EC8702-AD HOC AND WIRELESS SENSOR NETWORKS

Department: ECE

IV-ECE-A,B&C- 7th sem

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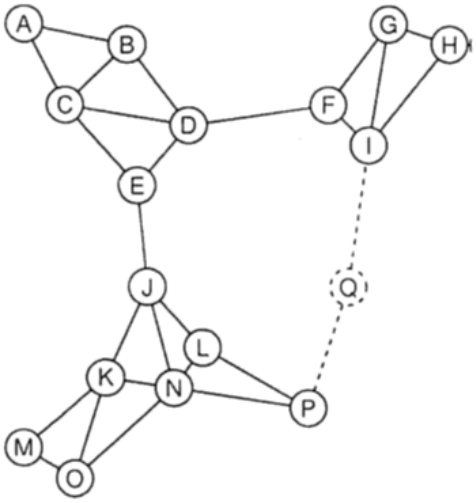
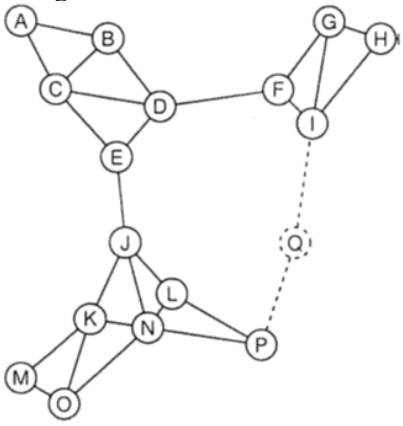
UNIT-I

S.No	Topic	Remarks
1	Elements of Ad hoc Wireless Networks,	
2	Issues in Ad hoc wireless networks,	
3	Example commercial applications of Ad hoc networking,	Very important
4	Ad hoc wireless Internet,	Important
5	Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks,	Very important
6	Classifications of Routing Protocols,	
7	Table Driven Routing Protocols – Destination Sequenced Distance Vector (DSDV),	Very important
8	On–Demand Routing protocols –Ad hoc On–Demand Distance Vector Routing (AODV).	Very important

PART-B - UNIT-I
Model Questions

S.No	Question	Text book Page
1.	Compare Cellular and Ad hoc wireless Networks with a neat diagram. (13) or Give a brief discussion how Adhoc network is different from cellular network	193-196
2.	Explain in detail about the applications of Ad hoc networking. (13) or Discuss the commercial applications of Ad hoc Networks. (13)	196-203
3.	Discuss the various factors affecting the design of an Ad hoc Network. (13) or Elaborate the various issues involved in designing an Ad hoc Network. (13)	204-220
4.	Discuss how an Ad hoc Network is connected to the Internet. (13) or Explain how a Gateway connect an Ad hoc Network to Internet. (13)	220--222
5.	Explain the challenges in designing a routing protocol for Ad Hoc Network.(7)	299-303
6.	i) What is Routing? What are the characteristics of an ideal routing protocol?(6)	303-304
7.	What is a table driven routing protocol? Explain it with an example protocol. (13) or Explain about Destination Sequenced Distance Vector (DSDV). (13)	308-311
8.	. i) Draw protocol graph for the following network: end node (ad hoc node) -> mobile node -> wireless gateway -> end node (ad hoc node). (5) (DEC-2020) ii) The following network follows DSDV routing protocol. Draw the routing table of ad	308-311

	hoc network, and the source node is 'A'. (8) (DEC-2020) 	
9.	**What is a proactive routing protocol (AODV)? Explain it with an example protocol. (13) or Explain in detail about reactive routing protocols or on demand routing protocols with an example? (15) or Discuss the operation of the AODV protocol with an example. (15) or Explain how route establishment and maintenance is carried out in AODV with an Example. (15) or What is reactive routing protocol? Explain it with an example protocol. (15)**	**320-323**
10.	**Explain AODV route establishment and route maintenance with proper diagram for the following network. Consider 'A' is a source node (DEC-2020)** 	**320-323**

UNIT-II

S.No	Topic	Remarks
1	**Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks,**	
2	**WSN application examples,**	**Important**
3	**Single-Node Architecture – Hardware Components,**	**Very important**
4	**Energy Consumption of Sensor Nodes, Figures of Merit.**	**Important**
5	**Network Architecture – Sensor Network Scenarios,**	**Very important**
6	**Transceiver Design Considerations,**	**Very important**
7	**Optimization Goals and Figures of Merit**	**Very important**

