PRN:		Course Code :	PES302

Second Year M. **Tech** End Semester Examination Winter 2023

Embedded Wireless Sensor Networks

Day and Date: Thursday 30/11/2023 Max Marks: **100**

Time : 10.30 am to 5-30 am. Duration: **03** hrs

Instructions:All questions are compulsory.

Q.1		**Attempt the following**	Marks	Bloom's Level	CO
	a)	Analyze the factors contributing to the energy consumption of sensor nodes in WSNs. How do different operating systems and execution environments impact the energy efficiency of sensor nodes?	08	3	2
	b)	What are the primary challenges faced by Wireless Sensor Networks (WSNs) in terms of communication and data management, and how do these challenges impact the overall performance and reliability of WSNs?	08	2	1
		OR			
	b)	Explain the key components of a single-node architecture in a Wireless Sensor Network (WSN).	08	2	3
Q.2		**Attempt the following**			
	a)	Describe the service interfaces used in Wireless Sensor Networks (WSNs) and explain their significance in facilitating communication and interaction within the network.	08	2	3
	b)	Elaborate on the concept of gateways in Wireless Sensor Networks. What role do gateways play in connecting WSNs to external networks or the Internet?	08	2	2
		OR			
	b)	Provide examples of sensor network scenarios and discuss how the characteristics of each scenario influence the design and optimization goals of Wireless Sensor Networks (WSNs).	08	3	4
Q.3		**Attempt any two from the following**			
	a)	Explain the fundamental concepts of programming sensors using nesC.	08	2	1
	b)	Discuss the key principles and practices involved in programming sensors using nesC.	08	2	3
	c)	How does nesC differ from traditional programming languages, and what specific features make it suitable for programming in the context of Wireless Sensor Networks (WSNs)?	08	3	1
Q.4		**Attempt any two from the following**			
	a)	Identify and discuss the challenges associated with designing and implementing system architectures for sensor networks.	08	1	2
	b)	Discuss different system architectures commonly employed in Sensor Networks. Highlight the strengths and limitations of each architecture	08	2	3
	c)	Define the concept of Cooperating Objects in the context of	08	2	3

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		Sensor Networks. How do these entities collaborate within the network, and what advantages do cooperating objects bring to the overall functionality and efficiency of the system?			
Q.5		**Attempt any Two of the following**			
	a)	Discuss the necessity of simulation in the context of Wireless Sensor Networks (WSNs).	09	2	3
	b)	Explore the different types of simulations used in the study of Wireless Sensor Networks.	09	1	3
	c)	Explain the features and capabilities of generic network simulators in the context of WSNs.	09	1	2
Q.6		**Attempt any Two of the following**			
	a)	Explore the role of Wireless Sensor Networks (WSNs) in environmental monitoring.	09	1	3
	b)	Explain the concept of Wireless Sensor Networks with mobile nodes. How do mobile nodes enhance the capabilities of traditional static sensor networks?	09	1	2
	c)	Investigate how the integration of Wireless Sensor Networks and autonomous robotic teams enhances surveillance capabilities.	09	3	2

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