and generative CAPP systems. (16)
3. Discuss about MICLASS and DCLASS classification and coding system. (16)
4. Briefly discuss the various benefits of implementing a GT in a firm. Also bring out the advantages and limitations of using GT. (16)
5. (a) Describe the composite part concept in cellular manufacturing. (8)
   (b) Discuss the importance of process planning in product development (8)

UNIT-III (SHOP FLOOR CONTROL AND FMS)
PART-A (2MARKS)
1. Define SFC.
2. What are the primary functions of SFC?
3. What are the phases of SFC?
4. What is meant by factory data collection system?
5. What are the different types of automatic identification technologies?
6. What is Bar code concept?
7. Define FMS.
8. What are the components of FMS?
9. What are the Objectives of FMS?
10. What are the types of layout configuration in FMS?
PART B

1. Explain the component of FMS and FMS layout configuration. (16)
2. Explain three phases of shop floor control. (16)
3. Write an engineering brief about the various types of automatic identification technologies. (16)
4. Write short notes on various materials handling equipment that are commonly used in a FMS. (16)
5. Discuss the applications, advantages and disadvantages of a FMS. (16)

UNIT-IV (CIM IMPLEMENTATION AND DATA COMUNICATION)

PART-A (2MARKS)

1. Define CIMOSA.
2. What is the function of CIM open system architecture?
3. What are all the components of a LAN?
4. What is activity cycle diagram?
5. What is network?
6. What are the types of Networks?
7. What is network topology?
8. What are the types of transmission mode?
9. What is meant by multiplexing?
10. What is network management?
11. What are the functions of network management?

UNIT-IV (CIM IMPLEMENTATION AND DATA COMUNICATION)
PART-A (2 MARKS)

1. What is meant by open system interconnection?
2. What is the purpose of open system interconnection?
3. What is a database?
4. State some application of technical office protocol?
5. Define relational database.
6. What is a database system?
7. What are data models?
8. What are types of data associations?
9. List out the layers of OSI model.
10. What are the eight database operators?

UNIT-V (OPEN SYSTEM AND DATABASE FOR CIM)

PART-B

1. What is meant by open system interconnection? Explain briefly seven layers of the ISO/OSI reference model. (16)
2. a) Explain manufacturing Automation Protocol. (8)
   b) Explain Technical Office protocol. (8)
3. a) Write short notes on architecture of DBMS. (8)
   b) Write the advantages and disadvantages of DBMS (8)
4. a) Describe Database operators. (8)
   b) Describe Relational database. (8)
5. a) Describe the three database models. (8)
   b) Describe the architecture of a database management system. (8)
Reg. No.:

**Question Paper Code: 21577**

Seventh Semester
Mechanical Engineering
ME 2402/ME 72 — COMPUTER INTEGRATED MANUFACTURING
(Regulation 2008)
(Common to PTME 2402 – Computer Integrated Manufacturing for B.E.

Time: Three hours
Maximum: 100 marks
Answer ALL questions.

**PART A — (10 x 2 = 20 marks)**

1. Distinguish between reflection and scaling transformations.
2. What is sculptured surface?
3. What is a communication network? List its types.
4. What is MAP model?
5. What is the main difference between hierarchical codes and attribute code structures?
6. What is CMPP system?
7. Distinguish between on-line and off-line data collection systems.
8. List some important advantages of implementing FMS?
9. What do you mean by fixed-order quantity model?
10. What is direct digital control?

**PART B — (5 x 16 = 80 marks)**

11. (a) (i) Write short notes on 3D scaling and 3D shearing geometric transformation. (8)
(ii) Consider a point P (3, 2) in a coordinate plane. Perform reflection of the point P:
(1) through y axis and
(2) through x axis.
Or
(b) Explain with suitable example, how a solid model is generated using boundary representation and write the advantages of solid modelling. (16)
12. (a) (i) Explain the importance of CIM. Also write the reasons for implementing CIM. (8)
(ii) Explain in detail the communication matrix in CIM. (8)

Or

(b) (i) Explain briefly the seven layers of ISO/OSI reference model. (10)
(ii) What is CSMA/CD? And also write the rules for CSMA/CD. (6)

13. (a) Explain the methods for part family formation with a suitable illustration and discuss with examples: “coding system structure”. (16)

Or

(b) (i) Explain composite part concept in cellular manufacturing. (6)
(ii) Discuss the benefits of computer-aided process planning (CAPP) and explain CAPP approaches in detail. (10)

14. (a) (i) What are the functions of shop floor control (SFC)? (4)
(ii) Explain briefly the technologies used in Automatic Identification systems. (12)

Or

(b) (i) Explain the functions of a FMS computer control System. (8)
(ii) Discuss the application, advantages and disadvantages of a FMS. (8)

15. (a) (i) Briefly explain the objectives, principles and various concepts of lean production. (10)
(ii) Write short notes on material requirements planning (MRP). (6)

Or

(b) (i) Explain the configuration and function of adaptive control. (8)
(ii) Describe the components and their arrangement of a direct digital control. (8)
Reg. No. : [BLANK]

**Question Paper Code : 91670**


Seventh Semester

Mechanical Engineering

ME 2402/ ME 72/ 10122 ME 703 — COMPUTER INTEGRATED MANUFACTURING

(Regulation 2008 / 2010)


Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between 2D and 3D wire frame models.

2. What is sculptured surface?

3. What are the specific characteristics that have to be incorporated in the CIM system models?

4. What does the term transmission mode refer to? Also list various types of transmission modes?

5. List any four design considerations guiding the cell- formation.

6. What are the various components of a generative CAPP system?

7. What are the objectives of FDC system?

8. Differentiate between primary and secondary material handling systems.

9. What is direct digital control?

10. What is Master Production Schedule (MPS)?
PART B — (5 × 16 = 80 marks)

11. (a) (i) Describe briefly the surface modelling facilities available in an advanced modeller. (8)
(ii) Write a short notes on generative NC machining based on solid modelling. (8)

Or

(b) (i) Explain the characteristics of solid modeling packages. (8)
(ii) Briefly describe the basic 3D transformation for scaling, translation and rotation. (8)

12. (a) (i) Discuss how CIM can act as an enabling technology for concurrent engineering. (8)
(ii) Discuss the hierarchical structure of computer control of manufacturing system. (8)

Or

(b) (i) Explain the two modes for transmitting binary data across a link. (8)
(ii) List and briefly discuss the various guided and unguided transmission media. (8)

13. (a) (i) Discuss with examples the following: monocode, polycode and mixed code. (8)
(ii) Briefly discuss the various benefits of implementing a CT in a firm. Also bring out the advantages and limitations of using CT. (8)

Or

(b) Explain briefly on CMPP. In what ways, CMPP is considered very significant. What factors should be considered while selecting the best CAPP system? (16)

14. (a) (i) List and briefly explain the various priority sequencing rules used for job sequencing. (8)
(ii) Explain briefly the technologies used in Automatic Identification systems for computer process monitoring. (8)

Or

(b) (i) List and explain the functions of the material handling system in a FMS. (8)
(ii) Write short notes on Automated guided vehicle systems. (8)

15. (a) Briefly explain about production planning process in discrete part manufacturing. (16)

Or

(b) What is MRP? Explain the inputs to MRP and various MRP outputs. Also list the various benefits of MRP. (16)
Reg. No.: 

Question Paper Code: 91670


Seventh Semester

Mechanical Engineering

ME 2402/ ME 72/ 10122 ME 703 — COMPUTER INTEGRATED
MANUFACTURING

(Regulation 2008 / 2010)

(Common to PTME 2402 / 10122 ME 703 — Computer Integrated Manufacturing for

Time: Three hours

Answer ALL questions.

