QP Code: R252B070 | Reg. No | | | | | | | | | | | AY 24

GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR

(GIET UNIVERSITY)

M.Tech. (Second Semester) Regular Examinations, July – 2025

24MECPE12001/24MVLPE12001 - Wireless Sensor Networks

(ECE/ ECE-VLSI)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

	Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a.	Define sensor network architecture and provide an overview of its applications.	CO1	K2
b.	What are the key differences between sensor networks and Ad Hoc Networks?	CO1	K3
c.	What is the significance of MANTIS in sensor network software?	CO2	K2
d.	Give an example of a sensor node platform known for its energy efficiency.	CO2	K2
e.	What are the primary programming tools used for developing applications in wireless sensor networks?	CO3	K3

PART – B **(10 x 5 = 50 Marks)**

	Answer ***ALL*** the questions	Marks	CO #	Blooms Level
2.a	Describe various sensors, microcontrollers, and communication modules used in sensor nodes.	5	CO1	K3
b	Explain software layers in sensor nodes: OS, middleware, and application software.	5	CO1	K2
	(OR)			
c	Explain the functions of sensing, processing, and communication components in a sensor node.	5	CO1	K2
d	Describe factors influencing the selection of hardware for energy-efficient WSN platforms.	5	CO1	K3
3.a	Compare features of sensor node platforms: mica2, telosB, Imote2, and Sun SPOT.	5	CO2	K3
b	Discuss the role of TinyOS, Contiki, and RetOS in WSN operating systems.	5	CO2	K4
	(OR)			
c	Describe the importance of modular design in WSN platforms using specific examples.	5	CO2	K3
d	Explain energy-saving techniques integrated into WSN platforms like Imote2 and telosB.	5	CO2	K3
4.a	Analyze the benefits and limitations of open-source WSN simulators like ns-2 compared to QualNet.	5	CO3	K5
b	Investigate procedures for comparing performance between WSN simulations and real testbeds.	5	CO3	K3
	(OR)			
c	Describe simulation setup and performance metrics for evaluating WSN performance in ns-3.	5	CO3	K4
d	Discuss challenges faced while validating simulation results with real-world WSN experiments.	5	CO3	K4

5.a	Explain wireless communication technologies such as Bluetooth and UWB for sensor networks.	5	CO4	K3
b	Compare multi-hop and cluster-based routing in WSNs.	5	CO4	K4
	(OR)			
c	Discuss the design and implementation of node discovery protocols with examples.	5	CO4	K3
d	Evaluate fault-tolerant techniques and their impact on WSN reliability.	5	CO4	K4
6.a	Compare WSN architecture with Ad Hoc Networks, highlighting communication and energy use.	5	CO2	K5
b	Explore MICA2 hardware and TinyOS software in WSN node architecture.	5	CO2	K3
	(OR)			
c	Explain key constraints in WSN design: memory, bandwidth, energy, and processing power.	5	CO2	K4
d	Describe how protocol stack design supports scalability and power efficiency in WSNs.	5	CO2	K4

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