



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

## ELECTRONICS AND COMMUNICATION ENGINEERING

### TUTORIAL QUESTION BANK

<b>Course Name</b>	:	<b>EMBEDDED WIRELESS SENSOR NETWORK</b>
<b>Course Code</b>	:	<b>BESB14</b>
<b>Class</b>	:	<b>I - M. Tech</b>
<b>Branch</b>	:	<b>EMBEDDED SYSTEMS</b>
<b>Year</b>	:	<b>2018– 2019</b>
<b>Course Coordinator</b>	:	<b>Mr K Ravi, Assistant Professor, ECE</b>
<b>Course Faculty</b>	:	<b>Mr K Ravi, Assistant Professor, ECE</b>

#### 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.

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

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

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

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

6.	<b>Develop</b> sensor network for any one application	Remember	2
7.	<b>Draw</b> the architecture of a sensor node.	Remember	2
8.	<b>What</b> is WSN tunneling?	Understand	2
9.	<b>Explain</b> the concept of gateway with different scenarios in WSN.	Understand	2
10.	<b>Write</b> 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	<b>Explain</b> the concept of fanin and fanout.	Remember	3
2	<b>Write</b> short note on tiny operating system.	Remember	3
3	<b>What</b> is the role of timers in wireless sensor applications?	Remember	3
4	<b>What</b> are the some challenges of writing wireless sensor applications?	Remember	3
5	<b>What</b> interface is responsible for system initialization in tiny OS	Remember	3
6	<b>What</b> is idle listening?	Remember	3
7	<b>State</b> the sources of energy drain in a sensor node	Remember	3
8	<b>Describe</b> CSMA-CA mechanism.	Remember	3
9	<b>State</b> the modes of operation of S-MAC?	Remember	3

**Group - B (Long Answer Questions)**

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

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S. No	Questions	Blooms Taxonomy Level	Course Outcome
1	<b>Define</b> co-operating objects?	Remember	4
2	<b>Write</b> short note on embedded WiSeNts.	Remember	4
3	<b>State</b> the requirement of programming models.	Remember	4
4	<b>Differentiate</b> between data centric and service centric approach.	Understand	4
5	<b>What</b> is spatial programming?	Remember	4
6	<b>What</b> is adaptive system software?	Understand	4
7	<b>Write</b> short notes on (a) mobile code (b) mobile agents.	Understand	4
8	<b>What</b> is event detection?	Remember	4
9	<b>Write</b> about network dynamics.	Remember	4
10	<b>Write</b> 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	<b>Explain</b> co-operating objects.	Remember	4
2	<b>Explain</b> adaptive system software.	Understand	4
3	<b>Discuss</b> about communication models.	Remember	4
4	<b>Explain</b> data management middleware.	Remember	4
5.	<b>Discuss</b> about group based approach.	Understand	4
6	<b>Explain</b> embedded WiSeNts.	Remember	4
7	<b>Explain</b> about shared information space.	Remember	4
8	<b>Briefly</b> explain system architecture.	Remember	4
9	<b>Explain</b> 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	<b>What</b> methods are used for environmental monitoring in WSN?	Understand	5
2	<b>What</b> is the advantage of providing mobility to the sensor nodes?	Remember	5
3	<b>List</b> the applications of sensor network when nodes are provided mobility.	Remember	5
4	<b>What</b> is inter-vehicle communication network?	Remember	5
5	<b>List</b> the advantages of inter vehicle communication.	Remember	5
6	<b>How</b> the lifetime of a sensor network can be enhanced?	Remember	5
7	<b>What</b> parameters should be taken to reduce the energy consumption of WSN?	Remember	5
8	<b>What</b> parameters should be taken into consideration for designing a WSN?	Remember	5
9	<b>What</b> are the design challenges of WSN?	Remember	5

10	<b>Discuss</b> on communication protocol in context to any case study.	Understand	5
<b>Group – B (Long Answer Questions)</b>			
1	<b>Write</b> a case study for environmental monitoring in WSN.	Remember	5
2	<b>Write</b> a case study for inter vehicle communication.	Remember	5
3	<b>Write</b> a case study for surveillance and monitoring.	Remember	5
4	<b>How</b> do you create and maintain a list of active devices that are connected to WSN.	Understand	5
5	<b>Describe</b> data aggregation and the concept of tree data structures.	Remember	5
6	<b>Write</b> a case study which explains the role of mobile nodes in a sensor network.	Remember	5
7	<b>Write</b> a flowchart for any one application a sensor network.	Remember	5
8	<b>Design</b> a sensor network to maximize its lifetime and reduced energy consumption.	Remember	5
9	<b>Write</b> a case study for energy efficient environmental monitoring.	Remember	5

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**Date: 7<sup>th</sup> March, 2019.**

**HOD, ECE**