Maximum: 100 marks

PART A — (10 × 2 = 20 marks)

1. Distinguish between 2D and 3D wire frame models.

2. What is sculptured surface?

3. What are the specific characteristics that have to be incorporated in the CIM system models?

4. What does the term transmission mode refer to? Also list various types of transmission modes?

5. List any four design considerations guiding the cell- formation.

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10. What is Master Production Schedule (MPS)?
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(ii) Write a short notes on generative NC machining based on solid modelling. 

Or 

(b) (i) Explain the characteristics of solid modeling packages. 
(ii) Briefly describe the basic 3D transformation for scaling, translation and rotation. 

12. (a) (i) Discuss how CIM can act as an enabling technology for concurrent engineering. 
(ii) Discuss the hierarchical structure of computer control of manufacturing system. 

Or 

(b) (i) Explain the two modes for transmitting binary data across a link. 
(ii) List and briefly discuss the various guided and unguided transmission media. 

13. (a) (i) Discuss with examples the following: monocode, polycode and mixed code. 
(ii) Briefly discuss the various benefits of implementing a GT in a firm. Also bring out the advantages and limitations of using GT. 

Or 

(b) Explain briefly on CMPP. In what ways, CMPP is considered very significant. What factors should be considered while selecting the best CAPP system? 

14. (a) (i) List and briefly explain the various priority sequencing rules used for job sequencing. 
(ii) Explain briefly the technologies used in Automatic Identification systems for computer process monitoring. 

Or 

(b) (i) List and explain the functions of the material handling system in a PMS. 
(ii) Write short notes on Automated guided vehicle systems. 

15. (a) Briefly explain about production planning process in discrete part manufacturing. 

Or 

(b) What is MRP? Explain the inputs to MRP and various MRP outputs. Also list the various benefits of MRP.
PART A — (10 × 2 = 20 marks)

1. What are the components of manufacturing system?

2. A total of 800 shafts must be produced in the lathe section of the machine shop during a particular week. Each shaft is identical and requires a machine cycle time 11.5 minutes. All of the lathes in the department are equivalent in terms of their capability to produce the shaft in the specified cycle time. How many lathes must be devoted to shaft production during the given week, if there are 40 hours of available time on each lathe?

3. By whom and when was Group technology first documented?

4. What is meant by rout sheet?

5. Classify FMS according to the king of operations performed.

6. What are the technologies used for automatic data collection?

7. Write short notes on ‘CIMOSA’.


9. What is Engineering Change Control?

10. List the features of RDBMS.
PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the basic elements of automation. (8)

(ii) Explain the capabilities of computer control that allow real time basics with process and the operator. (8)

Or

(b) (i) Explain the advanced automation functions. (8)

(ii) Discuss the role of marketing in manufacturing industries. (8)

12. (a) (i) How does cellular manufacturing help CAPP? Illustrate with an example. (8)

(ii) List the benefits of Group Technology. (8)

Or

(b) (i) Explain in detail the generative and variant approaches in process planning and differentiate both approaches. (8)

(ii) How parts are classified and coded in Group technology? Illustrate the same for a product. (8)

13. (a) List and explain the major I/O devices to keep track of ongoing shop-floor conditions. (16)

Or

(b) What makes the FMS flexible? Define the types of flexibility and explain its dependent factors. (16)

14. (a) List and explain the requirements for integrating manufacturing systems. (16)

Or

(b) Explain in detail various networking methods with necessary sketches. (16)

15. (a) Describe the salient features of MAP and TOP. (16)

Or

(b) (i) Draw the RDBMS architecture. (8)

(ii) What are the database requirements of CIM? (8)
Reg. No.: 

**Question Paper Code : 51658**


Seventh Semester

Mechanical Engineering

ME 2402/ME 72/10122 ME 703 – COMPUTER INTEGRATED MANUFACTURING

(Regulation 2008/2010)


Time : Three hours

Maximum : 100 marks

Answer ALL questions.

**PART A — (10 × 2 = 20 marks)**

1. Define the terms- zoom, pan.
2. Compare surface modelling and solid modelling.
3. Define Computer integrated manufacturing.
4. What are the various types of communications in CIM?
5. Define variant approach in CAPP.
6. What do you meant by cellular manufacturing?
7. What are the various types of layouts used in FMS design?
8. List out the advantages of Radio frequency identification.
9. Draw the structure of an MRP system.
10. Mention the principles of lean production system.

**PART B — (5 × 16 = 80 marks)**

11. (a) Describe in detail about the basic features of AUTO CAD.

Or

(b) Specify the three principal classification of geometric modelling system and write in brief about each of them.

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Reg. No. :

Question Paper Code: 31577

Seventh Semester
Mechanical Engineering
ME 2402/ME 72/10122 ME 703 — COMPUTER INTEGRATED MANUFACTURING
(Regulation 2008/2010)
(Common to PTME 2402 — Computer Integrated Manufacturing for B.E.
(Part-Time) Sixth Semester – Mechanical Engineering – Regulation 2009)
Time: Three hours

Answer ALL questions.

PART A — (10 × 2 = 20 marks)
1. What are the advantages to be gained by the adoption of CAD?
2. Specify the range of applications for which typical geometric modeling information is used.
3. Differentiate IGES and GKS Graphic standards.
4. Differentiate Modulation and Demodulation.
5. Explain opitz coding system.
6. Define Group technology.
7. Mention the importance of Shop Floor Control Systems (SFC).
8. What are the inputs and outputs of MRP?
9. Describe CIM data transmission methods.
10. List different types of production monitoring systems.

PART B — (5 × 16 = 80 marks)
11. (a) (i) Explain the requirements for a graphic database. (8)
    (ii) Brief the importance of editing, dimensioning and labeling features of CAD. (8)

Or
(b) (i) Describe various types of information normally stored in a geometric database for products in a CIM environment. (8)

(ii) Explain the concept of obtaining a rotation about an arbitrary point in XY plane. (8)

12. (a) (i) Explain the Open System Interconnection Architecture (OSI) formulated by ISO. (8)

(ii) Illustrate the communication matrix used in CIM. (8)

Or

(b) (i) What are the different network topologies available? Discuss them in detail. (8)

(ii) Brief the significance of MAP in CIM environment. (8)

13. (a) (i) Explain generative and variant computer aided process planning approaches in detail. (8)

(ii) Discuss the role of CAPP in CAD/CAM integration. (8)

Or

(b) (i) Discuss DCLASS and MCLASS coding systems. (8)

(ii) Define part classification and coding. How is it useful in forming group technology layout? (8)

14. (a) (i) Explain bar code technology in detail. (8)

(ii) Illustrate different FMS layout configurations. (8)

Or

(b) (i) Discuss the technology behind automated data collection system. (8)

(ii) Explain the types of material handling and storage systems used in FMS. (8)

15. (a) (i) Discuss the benefits of direct digital control. (8)

(ii) Discuss the activities under computer aided manufacturing planning and manufacturing control. (8)

Or

(b) (i) Describe the features of MRP-I and MRP-II systems. (8)

(ii) Brief Lean and Agile manufacturing concepts. (8)

Seventh Semester

Mechanical Engineering

ME 2402/ME 72/10122 ME 703 — COMPUTER INTEGRATED MANUFACTURING

(Regulation 2008/2010)


Time: Three hours www.universityquestions.in Maximum: 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the various methods for representing the solids in CAD.

