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Question Paper Code: U5207

M.E. DEGREE EXAMINATION, APRIL / MAY 2025

Elective

Communication Systems

21PCM507 - IOT PROTOCOLS

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 20 = 100 Marks)

1. (a) How has digitization influenced the adoption of IoT across industries? Explain how data-driven decision-making is enhanced through IoT and digitization. CO1- U (20)

Or

- (b) Describe the layers of a simplified IoT architecture and their functions. What are the different types of IoT communication protocols, and how do they impact system performance? CO1- U (20)

2. (a) In an industrial IoT deployment, apply the communication criteria (range, frequency bands, power consumption, and topology) to select the appropriate network architecture for monitoring machinery in a large factory. How would you ensure reliable communication with minimal power usage? CO2-App (20)

Or

- (b) Apply the concept of sensor networks to develop an IoT solution for monitoring air quality in a city. How would you select appropriate sensors, communication technologies, and network topologies to ensure reliable and cost-effective data collection across multiple locations? CO2-App (20)

3. (a) Analyze the security vulnerabilities of IoT networks in relation to the transport layer. How might different transport protocols (like TLS over TCP or Datagram-based security over UDP) impact the overall security posture of a critical IoT infrastructure, such as healthcare or energy monitoring systems? CO4- Ana (20)

Or

- (b) Analyze the trade-offs involved in optimizing IP for IoT, focusing on the impact of header compression and routing protocols on the overall efficiency of the network. How do these optimizations affect network reliability and scalability? CO4- Ana (20)
4. (a) Explain the concept of edge analytics and how it benefits real-time IoT applications. CO1- U (20)
- Or
- (b) Describe the purpose of formal risk analysis frameworks like NIST RMF in securing IoT systems. CO1- U (20)
5. (a) In a smart city transportation system, apply IoT technologies to improve road safety. How would you implement sensors for detecting road conditions (e.g., icy roads, traffic accidents) and communicate these warnings to vehicles in real-time to avoid accidents? CO3-App (20)
- Or
- (b) Apply IoT-based technologies to improve response times in emergency medical services. How would you integrate wearable devices for emergency responders to monitor their vitals and share real-time health data with hospitals during an emergency? CO3-App (20)