



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

ELECTRONICS AND COMMUNICATION ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	EMBEDDED WIRELESS SENSOR NETWORK
Course Code	:	BES210
Class	:	I - M. Tech
Branch	:	EMBEDDED SYSTEMS
Year	:	2017 – 2018
Course Coordinator	:	Ms Shreya Verma, Assistant Professor, ECE
Course Faculty	:	Ms Shreya Verma, Assistant Professor, ECE

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

Unit-I INTRODUCTION TO WSN			
Group – A (Short Answer Questions)			
S. No	Questions	Blooms Taxonomy Level	Course Outcome
1.	What is a Wireless Sensor Network?	Remember	1
2.	State few characteristics requirements of WSNs.	Remember	1
3.	State the challenges for WSNs	Remember	1
4.	What are differences between sensor network and MANETS?	Understand	1
5.	Why multihop wireless communication is required for WSN?	Remember	1
6.	Explain the concept of fault tolerance.	Remember	1
7.	Summarize on network lifetime.	Remember	1
8.	Discuss about scalability and maintainability?	Remember	1
9.	Apply the concept of collaboration to WSNs and examine it.	Understand	1
10.	Compose about in-network processing.	Remember	1
11.	Generalize the three types of mobility for mobile nodes.	Remember	1
Group - B (Long Answer Questions)			

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1.	Explain the various challenges and potential applications of wireless sensor networks.	Understand	1
2.	(i) Relate sensor network with Ad-hoc network. (ii) Prepare notes on single node architecture.	Understand	1
3.	Illustrate in detail about the various hardware components and their composition into a functioning node of WSN.	Remember	1
4.	Discuss in detail the transceiver characteristics and structure.	Remember	1
5.	(i) Define the types of sensors. (ii) List some ideas on the energy scavenging techniques for sensor nodes.	Understand	1
6.	(i) Write about operational states of sensor node. (ii) Show various mechanisms which form a typical part of WSN.	Understand	1
7.	(i) Differentiate single hop and multihop networks with neat diagram. (ii) Explain about energy consumption of sensor nodes in detail.	Remember	1
8.	(i) With neat diagram, explain sensor network architecture. (ii) What are various challenges of WSN.	Remember	1
9.	Discuss the design principles for wireless sensor network	Understand	1
10.	(i) Explain how sensor networks are deployed for various applications. (ii) Discuss the characteristic requirements of WSN.	Remember	1

Unit-II NETWORK ARCHITECTURE			
Group – A (Short Answer Questions)			
S. No	Questions	Blooms Taxonomy Level	Course Outcome
1.	Differentiate data-centric paradigm and address centric paradigm.	Remember	2
2.	What is meant by event detection?	Remember	2
3.	Define function approximation.	Remember	2
4.	What is edge detection?	Remember	2
5.	Deduce the features of programmability.	Remember	2
6.	Write short note on dynamic energy and power management.	Remember	2
7.	Write in detail about communication devices in a WSN.	Remember	2
8.	What is a gateway?	Remember	2

Group – B (Long Answer Questions)			
S. No	Questions	Blooms Taxonomy Level	Course Outcome
1.	Explain the innovative mechanisms to realize the characteristic requirement of WSN.	Remember	2
2.	Explain optimization goals and figure of merit of WSN.	Remember	2
3.	Design a multihop sensor network with necessary source and sinks.	Remember	2
4.	Prepare steps in detail to develop a wireless sensor network.	Remember	2
5.	Discuss about the power source of a sensor node.	Understand	2
6.	Develop sensor network for any one application	Remember	2
7.	Draw the architecture of a sensor node.	Remember	2

8.	What is WSN tunneling?	Understand	2
9.	Explain the concept of gateway with different scenarios in WSN.	Understand	2
10.	Write about the structure of OS and protocol stack in WSN.	Understand	2