2. Mention the reasons for implementing CAD.

3. What is meant by topology?

4. Write the types of Guided media.

5. List the factors to be considered in selection of coding system.

6. List any two advantages of CAPP.

7. Define Master Production Schedule.

8. Write the main elements of Flexible Manufacturing System.

9. List the types of inventory.

10. Define the term Direct Digital Control.
PART B — (5 × 16 = 80 marks)

11. (a) (i) What are homogeneous co-ordinates? How can the composition of 2D Transformations be carried out? (6)
(ii) What is CAD? Discuss the various design related tasks performed by CAD. (10)

Or

(b) (i) Discuss the computer graphics display devices (10)
(ii) List the benefits and applications of CAD. (6)

12. (a) (i) State the special features of LAN. Also describe the various elements of LAN. (8)
(ii) What is meant by Product Data Management? Explain why it is important in CAD/CAM integration. (8)

Or

(b) (i) What is meant by serial transmission and explain the types in detail? (8)
(ii) Describe about seven layer OSI model in computer networking. (8)

13. (a) (i) Discuss the Product Flow Analysis in detail. (8)
(ii) Explain the criteria for selecting a CAPP system. (8)

Or

(b) (i) List the benefits and applications of Group Technology. (10)
(ii) Explain briefly about the variant CAPP system. (6)

14. (a) Explain in detail the phases of shop floor control system. (16)

Or

(b) (i) List and explain the various functions that are performed by the FMS computer control system. (10)
(ii) Discuss the benefits of FMS. (6)
UNIT-I INTRODUCTION

PART - A

1. Explain CIM.
2. What are the components of CIM?
3. What are the steps involved in designing and manufacturing a product?
4. What is the role of CIM in manufacturing?
5. What are important applications of CIM in manufacturing planning?
6. What are the important applications of CIM in manufacturing control?
7. What is management?
8. List our the tasks for the managers in effective management:
9. What are the major communications used in manufacturing industry?
10. What is videoconferencing?
11. Define automation.
12. What are the goals of automation in manufacturing industry?
13. What are the functions of automated manufacturing system?
14. Give the classification of automation.
15. What are the benefits of automation?

PART - B

1. Briefly explain the nature and role of the elements of CIM system. (16)
2. Describe the basic activities that must be carried out in a factory to convert raw materials into finished product. (16)
3. Describe the changing manufacturing and management scenario after the development of CIM. (16)

5. List some CIM hardware and CIM software and bring out the various benefits of implementing a CIM system. 

UNIT-II
GROUP TECHNOLOGY AND COMPUTER AIDED PROCESS PLANNING

PART - A

1. Define Group Technology (GT).
2. List out the stages in Group Technology.
3. Define Part families.
4. What are the methods available for solving problems in GT?
5. Explain the two categories of attributes of parts.
6. List out the premises for the developed of DCLASS code.
7. What is PFA?
8. What is the weakness of PFA?
9. What are the applications of GT?
10. What is Process planning?
11. What are the results of Process Planning?

PART - B

1. Explain about Optiz classification and coding system. 
2. Define variant CAPP systems. Explain the general procedure for using one of the variant CAPP systems. 
3. Discuss about MICLASS and DCLASS classification and coding system. 
4. Briefly discuss the various benefits of implementing a GT in a firm. Also bring out the advantages and limitations of using GT. 
5. Explain in detail the process planning activities.
UNIT-III
SHOP FLOOR CONTROL AND FMS

PART - A

2. Define SFC.
3. What is the primary function of SFC?
4. What are the phases of SFC?
5. What is the purpose of FDS?
6. What is an Automatic Data Capture (ADC) method?
7. What are the technologies used in ADC?
8. What Bar code consists?
9. What are the types of Bar code?
10. What is DAS?
11. List out the application of ADC technology.
12. What are the types of SFC?
13. Define FMS.
14. What are the Objectives of FMS?

PART - B

1. Explain the component of FMS and FMS layout configuration (16)
2. Explain three phases of shop floor control. (16)
3. Write an engineering brief about the various types of automatic identification technologies. (16)
4. Write short notes on various materials handling equipment that are commonly found in a FMS. (16)
5. What is MRP? Explain the inputs to MRP and various MRP outputs. Also list the various benefits of MRP. (16)
UNIT-IV
CIM IMPLEMENTATION AND DATA COMUNICATION

PART - A

1. Which is ideal state in computer based manufacturing applications?
2. Write about CIMOSA.
3. How CIMOSA separates functions?
4. Explain about MRR
5. What is the role of process planning in CIM architecture?
6. What is dispatching?
7. What about shop-floor information?
8. Explain PDM.
10. What are the types of IDEF models?

PART - B

1. Explain the components of a Local Area Network and network topologies. (16)
2. a) Explain the CIMOSA model with a neat diagram. (8)
    b) Describe product data management and its advantages. (8)
3. What is data communication? Identify and briefly explain the five components of a data communication system. (16)
4. Compare the two methods of serial transmission. Discuss the advantages and disadvantages of each. (16)
5. Writes short notes on: Ethernet, token ring, and FDDI. (16)
6. What is network management? Discuss the various functions of it. (16)
UNIT-V
OPEN SYSTEM AND DATABASE FOR CIM

PART - A

1. What are the two types of channel?
2. List the characteristics of channel.
3. What is channel bandwidth?
4. What are two types of transmission mode?
5. What is modulation?
6. What is demodulation?
7. What are the reasons for using LAN?
8. What are the features of LAN?
9. Define topology and explain its classification.
10. What are the Advantages of LAN?
11. Define OSI.
12. List out the layers of OSI model.
13. What is the functions of physical layers?
14. What is the function of data link layer?

PART - B

1. Explain about MAP/TOP. (16)
2. a) Explain manufacturing Automation Protocol. (8)
   b) Explain Technical Office protocol. (8)
3. Explain the features of a database management system and database model (16)
4. Describe about the following
   a) Database operators. (8)
   b) Relational databases (8)
5. What are the three levels of architecture of a database system? Describe them. (16)
Reg. No.: [ ]

Question Paper Code: 20352


Seventh Semester

Mechanical Engineering

ME 2402/ME 72 — COMPUTER INTEGRATED MANUFACTURING

(Common to PTME 2402 – Computer Integrated Manufacturing for B.E. (Part-Time)
Sixth Semester – Mechanical Engineering – Regulation 2009)

(Regulation 2008)

Time: Three hours

Maximum: 100 marks

Answer ALL questions.

PART A — (10 x 2 = 20 marks)

1. What are the drawing features of CAD package?

2. What are the advantages of solid modeling?

3. What is the difference between automation and CIM?

4. What is meant by asynchronous data transfer?

5. Mention the benefits of GT.

6. What is CAPP?

7. List the different stages of shop floor control.

8. State the functions of computer control system of FMS.


10. What are the inputs to MRP system.
PART B — \((5 \times 16 = 80\) marks)

11. (a) Describe about operator input devices used at the graphics workstation. \(\text{(16)}\)

Or

(b) (i) What are the functions of a graphics package? \(\text{(8)}\)
(ii) Explain about 2-dimensional transformations. \(\text{(8)}\)

12. (a) (i) What are the benefits of CIM? \(\text{(8)}\)
(ii) Explain about the following data transmission methods:
(1) Simplex
(2) Duplex.

