Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code: R5G04

B.E./B.Tech. DEGREE EXAMINATION, NOV/DEC 2025

Fifth Semester

Artificial Intelligence and Machine Learning

R21UAM504 - BULIDING INTERNET OF THINGS

(Regulations R2021)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1.	Determine the basic operations in IoT.	CO1- U
2.	A production company wants to implement a real-time quality control system using IoT to detect defects in products during manufacturing. Which industrial IoT architecture should be adopted, and how would it operate?	CO2-App
3.	Explain an IoT use case in healthcare and its impact on patient care.	CO1- U
4.	Apply the IoT definition to explain how a fitness tracker fits into the IoT ecosystem.	CO2-App
5.	Why is "Interoperability" important in IoT systems?	CO1- U
6.	Apply MQTT protocol for developing an iot application that needs to integrate with devices from different manufacturers	CO2-App
7.	Name two benefits of using a layered IoT architecture.	CO 1- U
8.	Design a secure resource-efficient IoT architecture that meets low-power and memory constraints, while still ensuring encryption, authentication, and resilience.	CO2-App
9.	What is security vulnerability in the context of IoT devices?	CO 1- U
10.	Design and implement a web application architecture that automatically adjusts resources (e.g. server instances, services) in real time based on user demand to ensure optimal performance and cost-efficiency.	CO2-App

PART – B (5 x 16= 80 Marks)

11. (a) Apply the solutions for Potential Challenges in Deploying a   CO2- App   (16)
Sensor Network in a Remote, Harsh Environment.

(b) With reference to an IoT system used in smart home automation, explain the roles of sensing, actuation, and networking. Discuss the physical and logical design of the system, communication protocols involved, and how machine-to-machine communication enables automation. Also, outline the main IoT functional blocks and communication models used.   CO2- App   (16)

12. (a) Describe the emerging trends in IoT technology and their implications for the industrial structure of IoT systems. How do advancements in technologies like edge computing, 5G, and AI impact the design and deployment of IoT solutions in sectors such as manufacturing, logistics, and healthcare?   CO2- App   (16)

Or

(b) Explain the Machine-to-Machine (M2M) value chain in detail. Discuss the key components, stakeholders involved, and how value is created and delivered in an M2M ecosystem.   CO2- App   (16)

13. (a) Explain in detail the main design principles and needed capabilities of IoT.   CO1- U   (16)

Or

(b) Describe the architecture of IoT and explain its effectiveness in modern applications.   CO1- U   (16)

14. (a) Apply the operational views of IoT for ensure real time data processing and reliable communication between devices.   CO2- App   (16)

Or

(b) Using a smart grid as an example, describe the deployment of sensors, smart meters, communication networks, and edge/cloud resources to monitor and manage power usage distribution. Show how each component in the deployment architecture support the smart grid's functionality.   CO2- App   (16)

15. (a) Explain in detail about Arduino and Raspberry Pi.   CO1- U   (16)

Or

(b) Explain how cloud computing enhances data management, storage, and analytics in IoT applications. Provide examples of how cloud platforms process and analyze large volumes of IoT data in real-time.   CO1- U   (16)

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