



End Term (Even) Semester Examination May-June 2025

Roll no.....

Name of the Program and semester: B.Tech/4th

Name of the Course: *Automation in Production*

Course Code: TME-410

Time: 3 hour

Maximum Marks: 100

Note:

- (i) All the questions are compulsory.
- (ii) Answer any two sub questions from a, b and c in each main question.
- (iii) Total marks for each question is 20 (twenty).
- (iv) Each sub-question carries 10 marks.

Q1.

(2X10=20 Marks)

- a. Explain the applications of Automated Guided Vehicles. CO3
- b. i) What are the functions of storage buffer? CO2
 - ii) Give the importance of precedence diagram in line balancing.
 - iii) List out different types of material handling equipment.
 - iv) What is offline and online inspections?
- c. Explain any two principles of automation with an example for each. What are the basic elements of an automated system? Briefly describe their roles. CO1

Q2.

(2X10=20 Marks)

- a. With neat diagrams explain the functioning of various types of Transfer Mechanisms. CO3
- b. Write the formula for break-even analysis and explain the significance of each term. How does manufacturing lead time affect the unit cost of production? Explain briefly. CO2
- c. Discuss the various basic industrial sensors such as: CO5
 - i) IR Analog Sensor
 - ii) IR Digital Sensor
 - iii) Color IR (TSOP) Sensor
 - iv) Provide working principles and typical industrial applications for each

Q3.

(2X10=20 Marks)

- a. Define storage system performance. Why is storage system throughput important? CO2
- b. Draw and explain a simple schematic for an LED circuit using a current-limiting resistor connected to an Arduino. Discuss the importance of using a dropping resistor with LEDs. CO4
- c. Describe the construction, working principle, and applications of the following actuators: CO5
 - i) DC Motor
 - ii) DC Geared Motor

Q4.

(2X10=20 Marks)

- a. What is the role of Work-in-Process (WIP) storage in manufacturing systems? Mention one benefit of efficient WIP storage. CO3
- b. Describe the Arduino hardware setup and installation process. What are the different types of Arduino boards available? Explain any two boards in detail. CO4

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- c. Evaluate different methods used for investment analysis in production economics. Discuss their significance while planning for automation projects. CO3

Q5. (2X10=20 Marks)

- a. Analyze the key factors that influence the selection and design of a material handling system. Include layout, material characteristics, and cost considerations. CO2
- b. Differentiate between belt conveyors and roller conveyors based on working principle and application. CO1
- c. Describe the working principles of capacitors, resistors, inductors, and diodes. Provide their circuit symbols, characteristics, and at least one application for each component. CO4