Or

(b) (i) Describe about seven layer OSI model (Computer Networking in CIM). \(\text{(8)}\)
(ii) Explain about network topologies. \(\text{(8)}\)

13. (a) (i) Explain about parts classification and coding. \(\text{(8)}\)
(ii) Describe about OPITZ coding systems. \(\text{(8)}\)

Or

(b) Explain about CAPP. \(\text{(16)}\)

14. (a) Explain about factory data collection system. \(\text{(16)}\)

Or

(b) (i) Explain about FMS workstation. \(\text{(8)}\)
(ii) List the applications of FMS. \(\text{(8)}\)

15. (a) (i) How MRP works? \(\text{(8)}\)
(ii) Explain about cost planning and control. \(\text{(8)}\)

Or

(b) (i) What are the components of DDC? Explain with a figure. \(\text{(8)}\)
(ii) Explain about lean manufacturing. \(\text{(8)}\)

20352
Unit: 1
Two Marks Questions and Answers

1. Explain CIM.
   CIM is the integration of the total manufacturing enterprise through the use of integrated systems and data communications coupled with new managerial philosophies that improve organizational and personnel efficiency.

2. What are the components of CIM?

3. What are the steps involved in designing and manufacturing a product?
   Steps involved in designing and manufacturing a product.
   ♦ Definition of product
   ♦ Design analysis
   ♦ Drifting
   ♦ Pilot production
   ♦ Inspection
   ♦ Packing
   ♦ Conceptual design
   ♦ Prototype
   ♦ Material and process selection
   ♦ Production, Quality assurance and Final product
4. 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.

5. 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

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.

7. What is management?
   Management is the process of making decisions and directing the activities of personnel to achieve stated objective. The objectives are successfully met when efforts are organized by communicating appropriate information for control and readjustment.

8. List our the tasks for the managers in effective management:
   The following six tasks for the managers of CIM:
   1. Develop a business model to understand the problem environment
   2. Develop a functional model for the processes, functions, and activities to describe both "as is" and "to be".
   3. Develop an information model that identifies system interfaces, information exchange patterns, database requirements and applicable technologies.
   4. Develop a network model to identify communication and networking requirements
   5. Develop an organizational model to investigate the implications of integrating the various islands of automation on the existing organization structure and culture, and how to safeguard against detrimental effects.
   6. Finally, develop the implementation plan which should take into account special features of the business and operations.

9. What are the major communication used in manufacturing industry?
   The major communication used in manufacturing industry
   1. Telephones, including cellular systems
   2. Facsimile terminals (or) Fax machines
   3. Satellite dish and video conferencing
   4. Personal computers (PCs)

10. What is videoconferencing?
    The videoconferencing is a live, interactive television program delivered through satellite for a special audience. Videoconferencing can encompass several countries. In it, even two or more persons can participate. For example, in a videoconference manufacturing engineers may discuss "live" about the product with the designers who may be located at company headquarters 1000 kms away. Occasionally, customers or distributors may be called in "live" to clarify a point relating to the defect.
11. Define automation.

Automation is generally defined as the process of having machines follow a predetermined sequence of operations with little or no human labour, using specialized equipment and devices that performs and control manufaction processes.

12. What are the goals of automation in manufacturing industry?

Automation has the following primary goals.

i) Process Integration

ii) Improve Productivity

iii) Economize on floor space

v) Improve quality

13. What are the function of automated manufacturing system?

Automating manufacturing systems operate in the factory on the physical product. They perform operations such as processing, assembly, inspection, or material handing, in some cases accomplishing more than one of these operations in the same systems.

14. Give the classification of automation.

Automated manufacturing systems can be classified into three basic types:

1) Fixed automation

2) Programmable automation

3) Flexible automation.

15. What are the benefits of automation?

- To increase labour productivity
- To reduce labour cost
- To mitigate the effects of labour shortages
- To reduce or eliminate routine and clerical takes
- To improve worker safety.

16. What are the capabilities of computer control?

The capabilities are:

1) Polling (or) Data sampling

2) Interlocks

3) Interrupt system

4) Exception handling

17. Explain the types of interlocks.

There are two types of interlocks:

i) Input interlocks

ii) Output interlocks
i) Input interlocks: An input interlocks that originates from an external device (e.g., a limit switch, sensor, or production machine) and is sent to the controller.
ii) Output interlocks: An output interlock is a signal from the controller to the same external device. It is used to control the activities of each external device and coordinate its operation with that of the other equipment in the cell.

18. What is MAP?

Manufacturing Automation Protocol (MAP) is a specialized LAN designed for a factory environment. It is a hardware cumulative-software-implementable set of rules that facilitate information transfer among networked computers and computer-based equipment.

19. What are the approaches of physical distributions?

- **Customer service**: What level of customer service should be provided?
- **Transportation**: How will the products be shipped?
- **Warehousing**: Where will the goods be located? How many warehouses should be utilized?
- **Order processing**: How should the order be handled?
- **Inventory control**: How much inventory should be maintained at each location?
- **Protective packing and materials handling**: How can efficient methods be developed for handling goods in the factory, warehouse, and transport terminals?

**Chapter 2**

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.

2. List out the stages in Group Technology.
   a) Production planners to setup the GT database.
   b) Grouping the parts or components into part-families with some similar characteristics.
c) Re-design the shop-floor arrangement according to common shape, function or manufacturing process and tooling.

3. Define Part families.

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".

4. What are the methods available for solving problems in GT?

5. Explain the two categories of attributes of parts.

1) Design attributes, which are concerned with part characteristics such as geometry, size, and material.

2) Manufacturing attributes, which consider the sequence of processing steps required to make a part.

6. List out the premises for the development of DCLASS code.

   i) A part may be best characterized by its basic shape, usually is most apparent attribute.

   ii) Each basic shape may have several features, such as holes, slots, threads and grooves.

   iii) A part can be completely characterized by basic shape; size; precision and material type, from and condition.

   iv) Several short code segments can be linked to from classification code that is human recognizable and adequate for human monitoring.

   v) Each of these code segments can point to more detailed information.
7. What is PFA?

Production flow analysis is a technique for pre-planning the division of the whole factory into groups or departmental groups. When the knowledge of division is available, then it is possible to plan the layout.

8. What is the weakness of PFA?

The weakness of production flow analysis (PFA) that the data used are derived from production route-sheets. But the process-sequences have been prepared by different process planners and the difference is reflected on to these route-sheets.

9. What are the applications of GT?

1. **Design:** In a firm many components have similar shape. They can be grouped into design families and a design can be created by simply modifying an existing component design from the same family.

2. **In Manufacturing:** For this purpose GT gives a great importance than simply a design philosophy. Parts that are not similar in shape may still need similar manufacturing processes. Parts of this type are called production family. (All parts may need same operation like drilling, milling thread cutting etc.)

3. **Process Planning:** Process planning work can be facilitated as similar processes are needed for all components of a particular family.
   This helps production planning and control much easier because only similar parts are considered for each cell. Such a cell-oriented layout is called a group-technology layout or cellular layout.

