Final Assessment Test(FAT) - Nov/Dec 2024

Programme	B.Tech.	Semester	Fall Semester 2024-25
Course Code	BCSE401L	Faculty Name	Prof. Berlin Hency V
Course Title	Internet of Things	Slot	D1+TD1
		Class Nbr	CH2024250100449
Time	3 hours	Max. Marks	100

General Instructions

- Write only Register Number in the Question Paper where space is provided (right-side at the top) & do not write any other details.

Course Outcomes

1. Describe layers of IoT and IoT devices used for various applications.
2. Understand the standards, protocols and communication models of IoT
3. Comprehend advanced IoT applications and technologies from the basics of IoT.
4. Understand working principles of various sensor for different IoT platforms.
5. Understand the challenges of IoT using privacy and security metrics
6. Solve real-time problems and demonstrate IoT applications in various domains using prototype models

Section - I
Answer all Questions (6 × 15 Marks)

*M - Marks

Q.No	Question	*M	CO	BL
01.	In a smart healthcare system, patients use wearables and sensors to monitor their vital signs continuously. Healthcare providers use a user-friendly mobile application to access real-time data from devices, processed by an edge computing gateway, and stored in a cloud server for analytics. Describe how the integration of each component—sensors, communication methods, data processing in the cloud server, and user interfaces—contributes to the overall effectiveness of the smart healthcare system.	15	1	1
02.	Describe the IEEE 802.11 Wi-Fi frame format, detailing the structure, purpose, and functionality of each field within the frame. Discuss the significance of each field in enabling reliable communication, with multiple devices and access points.	15	2	3
03.	A retail company collects data on customer purchases to analyze shopping behavior. They have a dataset containing two features: Amount Spent (in dollars) and Number of Items Purchased. Apply a dimensionality reduction technique to transform the 2D dataset into a 1D representation, enabling easier visualization of customer segments and clustering algorithms for better marketing focus and customer engagement.	15	3	4

Amount Spent (in dollars)	2	3	4	5
Number of Items Purchased	4	6	8	10

Q.No	Question	*M	CO	BL
04.	A company uses a network of sensors to monitor environmental conditions like temperature, humidity, and air quality, organizing them into clusters for efficient data processing and communication to a central server. The sensors are located at the co-ordinate positions (1, 2), (2, 3), (4, 5), (5, 6), (7, 8), (8, 9) with initial cluster heads (0, 0), (3, 3), (6, 6) Determine the final cluster heads using the vector quantization technique, which groups sensors based on their proximity to the cluster heads and updates the cluster heads based on the average positions of their assigned sensors	15	4	3
05.	Blockchain technology has the potential to effectively address challenges in the global financial system, such as high costs, delays, excessive paperwork, and data breaches, leading to significant financial losses annually. Discuss the process involved in utilizing blockchain technology to resolve these issues, and outline the steps required to create a new block in a blockchain ledger for banking applications	15	5	3
06.	Autonomous vehicles (AVs) are capable of driving themselves without human intervention by utilizing various sensors and technologies to: perceive their environment, process information, formulate a driving strategy, and execute that strategy safely and reliably. Describe the fog computing framework that supports this use case in detail.	15	6	2

Section - II
Answer all Questions (1 × 10 Marks)

*M - Marks

Q.No	Question	*M	CO	BL
07.	Chennai is facing significant challenges with high air pollution levels and aims to implement a real-time air quality monitoring system as part of its Smart City initiative. The objective is to accurately track pollution levels, identify high-risk areas, and facilitate proactive measures to enhance air quality. Additionally, this data will inform the public about current air quality conditions and support city policies aimed at improving health and environmental outcomes. Design an appropriate IoT-based architecture for an air pollution monitoring system. How can such a system assist Chennai in effectively tracking and managing air quality levels?	10	1	1

BL-Bloom's Taxonomy Levels - (1.Remembering, 2.Understanding, 3.Applying, 4.Analysing, 5.Evaluating, 6.Creating)

⟺⟺⟺