



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad-500043

COMPUTER SCIENCE AND ENGINEERING

TUTORIAL QUESTION BANK

Course Title	WIRELESS SENSOR NETWORKS				
Course Code	BPSB03				
Programme	M.Tech				
Semester	I	WSN			
Course Type	Elective				
Regulation	IARE - R18				
Course Structure	Theory			Practical	
	Lectures	Tutorials	Credits	Laboratory	Credits
	3	-	3	-	-
Chief Coordinator	Mr. S Laxman Kumar, Assistant Professor, CSE.				
Course Faculty	Mr. S Laxman Kumar, Assistant Professor, CSE.				

COURSE OBJECTIVES:

The course should enable the students to:	
I	Architect sensor networks for various application setups
II	Devise appropriate data dissemination protocols and model links cost
III	Understandings of the fundamental concepts of wireless sensor networks and have a basic knowledge of the various protocols at various layers.
IV	Evaluate the performance of sensor networks and identify bottlenecks.

COURSE OUTCOMES (COs):

CO 1	Summarize the fundamental knowledge on basics of wireless sensor networks and network simulator tool
CO 2	Develop programs in network simulator tool for understanding and visualization of different network algorithm.
CO 3	Learn to apply hypotheses and data into actionable predictions
CO 4	Understand a range of routing algorithms along with their strengths and weaknesses.
CO 5	Able to document and transfer the results and effectively communicate the Findings using visualization techniques.

COURSE LEARNING OUTCOMES (CLOs):

BCSB04.01	Understand Fundamental concepts of wireless sensor networks and its applications.
BCSB04.02	Learn about network architecture techniques and find the differences between various types of network architecture.
BCSB04.03	Regain knowledge about the network hardware platforms.
BCSB04.04	Understand network simulators of different types and Explore on core network simulators.
BCSB04.05	Experience in implementation/modification of methods of medium access protocols in WSN.
BCSB04.06	Describe duty-cycled Markov chain models and the skill sets needed to be a network analysis
BCSB04.07	Understand the concepts of discrete time Markov chain and its applications.
BCSB04.08	Identify the difference between asynchronous duty-cycled and Markov chain analysis
BCSB04.09	Understand significance models in WSN
BCSB04.10	Describe the possible attacks in WSN.
BCSB04.11	Apply basic SPINS concepts for predictive network performance.
BCSB04.12	Identify the difference between static and dynamic key distribution.
BCSB04.13	Identify common approaches used to routing protocols in MANETS.
BCSB04.14	Create effective results of data centric and geographic routing
BCSB04.15	Understand the advanced topics in wireless sensor networks.

TUTORIAL QUESTION BANK

UNIT-I				
INTRODUCTION TO WIRELESS SENSOR NETWORKING				
Part - A (Short Answer Questions)				
S No	QUESTIONS	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes (CLOs)
1	What is meaning of wireless sensor network and define it	Remember	CO1	BCSB04.01
2	List any four applications of WSN.	Remember	CO1	BCSB04.01
3	State the important characteristics of WSN.	Remember	CO1	BCSB04.01
4	What is Data-Centric Network?	Understand	CO1	BCSB04.02
5	State about the Event Detection application.	Remember	CO1	BCSB04.01
6	Why is multi hop wireless communication required for WSN?	understand	CO1	BCSB04.02
7	What are design factors WSN ?	Remember	CO1	BCSB04.03
8	Write the components of WSN	Remember	CO1	BCSB04.04
9	Define cross layer design issues	Understand	CO1	BCSB04.02
10	State the motes of WSN	Remember	CO1	BCSB04.03
11	Define first generation of sensor network	Remember	CO1	BCSB04.01
12	List out the different types of interaction pattern between sources and sinks in WSN.	Remember	CO1	BCSB04.02
13	Define Fault Tolerance	Remember	CO1	BCSB04.03
14	Explain Second Generation Sensor Network -2GSN	Remember	CO1	BCSB04.01
15	What is meant by energy scavenging?	Understand	CO1	BCSB04.02

