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Printed Page:-3 **Subject Code:- BME0511**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
B.Tech
SEM: V - THEORY EXAMINATION (2025 - 2026)
Subject: Factory Automation

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION-A 20

1. Attempt all parts:-

1-a. Fixed automation is best suited for: CO1 K1 1

(a) Low-volume production
(b) High-volume, repetitive tasks
(c) Customized products
(d) Prototype development

1-b. Sensors in automated systems are primarily used to: CO1 K1 1

(a) Generate power
(b) Detect conditions
(c) Write programs
(d) Control operators

1-c. Which principle emphasizes minimum handling? CO2 K1 1

(a) Gravity principle
(b) Minimum handling principle
(c) Ergonomic principle
(d) Unit load principle

1-d. Material handling systems are widely used in: CO2 K1 1

(a) Manufacturing
(b) Warehousing
(c) Construction
(d) All of these

1-e. In factory layouts, cellular design aims mainly to: CO3 K1 1

(a) Reduce flow distance and work-in-process
(b) Maximize inventory
(c) Increase number of inspections
(d) Promote fixed-position assembly

1-f. A potential drawback of cellular manufacturing is: CO3 K1 1

(a) Risk of machine underutilization
(b) Excess motion
(c) Poor ergonomics
(d) Higher defect rates

1-g. A PLC is primarily used for: CO4 K1 1

(a) Discrete control
(b) Continuous control
(c) Data warehousing
(d) ERP

1-h. Which is an example of a field device? CO4 K1 1

(a) Sensor
(b) ERP software
(c) Database
(d) Spreadsheet

1-i. A closed-loop control system uses: CO5 K1 1

(a) Feedback to reduce error
(b) Only feedforward
(c) No sensors
(d) Manual override only

1-j. A typical sensor in process control is: CO5 K1 1

(a) Thermocouple
(b) Spreadsheet
(c) Printer
(d) Firewall

2. Attempt all parts:-

2.a. List the components of automation in production systems. CO1 K2 2

2.b. State the primary purpose of cellular manufacturing. CO2 K2 2

2.c. List the main components of an industrial control system. CO3 K2 2

2.d. Name the types of signals processed by analog I/O modules. CO4 K2 2

2.e. Give two examples of industries using material handling systems. CO5 K2 2

SECTION-B 30

3. Attempt all parts:-

3.a. Answer any one of the following:-

3.a.(i) Explain how levels of automation affect the design of production systems. CO1 K2 6

3.a.(ii) Explain the role of feedback in automated production systems. CO1 K2 6

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3.b. Answer any one of the following:-

3.b.(i)	Clarify the role of automation in material handling systems. CO2 K2	6
3.b.(ii)	Describe the process of selecting a material handling system for a specific application. CO2 K2	6

3.c. Answer any one of the following:-

3.c.(i)	Explain how cellular manufacturing reduces setup times and costs. CO3 K2	6
3.c.(ii)	Explain how FMS is planned and implemented in a production environment. CO3 K2	6

3.d. Answer any one of the following:-

3.d.(i)	Explain the importance of computer processes in industrial automation. CO4 K2	6
3.d.(ii)	Describe the differences between feedback and feedforward control systems in automation. CO4 K2	6

3.e. Answer any one of the following:-

3.e.(i)	Describe the key features of a Distributed Control System (DCS). CO5 K2	6
3.e.(ii)	Explain the role of sensors in automatic process control. CO5 K2	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Describe an automation strategy for increasing efficiency in a large-scale factory. CO1 K4	10
4-b.	Analyze and explain an automated system that meets the needs of mass customization in production. CO1 K4	10

5. Answer any one of the following:-

5-a.	Write a plan to incorporate automated guided vehicles into an existing material handling system. CO2 K4	10
5-b.	Explain process of using material handling systems to create a more efficient production line. CO2 K4	10

6. Answer any one of the following:-

6-a.	Write Implementation process for a quality control system in an FMS environment to ensure product consistency. CO3 K4	10
6-b.	Design a process for production layout that integrates manufacturing cells with automated inspection technologies. CO3 K4	10

7. Answer any one of the following:-

7-a.	Explain a discrete control techniques to automate an assembly line for electronic products. CO4 K4	10
7-b.	Explain benefits of computer-based control to track and control the operations of an industrial system. CO4 K4	10

8. Answer any one of the following:-

8-a.	Describe a Distributed Control System (DCS) for controlling a multi-stage process. CO5 K4	10
8-b.	Explain SCADA to integrate predictive maintenance into an industrial process control system. CO5 K4	10