PART-B - UNIT-II
Model Questions

S.NO	Questions	Book pages
1	i) What are the different Application types in WSN? (4) , ii) Explain some applications with examples? (9)	6-7
2	List out the requirements in designing a wireless sensor network and provide mechanisms to satisfy the requirements. (13)	7-10
3	Explain the Single Node Architecture of Wireless Sensor Networks. (13) or With a neat sketch explain the architecture of wireless sensor node. (13) or Illustrate in detail about the various hardware components and their composition into a functioning node of a WSN.(13)	18-31
4	i) Explain the transceiver operational states. (6) (DEC-2020) ii)Explain how changing the operating states minimize energy consumption. (6) ii) Explain the three categories of sensor with an example. (7) (DEC-2020)	25-26 31--32
5	How energy is consumed in Wireless Sensor Networks? Explain energy consumption of various components of the network? (13) i) Explain about energy consumption of sensor nodes in detail. (7) Discuss how energy consumption is done efficiently in wireless sensor networks by changing the operating states. (13) i) Discuss about the Operation states with different power consumption. (7) (DEC-2020)	36-44
6	ii) Briefly explain the different types of mobility with a proper diagram. (6) (DEC-2020)	62-63
7	Explain the different scenarios of wireless sensor network architecture. (15) Write Notes on i. Types of sources and sinks (8) ii. Single-hop versus multi-hop networks (7)	60-63 60 60-61
8	Explain the optimization goals and figures of merit of WSN. (13)	63-67

UNIT-III

S.No	Topic	Remarks
1	MAC Protocols for Wireless Sensor Networks,	
2	Low Duty Cycle Protocols And Wakeup Concepts – S-MAC, The Mediation Device Protocol,	Very important
3	Contention based protocols – PAMAS,	Very important
4	Schedule based protocols – LEACH,	Very important
5	IEEE 802.15.4 MAC protocol,	Very important
6	Routing Protocols Energy Efficient Routing,	Very important
7	Challenges and Issues in Transport layer protocol.	Very important

Part-B - UNIT-III

S.NO	Questions	Book pages
1.	Explain in detail about the specific requirements and design considerations for MAC protocols in wireless sensor networks. (13) or List the requirements of MAC protocol in WSN and explain the design considerations. (13) or Write Short notes on i) Requirements of MAC protocol (7) ii) Design Considerations of MAC (6)	112-114
2.	Explain in detail about Low duty Cycle Protocols and Wake up concepts. (13) or Elaborate the operation of Sensor-MAC protocol with its various phases. (13) or What are the various phases of S-MAC protocol? Explain them along with the wake up scheme. (13) or Explain : SMAC with necessary diagram. (13) (DEC-2020)	120-121 123-126
3.	Explain in detail about the mediation device protocol.(13) or Discuss the operation of mediation device protocol and wakeup concepts.(13)	126-127
4.	Explain Contention based protocol with example. (13) or Discuss the features and working of PAMAS protocol. (13) or Explain the overhearing avoidance mechanism of PAMAS protocol.(13) orWhat is the need of a power aware multi-access protocol for defining WSN MAC? Also briefly describes the working model of power aware multi-access signaling protocol. (13) (DEC-2020)or Explain the overhearing avoidance mechanism of PAMAS protocol.(13) (DEC-2020)	129-133
5.	Discuss the features and operation of LEACH protocol. (13) or What is LEACH protocol? Explain its operation. (13) or Elaborate the operation of Schedule based protocols with an example.(13)	133-135
6.	Explain the various roles of IEEE 802.15.4 protocol in detail. (15) Explain slotted CSMA-CA protocol specified by IEEE.(5) Explain the super frame structure and data transfer procedures of IEEE 802.15.4(10) (DEC-2020) or Elaborate the asymmetric features of IEEE 802.15.4 that support communication in WSN.(15) or	139-145

UNIT-IV

S.No	Topic	Remarks
1	Network Security Requirements	
2	Issues and Challenges in Security Provisioning,	Very important
3	Network Security Attacks,	
4	Layer wise attacks in wireless sensor networks,	Very important
5	Possible solutions for jamming, tampering, black hole attack, flooding attack.	Very important
6	Key Distribution and Management,	Very important
7	Secure Routing – SPINS,	Very important
8	Reliability requirements in sensor networks.	