Part - B (Long Answer Questions)				
1	Discuss the characteristic requirements of WSN.	Understand	CO1	BCSB04.02
2	What are applications of WSN and explain	Understand	CO1	BCSB04.01
3	Write history of WSN and performance factors in detailed	Remember	CO1	BCSB04.05
4	Define the traditional stack and explain the traditional layered stack in WSN	Remember	CO1	BCSB04.03
5	Explain the innovative mechanisms to realize the characteristic requirements of WSN.	Remember	CO1	BCSB04.03
6	Compare MANET and WSN.	Understand	CO1	BCSB04.13
7	Discuss about the enabling technologies to build up WSN.	Understand	CO1	BCSB04.05
8	What are hardware platforms of WSN and explain in detailed	Remember	CO1	BCSB04.03
9	Explain the various challenges of wireless sensor networks.	Understand	CO1	BCSB04.05
10	Define the cross layer design and explain in WSN	Remember	CO1	BCSB04.02
11	Briefly explain the Current Approaches of sensors	Remember	CO1	BCSB04.03
12	Explain the sensor networks communication	Remember	CO1	BCSB04.05
UNIT- II				
INTRODUCTION TO NS-3				
Part-A (Short Answer Questions)				
1	Write the Sensor Network Extensions for ns-3	Remember	CO2	BCSB04.04
2	Discuss about GloMoSim and QualNet	Understand	CO2	BCSB04.08
3	Define JiST/SWANS	Remember	CO2	BCSB04.07
4	What is the purpose of OMNeT++?	Understand	CO2	BCSB04.05
5	How to run TOSSIM	Understand	CO2	BCSB04.07
6	Define EmStar in NS-3	Remember	CO2	BCSB04.04
7	What is the function of Avrora NS-3	Remember	CO2	BCSB04.07
8	Write the NS-3 states	Remember	CO2	BCSB04.04
9	Draw the EmuNet device diagram	Understand	CO2	BCSB04.07
10	State the link layers in NS-3	Remember	CO2	BCSB04.04
11	List various modes of a sensor node.	Remember	CO2	BCSB04.03
12	Discuss about the lack of global identification	Remember	CO2	BCSB04.07
13	Can ASIC be used in a Wireless Sensor Network?	Understand	CO2	BCSB04.07
14	Define ideal dissemination	Remember	CO2	BCSB04.06
15	Define Hardware Constraints	Remember	CO2	BCSB04.05
Part - B (Long Answer Questions)				
1	Explain about the NS-3 modules in detailed	Remember	CO2	BCSB04.04
2	What are steps in Network simulator and explain with flow chart	Understand	CO2	BCSB04.07
3	Discuss about NS-3 features in detailed	Understand	CO2	BCSB04.04
4	State and explain about the distributed simulation with MPI	Remember	CO2	BCSB04.07
5	What are the link layer models in NS-3 and explain	Remember	CO2	BCSB04.04
6	How the routing is handled in NS-3 and explain with example	Remember	CO2	BCSB04.04
7	Explain about Objective Modular Network Tested in C++ Simulator(OMNET++) with example	Remember	CO2	BCSB04.07
8	Discuss about Network Simulator 3 (NS3) in detailed	Understand	CO2	BCSB04.04
9	Discuss about NS-3 workflow in detailed	Understand	CO2	BCSB04.04
10	State the Node Tracking Scenarios	Remember	CO2	BCSB04.04
11	What is WSN tunnelling?	Remember	CO2	BCSB04.07
12	Explain the concept of Gateway with different scenarios in WSN.	Remember	CO2	BCSB04.06