10. What is FMS?

FMS is a manufacturing system based on multi-operation machine tools, incorporating (automatic part handling and storgr).

11. What is Process planning?

Process planning consists of preparing a set of instructions that describe how to fabricate a part or build an assembly which will satisfy engineering design specifications. Process planning is the systematic determination of the methods by which product is to be manufactured, economically and competitively.

12. What are the results of Process Planning?
Routings which specify operations, operation sequences, work centers, standards, tooling and fixtures. This routing becomes a major input to the manufacturing resource planning system to define operations for production activity control purpose and define required resources for capacity requirements planning purposes.

*Process plans which typically provide more detailed, step-by-step work instructions including dimensions related to individual operations, machining parameters, set-up instructions, and quality assurance checkpoints.

*Fabrication and assembly drawings to support manufacture (as opposed to engineering drawings to define the part).

13. What are the steps involved in Process planning?

Steps involved in Process Planning

i) Preliminary analysis and Product design evaluation
ii) Selection of manufacturing process
iii) Selection of Machine Tool
iv) Selection of Tooling and Process parameters
v) Final operation sequence selection

14. What are the factors should be considered in selection of tooling?

- The type and amount of the material to be cut
- The surface finish required
- The rigidity and shape of the part
- The capacity and condition of the available equipment
- The required production volume (high volume jobs usually permit optimum speeds and feeds while lot jobs may use lower speeds to achieve completion of the lot without regrinding of the cutting tool)
- The succeeding operations such as finish grinding and honing
- The recommendations given in tables should be considered only as a starting point. A detailed analysis is further required in each individual case to arrive at the most feasible solution.
15. What are the principles should adhere while determining the efficient sequence?

- The first operation in the sequence should be one in which the largest layer of metal is removed.

- Finishing operations should be performed at the end of the operation sequence.

- Surfaces whose machining does not greatly affect the rigidity of the work should be machined earlier in the sequence, and

- The sequence of machining operations should be coordinated with heat treating operations, if any in the processor manufacture.

16. What are the prerequisites for process planning?

The other prerequisites for process planning are:

- Part list
- Annual demand/batch size
- Accuracy and surface finish requirement
- Equipment details
- Data on cutting fluids, tools, jigs and fixtures, gauges.
- Standard available stock sizes.
- Machining data, data on handling and setup.

17. What are the approaches the CAPP will recognize?

Two approaches to CAPP are traditionally recognized: the variant approach and the generative approach. Many CAPP systems combine both approaches.

18. Why CAPP systems are called as variant system?

The main reasons probably are:

1. The investment is less and the development time is shorter. Especially for medium sized companies which want to establish their own research groups.

2. The development costs and hardware costs are lower. Especially for some small companies where the products do not vary much and who still have process planners.
19. Give the main component of generative CAPP systems.

CAPP system contains of two main components.

i) Manufacturing data base (part description, machine tool library etc.)

ii) Decision logic (to represent the process planner)

20. What are the benefits of CAPP over manual process?

1. **Process rationalization:** Computer-automated preparation of operation routings is more likely to be consistent, logical, and optimal than its manual counterpart. The process plans will be consistent because the same computer software is being used by all planners.

2. **Increased productivity of process planners:** With computer-aided process planning, there is reduced clerical effort, fewer errors are made and the planners have immediate access to the process planning database. These benefits translate into higher productivity of the process planners.

3. **Reduced turnaround time:** Working with the CAPP system, the process planner is able to prepare a route sheet for a new part in less time compared to manual preparation. This leads to an overall reduction in manufacturing lead time.

4. **Improved legibility:** The computer-prepared document is neater and easier to read than manually written route sheets. CAPP systems employ standard text, which facilitates interpretation of the process plan in the factory.

5. **Incorporation of other application programs:** The process planning system can be designed to operate in conjunction with other software packages to automate many of the time-consuming manufacturing support functions.

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Chapter 3


   The two major objectives of a production management system (PMS) are planning and controlling of the manufacturing operations. The Planning Stage deals with initial Production planning, development of master schedule, capacity planning, and MRP.

2. Define SFC.

   Shop Floor Control (SFC) is defined as the important manufacturing activity that will control flow of the product and materials on the factory flow involving the quantities, types of parts, schedule dates, priorities and the status of jobs and orders.

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3. What are the primary function of SFC?

**Functions of SFC system**
- Priority control and assignment of shop orders
- Maintain information on work in process for MRP
- Monitor shop order status information
- Provide production output data for capacity control purposes

4. What are the phases of SFC?
The three phases or modules are:

1. Order Release
2. Order Scheduling
3. Order Progress

5. What is the purpose of FDS?
The purpose of the Factory Data Collection (FDS) system in shop floor control is to provide basic data for monitoring order progress. In a computerized SFC system these data are submitted to the order progress module for analysis and generation of work order status reports and exception reports.

6. What is an Automatic Data Capture (ADC) method?

   Automatic Identification methods is also known as Automatic Data Capture (ADC) it is refers to the technologies that provides direct entry of data into the computer or other control systems without using a keyboards. These technologies require no human involvement in the data capture and entry process.

7. What are the technologies used in ADC?

   1. Optical
   2. Magnetic type
   3. Electromagnetic type
   4. Smart card
   5. Touch techniques
   6. Biometric

8. What Bar code consists?

   The bar code consists of a thick and narrow coloured bars separates thick and narrow spaces separating the bars. The pattern of bars and spaces is co to represent alphanumeric characters.

9. What are the types of Bar code?

   Bar codes divide into two basic types:

1) Linear, in which the encoded data are read using a linear sweep of the scan
2) Two-dimensional, in which the encoded data must be read in both directions
10. What is DAS?

A data acquisitions system (DAS) is a computer system used to automatically collect data from a process or piece of equipment. They either perform an analysis data or transmit the data to another computer for processing and analysis.

11. List out the application of ADC technology.

The following are the most common application of ADC technologies.

1) Parts receiving  
2) Shipping  
3) Order picking  
4) Finished goods storage  
5) Manufacturing processing  
6) Work-in-process storage  
7) Assembly  
8) Sortation

12. What are the types of SFC?

The types of SFC data that would be collected the FDC system include

- Labour time turned in against a job
- Count on scrapped parts or needing rework.
- Piece counts
- Machine breakdowns.
- Completion of operations in the routing sequence.

13. Define FMS.

A Flexible Manufacturing System (FMS) is an individual machine or group of machines served by an automated materials handling system that is computer controlled and has a tool handling capability.

14. What are the Objectives of FMS?

- To provide flexible manufacturing facility for pan family components.
- To provide the benefits of grouping the operation in single location.
- To provide the flexibility in producing small and medium parts.
- To maximize the utilization of facilities.
- To have a good management control.

15. What are the components of FMS?

Flexible Manufacturing Systems (FMS) consists of the following four components.

1. Processing stations or workstations
2. Material handling and storage

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3. Computer control system
4. Human labour

16. What are the FMS layout configurations? FMSs can be divided into five categories:
   1) In-line layout
   2) Loop layout
   3) Ladder layout
   4) Open field layout
   5) Robot-centered cell.

