



B.E DEGREE EXAMINATIONS: MAY 2017

(Regulation 2014)

Sixth Semester

MECHATRONICS ENGINEERING

U14MCE201 : Computer Integrated Manufacturing

COURSE OUTCOMES

- CO1:** Describe the concept of automation and rapid prototyping processes
- CO2:** Classify the different types of material handling and storage system with principles and applications
- CO3:** Explain the importance of group technology and cellular manufacturing
- CO4:** Summarize the fundamentals of flexible manufacturing systems
- CO5:** Make use of computers to prepare the product and process plan
- CO6:** Discuss the importance of MRP, Inventory control, JIT and lean manufacturing techniques.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Matching type item with multiple choice code

CO1 [K₁]

List I	List II
A. Stereo lithography	i. solid stock
B. Selective Laser Sintering	ii. liquid based
C. Fused Deposition Modeling	iii. a foil
D. Laminated object manufacturing	iv. powder based

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|----|-----|----|-----|----|
| | A | B | C | D |
| a) | ii | i | iii | iv |
| b) | iii | iv | ii | i |
| c) | ii | iv | iii | i |
| d) | iii | i | ii | iv |

2. The essential element from which Rapid Prototyping technology is based is:

CO1 [K₂]

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|---------------------------------|----------------------|
| a) computer aided manufacturing | b) laser beams |
| c) computer aided design | d) numerical control |

3. Consider the following statements. CO3 [K₂]

1. The goal of cellular manufacturing is to move as quickly as possible, make a wide variety of similar products.
2. The cells are used to improve many factors in a manufacturing setting by allowing one piece flow to occur.
3. The goal of cellular manufacturing is to move as quickly as possible, make a wide variety of dissimilar products.
4. The cells are used to improve many factors in a manufacturing setting by allowing multi piece flow to occur.

Which one of the statement is correct?

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|--------|--------|
| a) 1,3 | b) 1,4 |
| c) 1,2 | d) 2,3 |

4. Fixed routing is associated with which of the following types of manufacturing systems CO2 [K₁]

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|-----------------------------------|-------------------------------|
| a) cellular manufacturing systems | b) automated storage systems |
| c) manual assembly lines | d) automated production lines |

5. Assertion (A): Lean manufacturing focuses on reducing costs, allowing companies greater price flexibility. CO6 [K₁]

Reason (R): Agile manufacturing focuses on responding quickly to unexpected customer requests, allowing companies to capitalize on the highest possible number of sales opportunities.

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|---|---|
| a) Both A and R are Individually true and R is the correct explanation of A | b) Both A and R are Individually true but R is not the correct explanation of A |
| c) A is true but R is false | d) A is false but R is true |

6. For heavy pay load on large distance the type of AGV employed is CO4 [K₁]

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|--------------------------|----------------------|
| a) Driverless train | b) AGV Pallet trucks |
| c) AGV unit load carries | d) Driver train |

7. Hierarchy of FMS control system are CO4 [K₁]

1) FMM 2)FMF 3)FMS 4) FMC

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|------------|------------|
| a) 2-3-4-1 | b) 1-3-2-4 |
| c) 3-4-2-1 | d) 4-1-3-2 |

8. Flexible manufacturing systems and cells are generally applied in CO4 [K₂]
- a) low volume b) medium-volume, medium-variety production
- c) high-variety, low-volume production d) mass production
9. Assertion In GT, where similar parts are collectively identified and grouped to use the benefit of their relationship in design and as well as in production. CO3 [K₁]
- Reason (R): The similar parts are grouped to form part families. Each and every family has similar design and manufacturing qualities.
- a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A
- c) A is true but R is false d) A is false but R is true
10. MRP II stands for CO6 [K₂]
- a) Material Resource Planning b) Material Requirements Planning
- c) Manufacturing Resource Planning d) Manufacturing Requirements Planning

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. Classify the levels of automation. CO1 [K₁]
12. State the importance of RPT in Industries. CO1 [K₁]
13. State the fundamental principle of stereo lithography process. CO1 [K₂]
14. List the control systems used in AGV's. CO2 [K₁]
15. Classify the basic elements of automated system. CO2 [K₂]
16. Summarize Cellular Engineering. CO3 [K₂]
17. List the few implementation issues of FMS. CO4 [K₃]
18. Why CAPP systems are called as variant system? CO5 [K₃]
19. Mention the salient features of JIT. CO6 [K₂]
20. What is MRP II? CO6 [K₁]

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

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|--|---------------------------|
| 21. Develop a case study on RP in terms of beneficiaries such as the product designers, tool designer, manufacturing engineer and consumers. | CO1 [K ₃] |
| 22. Explain with the sketch about the principle of operation of SLS. Also mention the merits and demerits of the process. | CO1 [K ₂] |
| 23. Explain various types of AGVs and also discuss the advantages of AGVs over other material handling systems. | CO2 [K ₂] |
| 24. Describe principle of an automated storage and retrieval system. | CO2 [K ₂] |
| 25. Summarize the importance of GT and also discuss the components of GT. | CO3 [K ₂] |
| 26. what is flexible manufacturing system? In what ways, FMS differs from other Manufacturing systems. | CO4 [K ₃] |
| 27. i) Show the characteristic of Just-In-Time Technology | (7) CO6 [K ₅] |
| ii) Compare Lean and Agile manufacturing systems. | (7) |