UNIT-III				
MEDIUM ACCESS CONTROL PROTOCOL DESIGN				
Part-A (Short Answer Questions)				
1	What is meaning of fixed access in WSN?	Remember	CO3	BCSB04.09
2	Define random access protocol of WSN	Remember	CO3	BCSB04.09
3	Write any two WSN protocols	Remember	CO3	BCSB04.09
4	State duty cycle of node	Remember	CO3	BCSB04.06
5	List out some properties of Markov Chain	Understand	CO3	BCSB04.06
6	Write any two classification of Markov chain model	Understand	CO3	BCSB04.06
7	What is the meaning of asynchronous duty cycled	Remember	CO3	BCSB04.05
8	MAC stands for	Remember	CO3	BCSB04.05
9	X-MAC stands for	Remember	CO3	BCSB04.05
10	State any two MAC protocols in WSN	Remember	CO3	BCSB04.05
11	Explain geographical forwarding	Remember	CO3	BCSB04.06
12	State the fundamental tasks of Address Management in WSN	Remember	CO3	BCSB04.08
13	Give the significance of uniqueness of addresses w.r.t WSN	Understand	CO3	BCSB04.05
14	What are Nested Queries?	Remember	CO3	BCSB04.05
15	Highlight the salient feature in location based routing.	Understand	CO3	BCSB04.08
Part - B (Long Answer Questions)				
1	Differentiate the random access and fixed access protocols in WSN with example	Remember	CO3	BCSB04.14
2	What are the synchronous protocols in WSN and explain it.	Remember	CO3	BCSB04.08
3	What is purpose of Markov chain model in WSN and explain with example	Understand	CO3	BCSB04.06
4	Discuss about the Markov chain properties in WSN	Understand	CO3	BCSB04.06
5	What are advantages of Markov chain model in WSN and discuss about the classification of Markov chain	Understand	CO3	BCSB04.08
6	Write any two MAC protocols in WSN and explain with example	Remember	CO3	BCSB04.09
7	State the asynchronous duty-cycled mechanism in MAC protocols and explain	Remember	CO3	BCSB04.08
8	Discuss about the X-MAC in WSN with example	Understand	CO3	BCSB04.09
9	Briefly specify IEEE 802.15.4 MAC protocol.	Remember	CO3	BCSB04.09
10	Can the MAC protocols of 802.11 & Bluetooth be used for WSN? Justify.	Understand	CO3	BCSB04.13
11	Discuss about content-based addressing in detail	Understand	CO3	BCSB04.11
12	Explain in detail about spare topology and energy management	Remember	CO3	BCSB04.11
UNIT-IV				
SECURITY				
Part-A (Short Answer Questions)				
1	What is meaning of symmetric key in security?	Remember	CO4	BCSB04.12
2	Define public key cryptography.	Remember	CO4	BCSB04.12
3	Write the purpose of key management in security.	Understand	CO4	BCSB04.15
4	Discuss the importance of DoS.	Remember	CO4	BCSB04.15
5	Write short note on SNEP.	Remember	CO4	BCSB04.15
6	Write the any two SPINS protocols.	Remember	CO4	BCSB04.11
7	Define the TinySec	Remember	CO4	BCSB04.11
8	Define the Exhaustion attack	Remember	CO4	BCSB04.11
9	What is "data freshness" in WSN	Understand	CO4	BCSB04.12
10	Write the importance of Confidentiality in security	Understand	CO4	BCSB04.12