17. What are the functions of computers in FMS?
   The functions of computers in FMS are:
   1. Workstation control
   2. Distribution of control instructions to workstations
   3. Production control
   4. Traffic control
   5. Shuttle control
   6. Work piece monitoring
   7. Tool control
   8. Performance monitoring and reporting
   9. Diagnosis

18. List the applications of FMSs.
   Applications of FMS installations are in the following areas:
   • Machining
   • Assembly
   • Sheet-metal press-working
   • Forging
   • Plastic injection molding
   • Welding
   • Textile machinery manufacture
19. Give the benefits of FMSs.

The benefits that can be expected from an FMS include:

- Increased machine utilization
- Fewer machines required
- Reduction in factory floor space required
- Greater responsiveness to change
- Reduced inventory requirements
- Lower manufacturing lead times
- Reduced direct labor requirements and higher labor productivity
- Opportunity for unattended production

20. List any two advantages and disadvantages of FMS implementation.

**Advantages**

- Faster, lower-cost changes from one part to another which will improve capital utilization.
- Lower direct labor cost, due to the reduction in number of workers.

**Disadvantages**

- Substantial pre-planning activity.
- Expensive, costing millions of dollars.

21. How does FMS classified based on level of flexibility?

FMS classified based on level of flexibility as:

- Production flexibility
- Machine flexibility
- Mix flexibility
- Product flexibility

22. How does FMS classified based on number of machines?

- Single Machine Cell (SMC)
- Flexible Manufacturing Cell (FMC)
- Flexible Manufacturing System (FMS)
Unit: 4

1. Which is ideal state in computer based manufacturing applications?
   Computer Integrated Manufacturing (CIM) is an ideal state in which computer based manufacturing applications communicate information to coordinate design, planning and manufacturing processes.

2. Draw simple E-R diagram.

   ![Components to Finished Assembles E-R Diagram](image)

3. What are the types of IDEF models?

<table>
<thead>
<tr>
<th>IDEF</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Function Modeling (It shows the overall high-level activities of the process)</td>
</tr>
<tr>
<td>1</td>
<td>Information Modeling (It captures conceptual views of the industry information)</td>
</tr>
<tr>
<td>1X</td>
<td>Data Modeling (It captures of logical view of industrial data based on ER model)</td>
</tr>
<tr>
<td>2</td>
<td>Simulation Model design (It represent time varying behavioral of resources in a factory)</td>
</tr>
<tr>
<td>3</td>
<td>Process description capture (It captures physical aspects of a factory system)</td>
</tr>
<tr>
<td>4</td>
<td>Object-oriented design (It captures application of computer language in part design stage)</td>
</tr>
<tr>
<td>5</td>
<td>Ontology description capture (It capture initial specification of the parts in a factory)</td>
</tr>
<tr>
<td>6</td>
<td>Design rationale capture (It represents various design attributes about the parts)</td>
</tr>
<tr>
<td>7</td>
<td>Information system auditing (It captures component manufacturing auditing parameters)</td>
</tr>
<tr>
<td>8</td>
<td>User interface modeling (It represents description about the interfacing methods in factory)</td>
</tr>
<tr>
<td>9</td>
<td>Scenario driven IS diagram (It represents all the inputs status in factory)</td>
</tr>
<tr>
<td>10</td>
<td>Implementation modeling (It captures all the implementation methods in part manufacturing)</td>
</tr>
</tbody>
</table>

4. Write about CIMOSA.
   CIMOSA defines a model-based enterprise engineering method which categorizes manufacturing operations into Generic and Specific (Partial and Particular) functions.

5. How CIMOSA separates functions?
   - The CIMOSA Modeling Framework in which specific and Generic functions are clearly separated.
   - The CIMOSA Integrating Infrastructure supporting execution of Generic functions and linking specific functions. It is effectively the communication system which interconnects all of the functions in the CIM system.
6. Explain about MRR

*The material requirements planning (MRP)* function takes current inventory levels for all components needed for the final products (a plant might have 20000 part numbers and perhaps 100 final products for which master schedules have been determined) as well as the components bills of materials and lead time information (obtained from design and process planning) and evolves component master schedules for all components needed by the demand requirements agreed upon. MRP does not take into account whether manufacturing has sufficient capacity to handle the job releases, and so capacity planning evaluates shop loading in terms of the requirements and feeds back to the master schedule for corrective action if problems occur. A further function of MRP based on such analysis is determining whether components should be produced in-house or subcontracted to outside vendors.

7. What is the role of process planning in CIM architecture?

The process planning function can ensure the profitability or non-profitability of a part being manufactured because of the myriad ways in which a part can be produced.

8. What is dispatching?

Dispatching is the function of releasing all required items needed to perform an operation on a part so that part production may be accomplished at the time planned by the scheduling function.

9. What about shop-floor information?

Shop-floor information system is responsible for getting the required information down to the processing equipment local controllers and sequencing controllers as well as capturing real-time status data from the equipment and parts so that the feedback loops can effect corrections or normal continuation of operation as required.

10. Explain PDM.

*Product Data Management (PDM)* or *Product Information Management (PIM)* systems provide the tools to control access to and manage all product definition data. It does this by maintaining information (meta-data) about product information. Product Data Management (PDM) systems, when tightly integrated with other product...
development tools does this transparently and with minimal additional effort on the part of the user.

Unit:5

1. What are the two types of channel?
Two basic channel types are used in data communications. They are
i) Analog type ii) Digital type

2. List the characteristics of channel.
The channel characteristics are
i) Electronic noise ii) Signal attenuation
   iii) Analog channel capacity iv) Digital channel capacity

3. What is channel bandwidth?
An analog signal can vary from a minimum to maximum frequency. The difference between the lowest and the highest frequency of a single analog is the bandwidth of that signal. The mathematical formula for frequency is,

\[
\text{Frequency} = \frac{\text{Velocity}}{\text{Wavelength}}
\]

4. What are two types of transmission mode?
There are three transmission modes available. They are
i) Simplex ii) Half-duplex iii) Duplex.
They can be applied to both analog and digital channels.

5. What is modulation?
The process of varying amplitude or frequency or phase of the carrier signal in accordance with the instantaneous value of the information signal is known as modulation.

6. What is demodulation?
The process of separating the original information signal from the modulated carrier signal is known as demodulation. It is the inverse process of modulation.

7. What are the reasons for using LAN?
1. LAN allows for decentralization of various data processing functions.
2. LAN allows departments to share hardware.
3. LAN allows for the electronic transfer of text.
4. LAN allows for communication between organizations.
5. LAN allows information to be shared.
8. What are the features of LAN?
   i) Compatibility  ii) Protected Mode Operation
   iii) Internetworking  iv) Growth Path and Modularity
   v) System Reliability

9. Define topology and explain its classification.
   The pattern of interconnection of nodes in a network is called topology. Topcigy can also be defined as the geometric arrangement of workstations and the links among them.
   The types of LAN topology are
   i) Bus topology   ii) Ringtopolgy   iii) Star topology   iv) Mesh topology

10. What are the Advantages of LAN?
   • LAN is suited to any type of application.
   • It provides data integrity.
   • Any number of users can be accommodated.
   • A LAN can fit any site requirements.
   • It is flexible and growth-oriented.
   • LAN provides a cost-effective multi user computer environment.
   • Data transfer rates are above 10 Mbps.
   • It allows sharing of mass central storage and printers.
   • It allows file/record locking.

