QP Code: R262B027 | Reg. No | | | | | | | | | | | AY 25

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

M.Tech. (Second Semester - Regular) Examinations, May – 2026

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	K1
b.	Give an example of a sensor node platform known for its energy efficiency.	CO2	K3
c.	Differentiate between Bluetooth and BLE (Bluetooth Low Energy), highlighting their respective advantages and applications in sensor networks.	CO3	K3
d.	Describe the architecture of a sensor node, including both hardware and software components.	CO4	K2
e.	Name four examples of hardware commonly used in sensor networks.	CO5	K1

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions		Marks	CO #	Blooms Level
2. a.	Describe the core components of a Wireless Sensor Network and how they interact to enable distributed sensing and data aggregation.	5	CO1	K3
b.	Discuss how Wireless Sensor Networks differ from Mobile Ad Hoc Networks in terms of routing, scalability, and energy efficiency.	5	CO1	K4
	(OR)			
c.	Analyze the technological improvements across platforms like iMote2, Z1 mote, and Arduino-based sensor nodes.	5	CO1	K3
d.	Discuss the influence of memory constraints and processing limitations in sensor node hardware design.	5	CO1	K2
3.a.	Explain how flash memory and external interfaces support sensing and data transmission in sensor nodes.	5	CO2	K3
b.	Discuss the importance of bootloaders and reprogramming capabilities in field-deployed sensor networks.	5	CO2	K2
	(OR)			
c.	Explain the features of IEEE 802.15.4 physical layer and its impact on wireless sensor network performance.	5	CO2	K2
d.	Compare narrowband communication and spread spectrum communication in terms of robustness and energy efficiency.	5	CO2	K3
4.a.	Analyze the working of TDMA-based MAC protocols and their advantages in energy-constrained environments.	5	CO3	K2
b.	Describe how cross-layer optimization can enhance wireless sensor network performance.	5	CO3	K2
	(OR)			

c.	Explain contention-based MAC protocols in Wireless Sensor Networks and discuss their advantages and limitations in energy-constrained environments.	5	CO3	K2
d.	Describe the working of S-MAC protocol and explain how sleep scheduling helps in reducing energy consumption in Wireless Sensor Networks.	5	CO3	K3
5.a.	Explain the role of cluster heads in hierarchical sensor networks and their impact on energy consumption.	5	CO4	K2
b.	Examine challenges associated with maintaining synchronization in time-critical sensor network applications	5	CO4	K3
	(OR)			
c.	Compare event-driven and thread-based programming models in wireless sensor software development.	5	CO4	K2
d.	Discuss the process and significance of benchmarking sensor network applications using simulation and testbeds.	5	CO4	K3
6.a.	Evaluate the trade-offs between cycle-accurate simulation and high-level simulation in WSN tools.	5	CO5	K2
b.	Describe the steps involved in configuring a wireless sensor node using simulation platforms like COOJA or OMNeT++.	5	CO5	K2
	(OR)			
c.	Outline key attacks on WSNs such as sinkhole, Sybil, and selective forwarding, and strategies for prevention.	5	CO5	K3
d.	Examine the impact of node density and deployment patterns on routing protocol performance.	5	CO5	K3

--- End of Paper ---