11	Explain about synchronization	Remember	CO4	BCSB04.12
12	What are the attacks in Network Security?	Remember	CO4	BCSB04.12
13	Define Berkely notes	Remember	CO4	BCSB04.11
14	What is called Wormhole attack?	Remember	CO4	BCSB04.12
15	Explain the basic requirements of network security	Remember	CO4	BCSB04.12
Part - B (Long Answer Questions)				
1	Explain about Security Attacks in Sensor Networks in detailed	Remember	CO4	BCSB04.12
2	Discuss about Attacks on Routing and on Transport Layer	Understand	CO4	BCSB04.12
3	State the Key Management and Defenses Against DoS Attacks and discuss	Remember	CO4	BCSB04.12
4	What are Defenses Against Aggregation Attacks and explain in detailed	Remember	CO4	BCSB04.12
5	Discuss the following i. Security Protocols for Sensor Networks ii. Secure Network Encryption Protocol	Understand	CO4	BCSB04.11
6	Write the use of TinySec Localized Encryption and Authentication Protocol (LEAP) in security of WSN	Remember	CO4	BCSB04.12
7	Explain the IEEE 802.15.4 and ZigBee Security.	Understand	CO4	
8	Explain some of the characteristics of a WSN that make routing security difficult to Implement.	Understand	CO4	BCSB04.13
9	What is a denial-of-service attack? Explain the following attacks: (a) Jamming attack (b) Exhaustion attack (c) Tampering attack	Remember	CO4	BCSB04.12
10	What is a “nonce”? How does SPINS use them and what services are provided by the SNEP protocol	Remember	CO4	BCSB04.11
11	Explain different symmetric key algorithms	Remember	CO4	BCSB04.13
12	Explain clearly about Berkely Notes. Mention the advantages and disadvantages of it.	Remember	CO4	BCSB04.14
UNIT-V				
ROUTING PROTOCOLS				
Part-A (Short Answer Questions)				
1	MANET stands for	Remember	CO5	BCSB04.13
2	Define the resource-aware routing	Remember	CO5	BCSB04.15
3	MMSPEED stands for	Remember	CO5	BCSB04.15
4	Write the another name of geographic routing.	Remember	CO5	BCSB04.15
5	What is meaning of Hierarchical Routing?	Remember	CO5	BCSB04.15
6	What is purpose of Directed Diffusion?	Understand	CO5	BCSB04.15
7	Write the function of Low-Energy Adaptive Clustering Hierarchy WSN.	Understand	CO5	BCSB04.15
8	What are different WSN Routing Techniques?	Remember	CO5	BCSB04.15
9	Write the purpose of DATA DISSEMINATION AND GATHERING WSN	Understand	CO5	BCSB04.12
10	What is meaning of Nearest with Forwarding Progress (NFP).	Understand	CO5	BCSB04.14
11	Write short note on EYES OS	Remember	CO5	BCSB04.15
12	What is the importance of MECN?	Remember	CO5	BCSB04.14
13	What is TinyOS? Where is it used?	Understand	CO5	BCSB04.14
14	Write about Power-Aware routing protocols	Remember	CO5	BCSB04.15
15	Write short note on Hierarchical routing protocols	Remember	CO5	BCSB04.15
Part - B (Long Answer Questions)				
1	Explain any two MANET protocols with example	Remember	CO5	BCSB04.13

2	Discuss about the routing challenges and design issues In wireless sensor networks	Understand	CO5	BCSB04.15
3	What is data-centric routing? Why is data-centric routing feasible (or even necessary) compared to routing based on identities (addresses)?	Remember	CO5	BCSB04.15
4	Explain about the Routing Strategies In Wireless Sensor Networks of flooding and Its Variants and Power-Efficient Gathering in Sensor Information Systems.	Remember	CO5	BCSB04.13
5	Explain Geographic Routing Unicast Location-Based Routing and Greedy Perimeter Stateless Routing	Remember	CO5	BCSB04.13
6	Define Multicast Location-Based Routing and explain in detailed.	Remember	CO5	BCSB04.12
7	Explain the concept of directed diffusion. Can you imagine at least three strategies or goals for reinforcement?	Remember	CO5	BCSB04.15
8	Explain the broadcast and multicast with differences.	Understand	CO5	BCSB04.11
9	Give full description about analysis of opportunistic routing (Markov Chain).	Understand	CO5	BCSB04.06
10	What is the meaning of SPEED WSN security and explain with multi speed multipath.	Remember	CO5	BCSB04.06
11	List all the Operating Systems used with WSNs. (i) Explain Tiny OS. (ii) Explain MANTIS. (iii) Explain Sen OS. (iv) Explain EYES OS	Remember	CO5	BCSB04.15
12	Give the description of future direction of Wireless Sensor Networks.	Understand	CO5	BCSB04.15

Prepared by:

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