11. Define OSI.
    Open systems interconnection (OSI) reference model is an international standards organization (ISO) standard that specifies the conceptual structure of systems that are to communicate with each other.

12. List out the layers of OSI model.

   Seven layers in OSI model
   — i) Physical layer
   — ii) Data link layer
   — iii) Network layer
   — iv) Transport layer
   — v) Session layer
   — vi) Presentation layer
   — vii) Application layer
13. What is the function of physical layers?
   The physical layer consists of the hardware that drives the network and circuits.

14. What is the function of data link layer?
   The data link layer handles the task of transferring information across the physical link by sending blocks of data.

15. What is the function of transport layer?
   The transport layer provides transparent transfer of packets (data) to and from the session layer without disruption.

16. What is the role of application in OSI model?
   The application layer provides the user interface to the networking system.

17. What is gateway?
   A gateway device is a special-purpose computer, a workstation with associated software, or a software module that runs as a task in a mainframe. It is essentially a protocol converter that facilitates the connection of two dissimilar network architectures. Gateways are integration tools to permit end-to-end communications.

18. List the application protocols of TCP/IP.
   A number of application protocols and user applications have been developed based on TCP/IP. These include Telnet, FTP, Network File System (NFS), Simple Mail Transfer Protocol (SMTP), and Simplified Network Management Protocol (SNMP).

19. How data’s are classified in engineering/manufacturing environment?
   Data encountered in an manufacturing environment can be classified into 4 basic types
   a) Resource data, which describes the resources involved in production, such as machines and tools.
   b) Product data, which consists of graphic, text and numeric data.
   c) Operational data, which describes the events of production, such as schedules and lot sizes.
   d) Production data, which describes how the parts are to be manufactured.

20. What is database?
   A database is a collection of files as an organized assembly of information that users can access for various purposes; that is, adding, deleting, or modifying data.

21. What is data model?
   A data model is a logical representation of a collection of data elements. Data models are the basic building blocks for designing all databases.
22. What is DBMS?

DBMS stands for Database management system. A program which lets you manage information in databases. The program we use to organize our data and the actual data structure we create with that program.

23. What is Primary key?

A key is used to represent unique value in a table. For example, in student table every student has unique identification such as ID.

24. What is foreign key?

A key used in one table to represent the value of a primary key in a related table. While primary keys must contain unique values, foreign keys may have duplicates. For instance, if we use student ID as the primary key in a Students table (each student has a unique ID), we could use student ID as a foreign key.

25. What is normalization?

The process of structuring data to minimize duplication and inconsistencies. The process usually involves breaking down a single table into two or more tables and defining relationships between those tables. Normalization is usually done in stages, with each stage applying more rigorous rules to the types of information which can be stored in a table.

27. Mention the different levels of data modeling.

The Data structures are created within a database. The extent of the relationships among them, plays an important role in determining the effectiveness of DBMS. Therefore the database design becomes a crucial activity in the database environment. The task of Database design is made simpler when data models are used. Models are "Simplified abstractions of real-world events or conditions".

For example, such abstractions will enable us to explore the characteristics of entities and the relationships that can be created among such entities. If the models are not logically sound, the database designs derived from them will not deliver the database system's promise of effective information drawn from an efficient database.

28. What is Network Data Model?

A network data model is simply a graph wherein nodes represent unique records, and links between nodes represent association between the corresponding records.

29. What is Hierarchical Data Model?

The hierarchical data model is similar to the network data model except that the relationships among the records are represented in the form of tree structure.

30. What is Data Associations?

A link describes an association between two records. The following are the different types of data associations used in DBMS in manufacturing scenario.
1. One-to-one association
2. One-to-many association
3. Many-to-many association

31. List out the Database operators.

To manipulate data in a relational database, three basic operations can be applied to the tables. These are:

- Selection,
- Projection,
- Join.
B.E/B.Tech (Part-Time) DEGREE EXAMINATIONS, APR/MAY 2014
Manufacturing Engineering (R-2005/2009)
Seventh Semester
PTMN481/PTMF9351 COMPUTER INTEGRATED PRODUCTION MANAGEMENT SYSTEMS

Time: 3 Hours
Max.: 100 Marks

Answer ALL Questions

PART -A
10x2 = 20 Marks

1. How is a batch production system different from a mass manufacturing system?

2. What is meant by seasonality index? Why is it required to smooth the seasonality index for forecasting the demand?

3. Why we need MRP system for dependent items?

4. What is meant by planned order receipts?

5. Make a note on priority rule for job sequencing.

6. When will you use low level scan and high level scan in multi level scanning during data acquisition?

7. What is the need for process planning?

8. Make a note on future trend of CAPP.

9. What are the benefits of computer aided process planning?

10. Make a note on automatic process planning.

PART -B
5 x 16 = 80 Marks

11. a.i) Briefly explain the problems encountered in planning and managing production operations

   ii) The demand for a particular product during the last 8 quarters is given below:

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Use exponential smoothing with trend correction to forecast the demand for quarter 9. Use $\alpha = 0.3$, $\beta = 0.2$. The initial smoothed average is 40.00 and the trend value is 0.0.

12 a.i) Discuss the importance of the master production schedule in an MRP system.  

ii) Product A consists of two units of subassembly B, three units of C, and one unit of D. B is composed of four units of E and three units of F. C is made of two units of H and three units of D.H is made of five units of E and two units of G.

A) Construct simple bill of material  
B) Construct bill of material using low level coding  
C) Construct an indented part list

Or

b. The MRP gross requirements for item A are shown here for the next 10 weeks. Lead time for A is three weeks and setup cost is Rs.600 Per setup. There is a carrying cost of Rs.2 per unit per week. Beginning inventory is 90 units.

<table>
<thead>
<tr>
<th>Weeks</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross requirements</td>
<td>30</td>
<td>50</td>
<td>10</td>
<td>20</td>
<td>70</td>
<td>80</td>
<td>20</td>
<td>60</td>
<td>200</td>
<td>50</td>
</tr>
</tbody>
</table>

Use the least total cost or the least unit cost lot sizing method to determine when and for what quantity the first order should be released.

13 a.i) Explain about flow of information in shop floor control  

ii) Explain the following configurations of Process monitoring: Data logging systems, Data Acquisition systems.

Or

b.i) What are the five methods of shop floor data collection systems? Explain any two.  

ii) Enumerate the following process control strategies: Feedback control, Regulatory control.

14 a. Elucidate the steps involved in developing a process plan.

Or
b. Explain with a case study the use of expert system in process planning. (16)

15 a.i) Briefly explain the methodology to be followed for developing a retrieval type 
CAPP system. (8)

ii) Explain the following: Backward planning and Forward planning. (8)

Or

b.i) Explain any one part description method used for CAPP. (8)

ii) Briefly explain the methodology to be followed for developing a generative type 
CAPP system. (8)
B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2014

MANUFACTURING ENGINEERING

VII Semester

MN 471/MF 9402 FLEXIBLE MANUFACTURING SYSTEMS
(Regulation 2004/2008)

Time : 3 Hours Answer ALL Questions Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. How is FMS defined?
2. What are the benefits of implementing FMS?
3. What are the software source alternatives for FMS?
4. How is FMS software justified?
5. Why is simulation applied for FMS?
6. What is a library of parts?
7. What is visual method of classification in group technology (GT)?
8. What is machine part incident matrix?
9. Why FMS is popular for metal cutting applications?
10. How can expert systems used in FMS?

