

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM**  
**IV B. Tech I Semester Advanced Supplementary Examinations March 2025**

**AUTOMATION IN MANUFACTURING**

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

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**UNIT-I**

1. a) What are the different types of automation, and how do they vary in terms of their applications in manufacturing processes? [7M]  
b) Explain the role of pneumatic and hydraulic components in automation. How do they contribute to machine tool efficiency? [7M]

(OR)

2. a) Discuss the importance of optical encoders in automation. What role do they play in controlling machine tools? [7M]  
b) What are the functions of mechanical feeding and tool-changing mechanisms in CNC machine tools? [7M]

**UNIT-II**

3. a) Describe the methods of part transport used in automated flow lines. How do transfer mechanisms improve production efficiency? [7M]  
b) What is buffer storage in automated flow lines? How does it affect the flow and efficiency of production? [7M]

(OR)

4. a) Explain the difference between transfer lines with and without buffer storage. What impact does buffer storage have on overall system performance? [7M]  
b) Discuss the key considerations for the design and fabrication of automated flow lines in industrial settings. [7M]

**UNIT-III**

5. a) What are the different types of assembly line balancing methods? How do they contribute to optimized production efficiency? [7M]  
b) Explain the concept of flexible assembly lines. What advantages do they offer over traditional assembly systems? [7M]

(OR)

6. a) Discuss the various ways to improve line balance in an assembly line. How does this affect productivity and worker efficiency? [7M]  
b) What are the key features and applications of automated inspection systems in modern assembly lines? [7M]

**UNIT-IV**

7. a) Explain the functions and advantages of automated material handling systems. What types of equipment are commonly used in these systems? [7M]  
b) Discuss the design and analysis of conveyor systems used in material handling. What factors influence their efficiency? [7M]

(OR)

8. a) Describe Automated Guided Vehicle Systems (AGVs) and their role in modern manufacturing processes. [7M]  
b) What is an Automated Storage and Retrieval System (ASRS), and how does it optimize storage and inventory management? [7M]

**UNIT-V**

9. a) What is adaptive control, and how does it enhance machining operations by optimizing parameters such as cutting force and temperature? [7M]  
b) Explain how adaptive control systems help reduce vibrations during machining. What impact does this have on product quality? [7M]

(OR)

10. a) Describe the role of adaptive control with optimization in manufacturing systems. How does it contribute to more efficient operations? [7M]  
b) Discuss the application of adaptive control in machining operations. What challenges are typically encountered in implementing these systems? [7M]

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