.

Printed Page:-3 **Subject Code:- BME0412**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
B.Tech
SEM: IV - 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:-

(1.1) Transfer time refers to? [CO1 K1] 1

(a) Processing
(b) Movement
(c) Inspection
(d) Setup

(1.2) Controller commonly used? [CO1 K1] 1

(a) PLC
(b) Lathe
(c) Wrench
(d) Fixture

(1.3) AS/RS means? [CO2 K1] 1

(a) Automated Storage and Retrieval System
(b) Advanced system
(c) Automatic sorting
(d) None

(1.4) Sorting systems classify based on? [CO2 K1] 1

(a) Size/ID
(b) Color only
(c) Shape only
(d) Time

(1.5) FMS is best suited for? [CO3 K1] 1

.

(a) Medium volume–medium variety
(b) Low volume
(c) High volume–low variety
(d) One product

(1.6) Cell layout improves? [CO3 K1] 1

(a) Throughput
(b) Distance
(c) Delay
(d) Inventory

(1.7) Closed-loop system includes? [CO4 K1] 1

(a) Feedback
(b) No sensor
(c) No controller
(d) None

(1.8) Analog signals are? [CO4 K1] 1

(a) Continuous
(b) Binary
(c) Discrete
(d) Text

(1.9) DCS architecture is? [CO5 K1] 1

(a) Distributed
(b) Centralized
(c) Manual
(d) Mechanical

(1.10) SCADA operates at [CO5 K1] 1

(a) Supervisory level
(b) Field
(c) Actuator
(d) Sensor

2. Attempt all parts:-

(2.1) Define the term "transfer lines" in the context of automation. [CO1 K2] 2

(2.2) Name one common material transport system used in manufacturing. [CO2 K2] 2

(2.3) State the primary purpose of cellular manufacturing. [CO3 K2] 2

(2.4) List the forms of computer processes used in automation. [CO4 K2] 2

(2.5) Define the term “SCADA” and its role in process control. [CO5 K2] 2

SECTION-B 30

Answer any one of the following:-

(3.1) Explain the basic elements of an automated system with a neat block diagram. [CO1 K2] 6

(3.2) List advantages and limitations of automation in manufacturing. [CO1 K2] 6

.

Answer any one of the following:-

(3.3) Explain fixed-path and variable-path transport systems. [CO2 K2] 6

(3.4) Describe RFID system components and working. [CO2 K2] 6

Answer any one of the following:-

(3.5) Explain FMS planning and scheduling requirements. [CO3 K2] 6

(3.6) Discuss Coordinate Measuring Machines (CMM). [CO3 K2] 6

Answer any one of the following:-

(3.7) Explain process control and its objectives. [CO4 K2] 6

(3.8) Discuss safety considerations in industrial control systems. [CO4 K2] 6

Answer any one of the following:-

(3.9) Explain components of a SCADA system. [CO5 K2] 6

(3.10) Differentiate between PLC and SCADA. [CO5 K2] 6

SECTION-C 50

4. Answer any one of the following:-

(4.1) A factory using transfer lines faces complete line stoppage due to breakdown at one station. Explain the working of transfer lines, analyze the problem, and suggest automation improvements. [CO1 K4] 10

(4.2) A company plans to integrate sensors, actuators, and controllers in its production system. Explain basic elements of automation with block diagram and discuss role of feedback. [CO1 K4] 10

5. Answer any one of the following:-

(5.1) Define material handling and explain its objectives. [CO2 K2] 10

(5.2) Describe material transport systems used in industries. [CO2 K2] 10

6. Answer any one of the following:-

(6.1) An installed FMS faces scheduling and routing inefficiencies. Discuss FMS planning, routing flexibility, and improvement strategies. [CO3 K3] 10

(6.2) A precision manufacturing firm plans automated inspection. Explain inspection principles, CMMs, and non-contact inspection techniques. [CO3 K3] 10

7. Answer any one of the following:-

(7.1) Explain industrial control systems. [CO4 K2] 10

(7.2) Explain continuous and discrete control. [CO4 K2] 10

8. Answer any one of the following:-

(8.1) An automation system needs real-time data visualization. Explain data acquisition, HMI, historian, and alarm management. [CO5 K3] 10

(8.2) An automated plant connected to IT networks faces cybersecurity risks. Analyze threats and preventive cybersecurity measures. [CO5 K3] 10