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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VII - THEORY EXAMINATION (2025 - 2026)

Subject: Introduction to IoT

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. Identify an example of a Consumer IoT device. [CO1] [K1]

1

- (a) Smartwatch
- (b) CNC Machine
- (c) Industrial Robot
- (d) SCADA system

1-b. IIoT stands for. [CO1] [K1]

1

- (a) Internet Industrial Optimization Technology
- (b) Industrial Internet of Things
- (c) Intelligent Internet Operations Technology
- (d) Integrated Internet Operations Technology

1-c. The term "data ingestion" refers to: [CO2] [K1]

1

- (a) Cleaning and formatting data
- (b) Collecting raw data from IoT devices
- (c) Storing data in cloud servers
- (d) Visualizing data for users

1-d. Edge Computing in IoT helps reduce: [CO2] [K1]

1

- (a) Data accuracy
- (b) Latency
- (c) Energy consumption
- (d) Storage costs

1-e. A strain gauge is an example of a: [CO3] [K2]

1

- (a) Pressure sensor
 - (b) Temperature sensor
 - (c) Force transducer
 - (d) Optical sensor
- 1-f. Identify the type of control system capable of adjusting control parameters based on changing conditions. [CO3] [K2] 1
- (a) Adaptive control system
 - (b) Sequential control system
 - (c) Safety control system
 - (d) Supervisory control system
- 1-g. Identify the protocol commonly used in low-power IoT communication. [CO4] [K2] 1
- (a) HTTP
 - (b) MQTT
 - (c) FTP
 - (d) SMTP
- 1-h. Identify the proximity networking technology commonly used for home automation applications. [CO4] [K2] 1
- (a) ZigBee
 - (b) Bluetooth
 - (c) Serial Communication
 - (d) CAN bus
- 1-i. Identify the mathematical method commonly used for smoothing noisy time series data. [CO5] [K2] 1
- (a) Linear regression
 - (b) Moving average
 - (c) Cluster analysis
 - (d) Decision tree
- 1-j. Identify the characteristic that makes time-series databases ideal for IoT data storage. [CO5] [K2] 1
- (a) Ability to perform complex joins
 - (b) Optimized for storing metadata
 - (c) Ability to handle high write throughput
 - (d) Designed for offline batch processing

2. Attempt all parts:-

- 2.a. Define a smart device in IoT and provide one example. [CO1] [K1] 2
- 2.b. Name the OSI layer responsible for establishing, maintaining, and terminating connections. [CO2] [K2] 2
- 2.c. Name two common types of sensors used in industrial systems. [CO3] [K2] 2
- 2.d. List two differences between TCP and UDP communication protocols. [CO4] [K1] 2
- 2.e. Name two examples of time series databases. [CO5] [K1] 2

SECTION-B

30

3. Attempt all parts:-	
3.a. Answer any <u>one</u> of the following:-	
3.a.(i) Explain the concept of real-time data analytics in IoT and discuss its advantages. [CO1] [K2]	6
3.a.(ii) Describe the impact of IoT on agriculture, focusing on its role in precision farming and crop management. [CO1] [K2]	6
3.b. Answer any one of the following:-	
3.b.(i) Discuss the benefits of using IoT Gateways in a distributed IoT architecture. [CO2] [K2]	6
3.b.(ii) Compare and contrast point anomaly detection and contextual anomaly detection in time series analysis. [CO2] [K2]	6
3.c. Answer any one of the following:-	
3.c.(i) Explain the importance of calibration in sensor-based systems. How does it affect performance. [CO3] [K2]	6
3.c.(ii) Compare and contrast LoRaWAN and NB-IoT as wireless technologies for IoT connectivity with an example. [CO3] [K3]	6
3.d. Answer any one of the following:-	
3.d.(i) Briefly explain how ZigBee differs from Bluetooth in terms of range, power consumption, and application. [CO4] [K3]	6
3.d.(ii) Compare the characteristics and use cases of MQTT and CoAP as IoT messaging protocols. [CO4] [K3]	6
3.e. Answer any one of the following:-	
3.e.(i) Explain how interpolation helps handle missing data in time-series datasets, with an example. [CO5] [K3]	6
3.e.(ii) Analyze the security challenges specific to IoT devices and networks. [CO5] [K4]	6
<u>SECTION-C</u>	50
4. Answer any <u>one</u> of the following:-	
4-a. Discuss the major challenges in scaling Industrial IoT solutions across manufacturing sectors? Suggest possible solutions to these challenges. [CO1] [K2]	10
4-b. Discuss the role of IoT in improving the efficiency of manufacturing processes, including predictive maintenance, real-time monitoring, and supply chain optimization, and provide examples of IoT-enabled manufacturing use cases. [CO1] [K2]	10
5. Answer any <u>one</u> of the following:-	
5-a. Discuss the concept of edge virtualization in IoT communication and evaluate its benefits in terms of resource optimization and communication scalability. [CO2] [K2]	10
5-b. Describe benefits and challenges of using blockchain technology in IoT communication and data management. [CO2] [K1]	10
6. Answer any <u>one</u> of the following:-	
6-a. Discuss the components, working, and functions of industrial control systems. Provide examples of their applications in manufacturing. [CO.3] [K2]	10

- 6-b. Discuss the challenges and solutions for sensor selection in industrial applications, considering factors such as environmental conditions, measurement requirements, and cost constraints. [CO3] [K3] 10
7. Answer any one of the following:-
- 7-a. Explain the OSI 7-layer architecture and map each layer to IoT architecture components. Provide relevant examples. [CO4] [K2] 10
- 7-b. Analyze the use of artificial intelligence (AI) and machine learning (ML) in IoT communication, highlighting their applications and potential benefits. [CO4] [K4] 10
8. Answer any one of the following:-
- 8-a. Describe the Industrial Internet Reference Architecture (IIRA) and its key components. How does it differ from general IoT architectures. [CO5] [K2] 10
- 8-b. Discuss the role of machine learning algorithms in time series forecasting, highlighting their strengths and weaknesses.[CO5] [K3] 10

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