Q. Code: 827305

Reg. No. | | | | | | | | | | | | | |

M.E / M.TECH. DEGREE EXAMINATIONS, MAY 2024

Second Semester

CU22009 – WIRELESS SENSOR NETWORKS

(Electronics and Communication Engineering)

(Regulation 2022)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Understand sensors and the networking of sensed data for different applications.	**2**
CO 2	Design issues in sensor nodes and network architectures.	**3**
CO 3	Design a medium access and routing protocols for the energy constrained operational scenario.	**5**
CO 4	Appreciate the need for designing energy efficient sensor nodes and protocols for prolonging network lifetime.	**4**
CO 5	Demonstrate an understanding of the different implementation challenges and the solution approaches.	**4**

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	How do sensor networks contribute to effective facility management?	**1**	**2**
2.	What are actuators?	**1**	**2**
3.	Classify sensor applications based on type of applications.	**1**	**2**
4.	Highlight the tradeoffs related to lifetime of a sensor.	**1**	**3**
5.	List out the different types of mobility in WSNs.	**2**	**2**
6.	Create a diagram illustrating and labeling the primary components of a sensor node.	**2**	**2**
7.	Establish a correlation between sleep time, recovery time, and startup energy.	**2**	**4**
8.	Identify the most appropriate communication technique for Wireless Sensor Networks and provide a justification for its suitability.	**2**	**2**

9.	What are the key features of IEEE 802.15.4 MAC protocol, and how does it differ from traditional Wi-Fi MAC protocols?	**3**	**2**
10.	Highlight the concept of Low Duty Cycle Protocols in Wireless Sensor Networks	**3**	**4**
11.	Mention the advantages of Zigbee in Wireless Sensor Networks.	**3**	**2**
12.	How wake up radio reduces energy consumption during idle periods.	**3**	**2**
13.	What are the pros and cons of centralized clustering approaches in WSN?	**4**	**2**
14.	How topology control impacts WSN's performance and energy efficiency?	**4**	**3**
15.	Identify the role of Clustering in Wireless Sensor Networks.	**4**	**2**
16.	How time synchronization is achieved in Wireless Sensor Networks?	**4**	**2**
17.	What are the techniques used for Storage and Indexing in sensor networks?	**5**	**2**
18.	How are queries formulated and executed in Wireless Sensor Networks?	**5**	**2**
19.	How does efficient data management contribute to network performance and resource utilization?	**5**	**4**
20.	How does tiny aggregation optimize data aggregation while minimizing energy consumption?	**5**	**2**

PART- B (5 x 10 = 50 Marks)

		Marks	CO	RBT LEVEL
21. (a)	Discuss the practical applications of Wireless Sensor Networks, illustrated with appropriate examples?	**(10)**	**1**	**3**
	(OR)			
(b)	Discuss the essential characteristics that Wireless Sensor Networks must meet for effective deployment and operation.	**(10)**	**1**	**3**
22. (a)	Provide a comprehensive discussion of the communication components	**(10)**	**2**	**3**

utilized within a sensor node.

(OR)

(b)	Discuss the diverse scenarios where Wireless Sensor Networks (WSNs) are utilized for various applications.	**(10)**	**2**	**3**
23. (a)	Compare and contrast IEEE 802.15.4 with Zigbee, highlighting their differences and suitability for various WSN applications.	**(10)**	**3**	**4**

(OR)

(b)	Analyze how the wake up radio concept contributes to reducing energy consumption and prolonging network lifetime. Provide examples of scenarios where these concepts are most beneficial.	**(10)**	**3**	**4**
24. (a)	Examine the roles of sensor nodes and its utilities in managing tasking and control within Wireless Sensor Networks .	**(10)**	**4**	**4**

(OR)

(b)	Investigate the techniques of trilateration and triangulation utilized for achieving positioning within Wireless Sensor Networks.	**(10)**	**4**	**4**
25. (a)	Analyze the relationship between efficient data management approaches and the optimization of resource utilization, leading to improved network performance.	**(10)**	**5**	**4**

(OR)

(b)	Explore the hurdles linked with storage and indexing in sensor networks, while also presenting examples of techniques employed for streamlined data storage and indexing.	**(10)**	**5**	**4**

PART- C (1 x 10 = 10 Marks)

(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	Evaluate the importance of security measures in Wireless Sensor Networks. Also examine the various security threats faced by WSNs and propose strategies and mechanisms to mitigate these threats, ensuring data integrity, confidentiality, and availability.	**(10)**	**5**	**5**

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