



Question Bank

Details of the Course

Academic Year : 2026 – 2027

Regulation : 2024

Name of the Department : Electronics and Communication Engineering Name of the

Course : Wireless Sensor Network Design

Course Code : EC243P09

Semester : V

Course Outcome: (List the Course Outcomes of the Course)

On completion of this course, the students will be able to

CO1: To be able to design solutions for WSNs applications

CO2: To be able to develop efficient MAC and Routing Protocols

CO3: To be able to design solutions for 6LOWPAN applications

CO4: To be able to develop efficient layered protocols in 6LOWPAN

CO5: To be able to use Tiny OS and Contiki OS in WSNs and 6LOWPAN applications

Bloom's Level: BL1-Remembering, BL2-Understanding, BL3-Applying, BL4-Analyzing, BL5-Evaluating, BL6-Creating.

UNIT - I – Introduction

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	PART – A (2 Marks)	Bloom's Level	Course Outcome	Marks Allotted
1.	What is an adhoc wireless network?	[BL1]	[CO1]	[2]
2.	Outline the challenging issues in adhoc network maintenance.	[BL2]	[CO1]	[2]
3.	Draw the super frame structure of IEEE 802.15.4.	[BL3]	[CO1]	[2]
4.	List out the expressibility requirements for WSN service interfaces.	[BL1]	[CO1]	[2]
5.	Define wireless sensor networks.	[BL1]	[CO1]	[2]
6.	What is a sensor? Give its categories.	[BL1]	[CO1]	[2]
7.	What are the three types of mobility?	[BL1]	[CO1]	[2]
8.	Draw the overview of sensor node components.	[BL3]	[CO1]	[2]
9.	What is Logical Link Control and Adaptation Protocol(L2CAP)?	[BL1]	[CO1]	[2]
10.	List the components of WSN involved in energy consumption.	[BL1]	[CO1]	[2]
11.	Give the characteristics of wireless sensor networks.	[BL1]	[CO1]	[2]

12.	Give the Advantages of WSN.	[BL1]	[CO1]	[2]
13.	Define data centric and address centric networks.	[BL1]	[CO1]	[2]
14.	Define lifetime of a sensor node.	[BL1]	[CO1]	[2]

15.	What are hardware components of a single node in WSN?	[BL1]	[CO1]	[2]
16.	What is network lifetime?	[BL1]	[CO1]	[2]

Descriptive Questions (13/15 Marks)

1.	Explain in detail about the various challenges involved in designing a Wireless Sensor Network.	[BL2, BL4]	[CO1]	[13]
2.	What are the different Application types in WSN? Explain some applications with examples?	[BL2]	[CO1]	[13]
3.	Explain the Single Node Architecture of Wireless Sensor Networks.	[BL2]	[CO1]	[13]
4.	How energy is consumed in Wireless Sensor Networks? Explain energy consumption of various components	[BL2, BL3]	[CO1]	[13]
5.	Explain the different scenarios of wireless sensor networks.	BTL2	[CO1]	[13]
6.	Explain in detail about the design considerations of transceivers in wireless sensor networks.	BTL2	[CO1]	[13]
7.	Explain in detail about IEEE 802.15.4 protocol in Wireless sensor network.	BTL2	[CO1]	[13]
8.	What are the different optimization goals in Wireless sensor Networks? Explain them.	BTL1, BTL2	[CO1]	[13]

UNIT- II – MAC AND ROUTING PROTOCOLS

PART – A (2 Marks)		Bloom's Level	Cours eOutcome	Marks A llotted
1.	Define MAC	[BL1]	[CO2]	[2]
2.	List down the important classes of MAC protocol	[BL1]	[CO2]	[2]
3.	Define Overhearing.	[BL1]	[CO2]	[2]
4.	Define Idle Listening	[BL1]	[CO2]	[2]
5.	What is Cycled Receiver Approach?	[BL1]	[CO2]	[2]
6.	Give the three phases of S-Mac protocol.	[BL1]	[CO2]	[2]
7.	List the advantages of Mediation Device protocol	[BL1]	[CO2]	[2]
8.	What is wake up radio concept?	[BL1]	[CO2]	[2]
9.	Give the features of PAMAS.	[BL1]	[CO2]	[2]
10.	What are the disadvantages of schedule based protocols?	[BL1]	[CO2]	[2]
11.	Give the phases of a LEACH round.	[BL1]	[CO2]	[2]

12.	What are the reasons of Hidden Terminal Problem?	[BL1]	[CO2]	[2]
13.	What is a cycle?	[BL1]	[CO2]	[2]
14.	What is Pegasus?	[BL1]	[CO2]	[2]
Descriptive Questions (13/15 Marks)				
1.	Explain in detail about the specific requirements and design considerations for MAC protocols in wireless sensor networks.	[BL2]	[CO2]	[13]
2.	Explain in detail about Low duty Cycle Protocols and Wake up concepts	[BL2]	[CO2]	[13]
3.	Analyze the impact of S-MAC protocol in a network with suitable diagrams.	[BL4]	[CO2]	[13]
4.	What is contention-based protocol? Explain it with an example.	[BL2]	[CO2]	[13]
5.	What is schedule-based protocol? Explain the LEACH protocol in detail.	[BL2]	[CO2]	[13]

6.	What is a routing protocol? Outline the issues in designing a routing protocol for WSN	[BL2]	[CO2]	[13]
7.	Present an outline of SPINS, security protocol for sensor networks.	[BL2]	[CO2]	[15]
8.	Discuss about the importance of the Mediation device protocols for sensor network.	[BL3]	[CO2]	[15]
9.	Describe about the SPIN and PEGASIS routing with the help of neat diagram. Give its advantages and Disadvantages.	[BL4]	[CO2]	[15]
10.	Summarize the methods to select the protocol for Schedule based routing And justify the reasons.	[BL5]	[CO2]	[15]