Part – B (5 x 16 = 80 marks)

11. i) Discuss any four types of FMS flexibility in detail.
    ii) What is the structure of knowledge based scheduling system?

12. a) Discuss the computer control in a work centre. Explain with a diagram.
    OR
    b) Discuss the extrinsic and intrinsic functions for the FMS with a block diagram.

13. a) Discuss the stages in FMS simulation with an example.
    OR
    b) What is the typical system design and corresponding database layout for FMS?

14. a) How is similarity coefficient method used to group parts? Give an example.
    OR
    b) How is cluster identification algorithm used to group parts? Give an example.

15. a) Discuss FMS application for sheet metal fabrication.
    OR
    b) Discuss FMS application for machining aerospace parts.
ME2402– COMPUTER INTEGRATED MANUFACTURING

IV year Mechanical Engg.

Subject code/Name: ME2402-COMPUTER INTEGRATED MANUFACTURING

Year/Sem: IV/VII

UNIT-I (COMPUTER AIDED DESIGN)

PART-A (2 MARKS)

1. Distinguish between reflection and scaling transformations.
2. What is sculptured surface?
3. What is meant by geometry and topology?
4. List any four rules of dimensioning.
5. What are the drawing features of CAD package?
6. What are the advantages of solid modeling?
7. Define wire frame modeling
8. What is meant by parametric modeling?
9. Define solid modeling
10. Differentiate between redraw and regenerate?
11. What is scaling, editing, dimensioning?
12. Describe the features of CAD?
13. What are the advantages and disadvantages of CAD?
14. What is surface modeling?
15. Explain labeling, zoom and pan.
16. Define CAD/CAM.

PART-B (16 MARKS)

1. Write short notes on solid modeling, wireframe modeling and surface modeling.
2. Explain the boundary representation form in solid modeling.
3. Explain the concept of design and CAD facility.
4. Explain the features of CAD
5. Differentiate between redraw and regenerate.
6. Explain the typical cad command structure.
7. Explain parametric and feature based modeling.
8. Explain the advantages and disadvantages of a CAD.
9. Explain the CAD commands in related to CAD Packages.
10. Explain the different forms of solid modeling.

UNIT-II (COMPONENTS OF CIM)

PART-A (2 MARKS)

1. What is the meaning of CIM?
2. What are the product related activities of a company?
3. How the CIM is differs from CAM?
4. List some CIM hardware and CIM software?
5. What is CIM?
6. What are the main elements of a CIM system?
7. Name any four activities of a manufacturing plant which can be carried out through computer control.
8. What is the role of CIM in manufacturing?
10. How the manufacturing industries can be grouped?
13. What is manufacturing automation protocol?
14. What is production planning?
15. What is meant by physical distribution?
16. What are plant operations?
17. Bring out some benefits of implementing a CIM system?
18. What is meant by “inventory control”
19. What is meant by “MAP”?
20. What is the difference between product layout and process layout?
21. What do you mean by CIM architecture, CIMOSA, PDM, CSMA/CD?
22. Define Topology. List different types of Topology.
23. What is communication network? List its types.
24. What are the functions of network management?

PART-B

1. Briefly explain the nature and role of the elements of CIM system.
2. Describe the basic activities that must be carried out in a factory to convert raw materials into finished product.
3. Describe the need for CIM and issues addressed by CIM.
4. Discuss the stages in the product development cycle and the importance of each stage.
5. What do you understand by term islands of automation? List and explain any six islands of automation.
6. Draw the CIM wheel and explain its different segments in relation to CIM scope?
7. Differentiate dedicated system from open system.
8. Explain the changes in manufacturing and management scenes in the recent past that led to the development of CIM.
9. What is network? And explain various advantages of network.
10. Write short notes on LAN, MAN, and WAN.
11. What is network management? Discuss various functions of it.
12. Explain CIMOSA model with neat diagram?

UNIT-III (GROUP TECHNOLOGY AND COMPUTER AIDED PROCESS PLANNING)

PART-A (2MARKS)

1. Define Group Technology (GT).
2. List out the stages in Group Technology.
3. Define Part families.
4. What are the methods available for solving problems in GT?
5. Explain the two categories of attributes of parts.
6. List out the premises for the development of DCLASS code.
7. What are the applications of GT?
8. What is Process planning?
9. What are the results of Process Planning?
10. List out the facility design layouts using G.T.
11. Define part family.
12. List out the types of machine cell design.
13. What are the benefits of group technology?
15. What are the applications of robots in CIM environment?
16. List the various coding system widely used GT
17. What is the role of GT in CIM environment?
18. What are the basic approaches of CAPP?
19. What is CMPT?
20. What is MPS?

PART-B

1. Explain about Optiz classification and coding system.

2. Explain retrieval and generative CAPP systems.

3. Discuss about MICLASS and DCLASS classification and coding system.

4. Briefly discuss the various benefits of implementing a GT in a firm. Also bring out the advantages and limitations of using GT.

5. (a) Describe the composite part concept in cellular manufacturing.

(b) Discuss the importance of process planning in product development


8. What is meant by physical distribution? Explain its various activities?

9. Explain why the GT is important in achieving CAD&CAM integration?

10. Explain in brief of the following.
   a. Optiz coding system.
   b. MICLASS.
   c. DCLASS.
   d. PFA.
UNIT IV SHOP FLOOR CONTROL AND INTRODUCTION TO FMS

PART-A (2MARKS)

1. What is meant by FMS?
2. What are the components of FMS?
3. Mention different type of layout in FMS.
4. Difference between FMS and FMC.
5. List out the advantages of implementing FMS.
6. What is meant by automated material handling system?
7. What is SFC?
8. What is meant by FDCS?
9. Distinguish between online and offline data collection system.
10. List out various data input techniques of FDC.

PART-B

1. What is meant by FMS and how it differs from other manufacturing systems?
2. Explain various components of FMS? And list out applications, advantages, disadvantages of FMS.
3. What is PDM? Explain its role in CIM implementation?
4. What is shop floor control? And what are the functions of SFC? Explain various phases of SFC.
5. Explain in detail the process planning activities?
6. Explain about the automated data collection.
7. What is FMS and explain its components.
8. Explain material handling and storage system.
9. Explain bar code technology?
10. Explain the FMS Layout and its application and benefits.

UNIT V COMPUTER AIDED PLANNING AND CONTROL AND COMPUTER MONITORING

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PART-A (2MARKS)

1. List the source of input data to MRP and output of MRP
2. What is CAPP?
3. What is data modeling?
4. What are data associations?
5. List some important features of DBMS.
6. Classify data models.
7. What are the basic approaches of CAPP?
8. What is CMPT?
9. What is MPS?
10. What is PFA?
11. What is the weakness of PFA?

PART-B

1. Describe the different plant operations.
2. What is the role of business and financial management of a Company?
3. Explain the types of production monitoring systems.
4. Explain the process control layout and its strategies.
5. Explain the material requirements planning.
6. What is meant by CAPP? List out the benefit of CAPP system?
7. Explain the various steps involved in Production flow analysis.
8. What are data models? Explain them.
9. Explain the technological framework of process planning by using block diagram also explain why process planning is important in achieving the integration of CAD/CAM?
10. Explain MAP and TOP?