Unit-III SENSOR NETWORK IMPLEMENTATION			
Group – A (Short Answer Questions)			
S. No	Questions	Blooms Taxonomy Level	Course Outcome
1	Explain the concept of fanin and fanout.	Remember	3
2	Write short note on tiny operating system.	Remember	3
3	What is the role of timers in wireless sensor applications?	Remember	3
4	What are the some challenges of writing wireless sensor applications?	Remember	3
5	What interface is responsible for system initialization in tiny OS	Remember	3
6	What is idle listening?	Remember	3
7	State the sources of energy drain in a sensor node	Remember	3
8	Describe CSMA-CA mechanism.	Remember	3
9	State the modes of operation of S-MAC?	Remember	3

Group - B (Long Answer Questions)			
S. No	Questions	Blooms Taxonomy Level	Course Outcome
1	Describe the TDMA mechanism and its advantages and disadvantages for sensor network implementation.	Remember	3
2	What is synchronization? Show an implementation in which five nodes synchronize with each other.	Remember	3
3	Provide an example in which the data is routed using previous routing table and describe how a routing table changes over time.	Remember	3
4	What role does the Split Control interface play in Tiny OS?	Remember	3
5	List the difference between Split Control and Std Control interfaces.	Understand	3
6	Write a simple application to continually increment a counter value and send to another mote where the process is repeated.	Remember	3
7	State the issues arised when atomic blocks are improperly used?	Understand	3
8	Briefly explain the components of Tiny OS.	Understand	3
9	What is an event-driven programming, and why is it critical for sensor network programming?	Remember	3

Unit-IV PROGRAMMING MODELS			
Group – A (Short Answer Questions)			
S. No	Questions	Blooms Taxonomy Level	Course Outcome
1	Define co-operating objects?	Remember	4
2	Write short note on embedded WiSeNts.	Remember	4

3	State the requirement of programming models.	Remember	4
4	Differentiate between data centric and service centric approach.	Understand	4
5	What is spatial programming?	Remember	4
6	What is adaptive system software?	Understand	4
7	Write short notes on (a) mobile code (b) mobile agents.	Understand	4
8	What is event detection?	Remember	4
9	Write about network dynamics.	Remember	4
10	Write short notes on (a) role based abstractions (b) group based approach.	Remember	4

Group – B (Long Answer Questions)			
S. No	Questions	Blooms Taxonomy Level	Course Outcome
1	Explain co-operating objects.	Remember	4
2	Explain adaptive system software.	Understand	4
3	Discuss about communication models.	Remember	4
4	Explain data management middleware.	Remember	4
5.	Discuss about group based approach.	Understand	4
6	Explain embedded WiSeNs.	Remember	4
7	Explain about shared information space.	Remember	4
8	Briefly explain system architecture.	Remember	4
9	Explain programming models requirements and its state of art.	Understand	4
Unit-V CASE STUDIES			
Group – A (Short Answer Questions)			
S. No	Questions	Blooms Taxonomy Level	Course Outcome
1	What methods are used for environmental monitoring in WSN?	Understand	5
2	What is the advantage of providing mobility to the sensor nodes?	Remember	5
3	List the applications of sensor network when nodes are provided mobility.	Remember	5
4	What is inter-vehicle communication network?	Remember	5
5	List the advantages of inter vehicle communication.	Remember	5
6	How the lifetime of a sensor network can be enhanced?	Remember	5
7	What parameters should be taken to reduce the energy consumption of WSN?	Remember	5
8	What parameters should be taken into consideration for designing a WSN?	Remember	5
9	What are the design challenges of WSN?	Remember	5
10	Discuss on communication protocol in context to any case study.	Understand	5
Group – B (Long Answer Questions)			
1	Write a case study for environmental monitoring in WSN.	Remember	5
2	Write a case study for inter vehicle communication.	Remember	5
3	Write a case study for surveillance and monitoring.	Remember	5

4	How do you create and maintain a list of active devices that are connected to WSN.	Understand	5
5	Describe data aggregation and the concept of tree data structures.	Remember	5
6	Write a case study which explains the role of mobile nodes in a sensor network.	Remember	5
7	Write a flowchart for any one application a sensor network.	Remember	5
8	Design a sensor network to maximize its lifetime and reduced energy consumption.	Remember	5
9	Write a case study for energy efficient environmental monitoring.	Remember	5

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