Part-B - UNIT-IV

S.No	Questions	Text book pages
1.	i) What are the requirements to be satisfied for the design of security protocols for ad hoc wireless networks? (7) ii) What are the issues and challenges in designing security protocolfor ad hoc wireless networks? (6) or Explain the requirements, issues and challenges in designing security protocol for ad hoc wireless networks? (13) Or List down the requirements of security protocols for ad hoc wireless networks. Or Explain the challenges faced in satisfying the requirements. (13) Or Discuss the challenges in designing security protocol for ad hoc wireless networks.(13) Or Elaborate the problems faced and solutions available in designing a security protocol for ad hoc wireless network. (13)	476-477
2.	Explain the different attacks pertaining to the network layer in the network protocol stack. (13) Or List the various Network Layer attacks. Explain them in detail. (13) Or Explain the solutions of Jamming, Black Hole and Flooding attacks.(13) Or Explain how Tampering, Flooding and Jamming attacks can be solved effectively. (13)	478-480
3.	What is the importance of cryptography? What are the different types of cryptography techniques? (13) Or What is Cryptography? Why it is important for wireless sensor network? Explain the different cryptographic techniques.(13) Or Point out the differences between symmetric key and asymmetric key cryptography. (13) Or Explain how cryptography provides security to wireless ad hoc networks. (13) Or Define Cryptography. Explain the two major kinds of cryptographic algorithms(13) Or Explain about key management and distribution. (13) or Explain the main approaches to key management. (13) Or Write notes on i) Key Pre distribution (4) ii) Key Transport (3) iii) Key Arbitration (3) iv) Key Agreement (3)	
4.	What is the need of security for routing protocol ? Also, explain the secured routing protocol using SPIN. (15) or What are the various protocols under the suite SPINS? Explain them. (15) or Explain the requirements for secure routing in for ad hoc networks and explain how it is achieved by SPINS.(15) or Explain how the two modules of SPINS provide secure routing in ad hoc networks.(15)	206-209 &686

UNIT-V

S.No	Topic	Remarks
1	Sensor Node Hardware	
2	Berkeley Motes	Very important
3	Programming Challenges	Important
4	Node-level software platforms – TinyOS, nesC, CONTIKIOS	Very important
5	Node-level Simulators – NS2 and its extension to sensor networks	Very important
6	COOJA, TOSSIM	Important
7	Programming beyond individual nodes – State centric programming	Very important

S.No	PART-B	Pg. No
1.	With a neat sketch explain the architecture of MICA motes. (13) or Explain the architecture of Berkeley motes. (13) or Explain the features and internal components of MICA motes with a neat diagram. (13)	Pg-242-245
2.	Explain about the programming beyond individual nodes. (13) or Explain State-Centric Programming in Wireless Sensor Networks. (13) or What is State-Centric Programming? Explain in detail. (13)	Pg-272-281
3	What are the programming challenges of Sensor network tools? (13) or Explain in detail the challenges in programming a sensor node. (13)	Pg-245-247
4	Explain in detail about the NS2 simulator and its extension to sensor network.(13)	Pg-269-271
5.	Explain about the following. a) TinyOS (6) b) nesC in detail. (7)	Pg-248-256
6	i) A researcher defined new routing protocol for WSN. In order to test the performance of the routing protocol, suggest the best approach such as simulation, emulation or real time implementation which should be cost effective. Justify your answer.(DEC-2020) ii) List out: Programming language name, graphical interface name, animation window name used in NS2. (DEC-2020) iii) Explain about TOSSIM simulator. (7) or Explain the features of TinyOS simulator. (7)	Pg-248-256
7	i) Most of the journal papers which published in network domain are displayed the result from simulation, Why they included simulation results instead of real time implementation ? Justify. (4) (DEC-2020) ii) List out and brief about any four open simulator which is used for ad hoc network and WSN. (4) (DEC-2020) iii) Analyse the methodology of cycle driven simulation and discrete event simulation. (5) (DEC-2020)	Pg 267-269