Question Paper Code : 90485

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Seventh Semester

Electronics and Communication Engineering

EC 8702 – ADHOC AND WIRELESS SENSOR NETWORKS

(Regulations 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List down any four challenges of the routing protocol in adhoc wireless networks.

2. Mention the significance of power aware routing in adhoc wireless networks.

3. What is the need for dynamic modulation scaling in a transceiver used in wireless sensor node?

4. Energy scavenging in WSN : Comment.

5. Differentiate flooding and gossiping.

6. List the objective of PAMAS.

7. Evaluate the impact of black hole attack in routing protocols.

8. Write the importance of flooding attack in secure routing.

9. How does TinyOS support Berkeley mote?

10. What is the need for nesC. language in sensor network programming?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Discuss the design goals and challenges in Adhoc wireless networks.   (8)

    (ii) What role does the routing protocol play in the provisioning of QoS guarantees for adhoc wireless networks? Explain.   (5)

Or

(b) There are 12 nodes from A to L formed an adhoc network. Node A wants to send packet to L. Using DSDV explain how path is established and packets are transferred. For each stage show the routing table. During the transaction process, show the effect of breaking the link at the node F. (13)

12. (a) Explain the transceiver characteristics and structure used in the sensor node. (13)

Or

(b) (i) Explain how the sensor networks are deployed for Military and Synthetic Aperture Radar (SAR) application. (7)

(ii) Derive the expression for energy consumption in a sensor node with an appropriate diagram. (6)

13. (a) List down the routing protocol design issues of WSN and explain in detail the design issues to be considered to achieve efficient communication. (13)

Or

(b) Consider the network topology graph given below. The numbers on the edges indicate the distance between two points. SMECN is used to construct a minimum exposure path between u and v. What is the shortest path between u and v in terms of distance? What is the minimum energy path if (13)

(i) $t = 5 \times c$?

(ii) $t = 4 \times c$?

(Assume the path loss exponent to be 2)
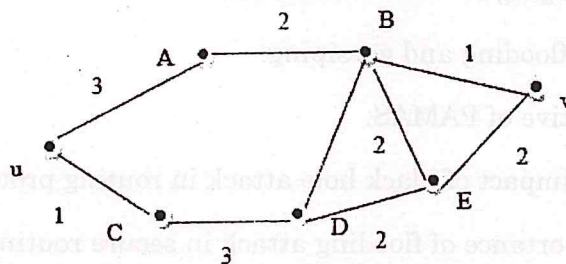
14. (a) How the SPIN protocol provides authenticated broadcast for resource-constrained environments? What are the three main design issues of this protocol? Give your suggestion to overcome this problem. (13)

Or

(b) Identify the Key management schemes in Wireless Sensor Networks. Illustrate the key distribution and management mechanism required for secure communication in sensor networks. (13)

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15. (a) Describe about the execution models of Node-Level Simulators. Formulate the characteristics of cycle-driven and discrete-event simulators in terms of timing behaviour. (13)

Or

(b) Discuss the issues to be addressed using abstractions during the design of sensor network to ensure the correctness and efficiency of the system. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Describe the following simulators used in wireless sensor networks:

(i) ns-2 simulator (5)

(ii) TOSSIM simulator (5)

(iii) COOJA simulator (5)

Or

(b) How is the operating system like TinyOS, nesC, CONTIKIOS designed for the sensor node and discuss the design challenges of these Operating System. (15)

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