UNIT- III – 6LOWPAN

PART – A (2 Marks)		Bloom's Level	Cours eOutcome	Marks A llotted
1.	What is 6LOWPAN?	[BL1]	[CO3]	[2]
2.	What are the applications of 6LOWSPAN?	[BL1]	[CO3]	[2]
3.	List the features of 6LOWSPAN.	[BL1]	[CO3]	[2]
4.	Give some advantages of 6LOWSPAN.	[BL1]	[CO3]	[2]
5.	Mention some of the disadvantages of 6LOWSPAN.	[BL1]	[CO3]	[2]
6.	Discuss about security and interoperability with 6LOWSPAN.	[BL2]	[CO3]	[2]
7.	List the basic requirement of 6LOWSPAN.	[BL1]	[CO3]	[2]

Descriptive Questions (13/15 Marks)

1.	Explain in detail about ROLL Routing protocol with neat illustration.	[BL2]	[CO3]	[13]
2.	With neat diagram explain Mobile IPv6.	[BL2]	[CO3]	[13]

3.	Explain in detail about Mobile IP with neat illustration.	[BL2]	[CO3]	[13]
4.	With neat diagram explain 6LoWPAN Architecture and protocol stack.	[BL2]	[CO3]	[13]
5.	Define Mobility of 6LoWPAN. Explain the following with neat Sketch: a) Types of Mobility b) Proxy Home Agent c) Proxy MIPv6	[BL2]	[CO3]	[13]
6.	Discuss the distributed assignment of Locally Unique MAC address for WSN.	[BL3, 4]	[CO3]	[13]
7.	Bring out the difference between stateless header compression and context based header compression.	[BL4]	[CO3]	[13]

UNIT- IV – APPLICATION

PART – A (2 Marks)		Bloom's Level	Course Outcome	Marks Allotted
1.	What are proxying?	[BL1]	[CO4]	[2]
2.	Summarize the commonly addressed issues in the applications of 6LoWPAN?	[BL2]	[CO4]	[2]
3.	What is a web service?	[BL1]	[CO4]	[2]
4.	What is a method?	[BL1]	[CO4]	[2]
5.	Name two commonly used web service protocols in 6LoWPAN.	[BL1]	[CO4]	[2]
6.	What is publish/subscribe?	[BL1]	[CO4]	[2]
7.	How SIP handles keep-alive mechanisms in network communications.	[BL2]	[CO4]	[2]

8.	What are the difference between MQTT nad MQTT-S?	[BL1]	[CO4]	[2]
9.	What are layers of BACnet?	[BL1]	[CO4]	[2]
10.	What is SIP?Where does it lies on OSI layer?	[BL1]	[CO4]	[2]
11.	What are the two modes in which the application protocol in gateway approach function?	[BL1]	[CO4]	[2]
12.	What are the disadvantages of SNMP?	[BL2]	[CO4]	[2]
13.	Differtiate RTP and RTCP.	[BL2]	[CO4]	[2]
14.	Zigbee uses horizontal or vertical approach.Justify	[BL3]	[CO4]	[2]
15.	What are the applications of BACnet protocol?	[BL1]	[CO4]	[2]

Descriptive Questions (13/15 Marks)

1.	Explain the operation of MQTT-s Protocol with relavant diagram.	[BL2]	[CO4]	[13]
2.	What is industry based protocols? Explain any two protocols in detail.	[BL2]	[CO4]	[13]
3.	Briefly describe the functions of RTP header structure.	[BL2]	[CO4]	[13]
4.	Explain the SNMP components with neat diagram.	[BL2]	[CO4]	[13]

5.	Describe the design issues in the applications of 6LOWSPAN.	[BL2]	[CO4]	[13]
6.	What are protocol paradigm? Give short notes on various paradigms .	[BL1, BL2]	[CO4]	[13]
7.	Explain the protocol stack of cap protocol.	[BL2]	[CO4]	[15]

UNIT- V – TOOLS

PART – A (2 Marks)		Bloom's Level	Cours eOutcome	Marks A lotted
1.	Define TOSSIM.	[BL1]	[CO5]	[2]
2.	Describe about COOJA network simulator interface.	[BL2]	[CO5]	[2]
3.	What is meant by Contiki OS?	[BL1]	[CO5]	[2]
4.	Define TinyOS.	[BL1]	[CO5]	[2]
5.	What is meant by nesC?	[BL1]	[CO5]	[2]
6.	What are the two types of nesC?	[BL1]	[CO5]	[2]
7.	Identify which are the three types of components in TinyOS?	[BL3]	[CO5]	[2]
8.	What are the two major components in nesC?	[BL1]	[CO5]	[2]
9.	Explain the difference between provides and uses interfaces in nesC.	[BL2]	[CO5]	[2]
10.	What options does nesC provide to developers to prevent race conditions?	[BL2]	[CO5]	[2]

Descriptive Questions (13/15 Marks)

1.	Analyze the programming challenges faced by sensor network tools and categorize them based on their impact on network performance and scalability.	[BL4]	[CO5]	[13]
2.	Explain about the following. (a) TinyOS (b) nesC in detail	[BL2]	[CO5]	[13]
3.	Explain in detail about the CONTIKIOS simulator	[BL2]	[CO5]	[13]
4.	Explain about the following . (a) COOJA (b)TOSSIM	[BL2]	[CO5]	[13]
5.	Demonstrate how a node level simulator can be used to model a specific wireless sensor network scenario. Provide an example.	[BL3]	[CO5]	[13]
6.	Outline the features of TinyOS and CONTIKI OS for wireless sensor networks.	[BL1, BT2]	[CO5]	[13]