



Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science and Engineering

Midterm Examination, Summer-2026

Course Code: CSE453, Course Title: Wireless Sensor Network

Level: 4

Term: 1

Batch: 64

Time: 1.5 Hours

Marks: 25

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.		Define a Wireless Sensor Network (WSN) and explain its basic architecture. Illustrate the main components of a sensor node, including the sensing unit, processing unit, transceiver, and power unit. Also, discuss two key differences between WSNs and traditional Mobile Ad Hoc Networks (MANETs).	[5]	CO1
2.		A government agency plans to deploy a Wireless Sensor Network (WSN) in a large forest to detect and report fire incidents. Thousands of sensor nodes are scattered throughout the forest to monitor temperature, humidity, and smoke levels. The network must operate for several years with limited battery power. Some sensors may fail due to harsh environmental conditions, and the monitored area is too large for direct communication between all nodes and the base station. Analyze the above scenario and propose an appropriate WSN solution. Your answer should address the following:		CO2
	a)	Explain the challenges faced in this deployment regarding energy consumption, scalability, and fault tolerance .	[3]	
	b)	Recommend suitable network architecture and routing paradigm (e.g., hierarchical clustering, data-centric routing, or geographic routing) for the system and justify your choice.	[3]	
	c)	Describe how sensor nodes, cluster heads (if used), and the base station would interact to collect and transmit data efficiently.	[2]	
	d)	Explain how the proposed solution would maintain network operation when some sensor nodes fail or run out of energy	[2]	
3.		A wildlife conservation authority plans to deploy a Wireless Sensor Network (WSN) across a large wildlife sanctuary to continuously monitor temperature, humidity, rainfall, and animal movement. Hundreds of battery-powered sensor nodes are randomly distributed		

		throughout the area. The network must operate for long periods without human intervention, and some sensor nodes may fail due to harsh weather conditions or animal interference.		CO3
	a)	<div><div>1. Describe the architecture of a typical sensor node that would be suitable for this application, explaining the role of the sensing unit, processor, transceiver, and power unit.</div><div>2. Discuss the importance of fault tolerance, scalability, and energy efficiency in ensuring reliable operation of the monitoring system.</div></div>	[3+3]	
	b)	Evaluate the suitability of Flooding, Gossiping, and SPIN routing protocols for collecting environmental data in the sanctuary. Compare their advantages and limitations, and recommend the most appropriate approach with justification	[4]	