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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN  
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]  
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

**Question Paper Code: 70050**

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS – JAN. 2025

Third Semester

VLSI Design

P23VDE20 – WIRELESS ADHOC AND SENSOR NETWORKS

(Regulation 2023)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

## PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Compare IEEE 802.3 and IEEE 802.11 standards for local area networks.	2	K2	CO1
2.	Classify MAC protocols for ad-hoc wireless networks.	2	K2	CO1
3.	Define hybrid routing protocols and interpret how they combine the features of both table-driven and on-demand protocols.	2	K1	CO2
4.	Recall the concept of power-aware routing protocols and their significance in ad-hoc networks.	2	K1	CO2
5.	Classify multicast routing protocols based on their operational characteristics.	2	K2	CO3
6.	Recall the concept of multicast core extraction.	2	K1	CO3
7.	What are sensing mode selection protocols, and how do they contribute to energy efficiency in WSNs?	2	K1	CO4
8.	List the key characteristics of operating systems designed specifically for sensor networks.	2	K1	CO4
9.	Infer the significance of secure routing in Ad-Hoc wireless networks.	2	K2	CO5
10.	Outline the primary challenges of key management in Ad-Hoc wireless networks.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11.	a) Compare and contrast contention-based protocols with other MAC protocols used in ad-hoc wireless networks. Also, analyze the performance of contention-based protocols under different network conditions, such as varying node density and traffic patterns.	13	K2	CO1
	(OR)			
	b) Explain the challenges faced by the Transmission Control Protocol (TCP) when operating over an ad-hoc wireless network environment and provide solutions to improve TCP performance in ad-hoc wireless networks.	13	K2	CO1
12.	a) Analyze the impact of efficient flooding mechanisms on the performance of routing protocols in ad-hoc networks. Also, evaluate how these mechanisms help to mitigate network congestion and control overhead.	13	K4	CO2
	(OR)			
	b) Examine the principles behind on-demand routing protocols and also evaluate the performance of on-demand routing protocols under varying network conditions and node mobility.	13	K4	CO2
13.	a) Explain the architectural components of a multicast routing protocol and their roles in facilitating communication among multiple nodes.	13	K2	CO3
	(OR)			
	b) Describe how zone routing protocols can be adapted for multicast communication in MANETs. Outline the challenges and solutions associated with implementing multicast routing protocols based on zone routing in highly mobile environments.	13	K2	CO3
14.	a) Compare and contrast various Topology Control Protocols and assess their impact on network scalability and energy efficiency. Also, outline the role of Topology Control Protocols in maintaining network connectivity while optimizing power consumption in wireless sensor networks.	13	K4	CO4
	(OR)			
	b) Analyze the design trade-offs between TinyOS and Contiki for real-time sensor network applications. Discuss how each operating system manages memory, power, and task scheduling in constrained environments.	13	K4	CO4

15. a) Explain the following network security attacks in Ad-Hoc wireless networks: 13 K2 CO5
- blackhole,
  - wormhole, and
  - Sybil attacks.

How do these attacks exploit the network's vulnerabilities and interpret their impacts on network performance?

(OR)

- b) Compare the performance of proactive and reactive secure routing protocols in Ad-Hoc wireless networks. Also, analyze their suitability in environments where the network topology is highly dynamic and prone to frequent attacks. 13 K2 CO5

### PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Infer how ad-hoc routing protocols support mobile health applications (m Health), particularly in remote or underserved areas where traditional healthcare infrastructure is lacking. Interpret the benefits and potential limitations of using these protocols in m Health solutions.	15	K5	CO2
(OR)				
b)	In a smart city application utilizing ad-hoc networks for traffic management, Interpret how would you assess the secure routing mechanisms in place to prevent data interception and manipulation?	15	K5	CO5