Roll No.											

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025

Date: 24 – 12- 2025 **Time:** 01:00pm – 04:00pm

School: SOCSE	**Program:** B.Tech	
Course Code: CIT2501	**Course Name:** Wireless communication in IoT	
Semester: V	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Marks	**24**	**24**	**24**	**28**	

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

1.	Explain how the design of operating systems in WSNs differs from general-purpose operating systems.	**2 Marks**	**L2**	**CO-1**
2.	Explain scalability in Wireless Sensor Networks (WSN)?	**2 Marks**	**L2**	**CO-1**
3.	Differentiate between single-hop and multi-hop communication	**2 Marks**	**L4**	**CO-2**
4.	Why RF communication is preferred in WSNs?	**2 Marks**	**L2**	**CO-2**
5.	Describe the energy problem caused by “overhearing” in MAC protocols.	**2 Marks**	**L2**	**CO-3**
6.	Demonstrate how TDMA-based MAC protocols can reduce idle listening.	**2 Marks**	**L3**	**CO-3**
7.	Why LTE networks are important for IoT applications.	**2 Marks**	**L2**	**CO-4**
8.	How the SPI protocol works.	**2 Marks**	**L2**	**CO-4**
9.	List four key characteristics of the CAN protocol.	**2 Marks**	**L1**	**CO-4**
10.	Describe briefly how NB-IoT works.	**2 Marks**	**L2**	**CO-4**

Part B

Answer the Questions. **Total Marks 80M**

11.	**a.**	Differentiate between M2M and IoT communication by analyzing their key features.	**10 Marks**	**L4**	**CO-1**
	b.	Describe Oracle's IoT conceptual framework and illustrate it using a neat block diagram.	**5 Marks**	**L2**	**CO-1**
	c.	Illustrate key application areas where Wireless Sensor Networks can be effectively used.	**5 Marks**	**L3**	**CO-1**
		Or			
12.	**a.**	Differentiate between WSN and IoT communication by comparing their characteristics.	**10 Marks**	**L4**	**CO-1**
	b.	Show how IoT-collected data supports decision-making.	**5 Marks**	**L3**	**CO-1**
	c.	Explain the significance of routing protocols in WSNs and describe the challenges associated with duty cycling.	**5 Marks**	**L2**	**CO-1**

13.	**a.**	Describe the role of Application Programming Interfaces (APIs) in WSN operating systems and provide examples of their functionality.	**10 Marks**	**L2**	**CO-2**
	b.	Illustrate the importance of in-network processing in WSNs using a suitable example.	**5 Marks**	**L3**	**CO-2**
	c.	Explain the different Quality of Service (QoS) metrics used in wireless sensor networks.	**5 Marks**	**L2**	**CO-2**
		Or			
14.	**a.**	Describe the single-node architecture of an IoT-based wireless communication system and explain its hardware components.	**10 Marks**	**L2**	**CO-2**
	b.	Examine the key figures of merit used to evaluate energy efficiency in wireless sensor networks.	**5 Marks**	**L3**	**CO-2**
	c.	**Explain** the different QoS metrics in wireless sensor networks.	**5 Marks**	**L2**	**CO-2**

15.	**a.**	Describe the LEACH protocol and explain how it improves energy efficiency in sensor networks.	**10 Marks**	**L2**	**CO-3**
	b.	Explain the working principle and advantages of schedule-based protocols.	**5 Marks**	**L2**	**CO-3**
	c.	Explain the balance of requirements for MAC protocols in Wireless Sensor Networks (WSNs).	**5 Marks**	**L2**	**CO-3**

Or					
16.	**a.**	Explain Physical layer and transceiver design considerations in WSNs.	**10 Marks**	**L2**	**CO-3**
	b.	Explain the role of RTS/CTS and acknowledgment mechanisms in CSMA protocols.	**5 Marks**	**L2**	**CO-3**
	c.	Analyze the main energy-related problems at the MAC layer in Wireless Sensor Networks.	**5 Marks**	**L4**	**CO-3**

17.	**a.**	Explain how the LIN Bus protocol works and draw its data frame format.	**10 Marks**	**L2**	**CO-4**
	b.	Explain IoT protocols and illustrate their classification with a neat sketch.	**5 Marks**	**L2**	**CO-4**
	c.	Describe how LoRaWAN technology works.	**5 Marks**	**L2**	**CO-4**
Or					
18.	**a.**	Justify the necessity of global connectivity solutions in IoT using valid reasons.	**10 Marks**	**L4**	**CO-4**
	b.	Apply specific selection criteria to choose the appropriate wireless technology for a given IoT use case.	**5 Marks**	**L3**	**CO-4**
	c.	Explain the I2C serial communication protocol and mention its pros and cons.	**5 Marks**	**L2**	**CO-4**