JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech-VII Semester (BI)

COURSE CODE (CREDITS): 25B1WCI731(2) MAX. MARKS: 35

COURSE NAME: Building IoT and Network Applications

COURSE INSTRUCTORS: SKP MAX. TIME: 2 Hours

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	When designing a campus-wide smart-energy monitoring system, evaluate why developers might prefer open-source platforms like ThingsBoard, Node-RED, or Blynk. Consider factors such as rapid prototyping, workflow customization, integration flexibility, and cost-effectiveness in large-scale deployments.	4	5
Q2	In a nationwide fleet management system with thousands of vehicles transmitting GPS and engine data, analyze how cloud IoT services (AWS IoT, Google Cloud IoT, Azure IoT Hub) manage high-volume device connectivity, ensure data security, provide scalability, and maintain low-latency processing.	3	5
Q3	Compare microcontrollers (e.g., Arduino) and single-board computers (e.g., Raspberry Pi) in terms of processing power, energy efficiency, peripheral support, and suitability for IoT edge applications. How do these differences influence the choice of hardware for a specific IoT deployment?	2	5
Q4	Discuss the trade-offs between WiFi, Bluetooth, Zigbee, and LoRa in terms of throughput, latency, energy efficiency, network topology, and scalability. How do these trade-offs influence protocol selection for heterogeneous IoT ecosystems?	1	5

Q5.	In a large factory generating continuous machine readings, discuss how proper data management, preprocessing, and the use of time-series databases ensure structured, reliable, and query-efficient storage. Consider how this supports analytics, predictive maintenance, and operational decision-making.	5	5
Q6.	Describe the design principles of the Constrained Application Protocol (CoAP) and its suitability for low-power, lossy networks. Compare its request/response model and reliability mechanisms to traditional HTTP in IoT contexts.	4	5
Q7.	In a smart home system where door locks, cameras, and sensors connect over Wi-Fi, evaluate the key security challenges such as authentication, encryption, and vulnerabilities. How can these challenges be mitigated to prevent unauthorized access and ensure user safety?	5	5

Best of luck