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

B.Tech

SEM: IV - THEORY EXAMINATION (2025 - 2026)

Subject: IoT Architecture and Protocols

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) | Identify the layer responsible for data transmission between devices and servers. (CO1, K1) | 1 |
| (a) | Application Layer | |
| (b) | Network Layer | |
| (c) | Perception Layer | |
| (d) | Business Layer | |
| (1.2) | Cloud computing in IoT architecture is mainly part of which layer. (CO1, K1) | 1 |
| (a) | Perception Layer | |
| (b) | Network Layer | |
| (c) | Processing Layer | |
| (d) | Application Layer | |
| (1.3) | LoRaWAN is used for: (CO2, K2) | 1 |
| (a) | Short-range communication | |
| (b) | Long-range low power communication | |
| (c) | Wired networking | |
| (d) | Optical transmission | |
| (1.4) | Identify the component which connects end devices to network server. (CO2, K1) | 1 |
| (a) | Gateway | |
| (b) | Sensor | |
| (c) | Cloud | |
| (d) | Router | |

- (1.5) Select the one which has lowest power consumption (CO3,K1) 1
- (a) Unlicensed spectrum
 - (b) Licensed spectrum
 - (c) Optical fiber
 - (d) Infrared
- (1.6) UART is used for: (CO3,K2) 1
- (a) Long-range communication
 - (b) Short-range IoT
 - (c) Satellite communication
 - (d) Optical networks
- (1.7) Protocol standardization in IoT ensures (CO4,K1) 1
- (a) High cost
 - (b) Interoperability
 - (c) Device failure
 - (d) Data loss
- (1.8) WSN consists of (CO4,K1) 1
- (a) Servers
 - (b) Routers
 - (c) Sensor nodes
 - (d) Satellites
- (1.9) IoT mainly deals with: (CO5, K1) 1
- (a) Physical layer
 - (b) Network layer
 - (c) Application layer
 - (d) Data link layer
- (1.10) WoT operates primarily at: (CO5, K1) 1
- (a) REST APIs
 - (b) Device communication
 - (c) Web services
 - (d) HTML

2. Attempt all parts:-

- (2.1) Explain the function of the Processing Layer. (CO1, K2) 2
- (2.2) List OIC design principles. (CO2, K1) 2
- (2.3) Define scalability in IoT networks.(CO3,K2) 2
- (2.4) Define vendor lock-in in IoT.(CO4,K2) 2
- (2.5) State two key differences between WoT and IoT. (CO5, K1) 2

SECTION-B

30

Answer any one of the following:-

- (3.1) Explain the 4-layer IoT architecture with a neat diagram.(CO1, K1) 6
- (3.2) Explain key design principles of IoT systems. (CO1, K1) 6

Answer any one of the following:-

- (3.3) Analyze the importance of the resource model in OIC for scalable IoT systems. (CO2, K4) 6
- (3.4) Justify the need for platform independence in IoT systems with suitable examples. (CO2, K4) 6

Answer any one of the following:-

- (3.5) Discuss the connectivity type best for wearable devices. (CO3,K4) 6
- (3.6) Explain energy efficiency with respect to IoT communications. (CO3,K2) 6

Answer any one of the following:-

- (3.7) Explain the need for protocol standardization in IoT and its benefits. (CO4,K2) 6
- (3.8) Explain the architecture and working of WSN with its applications.(CO4,K2) 6

Answer any one of the following:-

- (3.9) Differentiate between Web of Things (WoT) and Internet of Things (IoT) with suitable examples. (CO5, K2) 6
- (3.10) Explain the two pillars of the Web and their role in enabling WoT systems. (CO5, K2) 6

SECTION-C 50

4. Answer any one of the following:-

- (4.1) Explain the architectural overview of IoT systems with a neat diagram and describe its major layers. (CO1, K2) 10
- (4.2) Explain the key capabilities of IoT systems including sensing, communication, computation, and actuation with examples. (CO1, K2) 10

5. Answer any one of the following:-

- (5.1) Critically analyze how resource-oriented design differs from service-oriented architecture in IoT systems. (CO2, K4) 10
- (5.2) Evaluate the impact of security threats on IoT design principles and propose mitigation techniques. (CO2, K4) 10

6. Answer any one of the following:-

- (6.1) Compare UART, SPI, and I2C in terms of speed, complexity, and applications.(CO3,K4) 10
- (6.2) Compare MQTT, CoAP, and HTTP with respect to efficiency, overhead, and use cases.(CO3,K4) 10

7. Answer any one of the following:-

- (7.1) Ellobrate SCADA system architecture in detail and discuss its protocols and applications in industrial IoT systems.(CO4,K3) 10
- (7.2) Describe RFID technology in detail, including components, working principle, types of tags, and applications.(CO4,K2) 10

8. Answer any one of the following:-

- (8.1) Analyze the role of web technologies in enabling remote device access in WoT. (CO5, K4) 10
- (8.2) Analyze the need for standard frameworks in WoT for integrating heterogeneous 10

IoT devices. (CO5, K4)

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