

National Institute of Technology Silchar
Mid-semester (UG) Examinations, March 2025

Subject Code: - CS 442
 Semester:- 8th
 Duration:- One Hour

Subject:- Wireless Sensor Network
 Dept.- Computer Science & Engineering
 Total Marks:- 30

Answer all questions.

		Marks	CO
1)	(a) Give a taxonomy / classification of various types sensors used in typical WSN applications?	3	1
	(b) With an illustrative diagram show the components of a typical sensor node along with interconnections among the components.	2	1
	(c) Discuss different factors influencing the sensor network design?	3	3
	(d) State the similarities and differences of Wireless Sensor Network and Mobile Adhoc Network?	2	1
2)	(a) Explain antenna diversity? What are different forms of antenna diversity?	1+2	3
	(b) Using Friis transmission formula give the expression for path loss (in dB) of a signal of wavelength λ propagating over a distance d in free space signal propagation model?	2	3
	(c) Compare frequency hopping spread spectrum (FHSS) with respect to direct sequence spread spectrum (DSSS). Explain the difference between Fast hopping FHSS and Slow hopping FHSS?	3	3
	(d) Explain the received signal power & loss in 2-Ray ground reflection model?	2	3
3)	(a) Explain the following with respect to Wifi networks:- (i) DFWMAC protocol, (ii) Physical carrier sense, (iii) Virtual carrier sense?	3	2
	(b) What is LoWPAN? State variety of IEEE standards that supports LoWPAN?	2	1
	(c) Explain the usage of following Inter-frame space values:- SIFS, PIFS & DIFS?	3	2
	(d) State different station services and distribution services supported by IEEE 802.11 standard?	2	2

National Institute of Technology Silchar
Supplementary Examination (UG), July 2024

Subject code: CS 442
Semester: 8th
Duration: 3 Hours

Subject: Wireless Sensor Network
Department: CSE
Total Marks: 80

Answer any 8 (eight) questions

		Marks	COs
1	Describe the use of WSN in following each of the following domains of applications with an example. Clearly mention the type of sensors required, salient features of the deployment, specific advantages and challenges in each case:- (a) Military Applications, (b) Environment and Ecology, (c) Health Care, (d) Smart Home, (e) Industrial applications	5x2=10	CO1
2	Discuss how the following factors influence sensor network design (a) Fault Tolerance, (b) Scalability, (c) Power Consumption, (d) Sensor Network Topology, (e) Transmission Media	5x2=10	CO3
3	Discuss the following with respect to Wireless communication networks:- (a) Five basic propagation mechanisms, (b) 2-ray model – Path loss	5x2=10	CO3
4	Describe different Spread Spectrum techniques along with schematic diagrams for the circuitry used for different SS techniques.	5x2=10	CO3
5	Describe the PHY and MAC specifications following Wireless standards:- (a) IEEE 802.11 (b) IEEE 802.15.1	5x2=10	CO2
6	Describe the salient features of IEEE 802.15.4 & Zigbee networks.	10	CO1
7	Discuss the difference among the following:- (a) CSMA, (b) CSMA/CA, (c) MACA (d) MACAW (e) TDMA	5x2=10	CO2
8	Describe the following routing protocols:- (a) Directed Diffusion, (b) SPIN	5x2=10	CO2
9	Discuss the functioning of the following Hierarchical protocols for WSN:- (a) LEACH, (b) PEGASIS	5x2=10	CO2

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815 - CSE, UG

National Institute of Technology Silchar
End-Semester (UG) Examinations, May 2024

2

Subject Code CS 442

Subject: Wireless sensor network

Semester: 8th

Department: CSE

Duration: Two Hour

Total Marks: 50

Answer any 5 (five) questions

		Marks	CO
1.	<p>Discuss typical applications of WSN in following domains with mention of the type of sensors that may find usage in these specific applications.</p> <p>(i) Disaster relief and Guiding system, (ii) Early warning systems for Volcanic eruption, (iii) Precision agriculture - in wine making fields, (iv) Debris flow monitoring, (v) LCD plants</p>	2x5	CO1
2(a)	<p>Give a schematic diagram to show & compare the following ranges of point source wireless radio transmitter.</p> <p>(i) Transmission range, (ii) Detection range, (iii) Interference range Also, discuss the salient features of the above ranges.</p>	1+3	CO3
2(b)	<p>Discuss the challenges posed by the Acoustic channel in UWSN (Under water sensor network)?</p> <p>With appropriate diagram(s) show the difference among the following Coverage schemes: (i) Area, (ii) Barrier, & (iii) Target Coverage.</p>	3+3	CO3

PTO

		Marks	CO
3.	<p>Explain the following concepts clearly & briefly:-</p> <p>(i) Fundamental frequency, (ii) Spectrum, (iii) Absolute bandwidth, (iv) Adaptive Modulation, (v) ISM band, (vi) Pico-net, (vii) Channel Capacity, (viii) Shift Keying, (ix) Spreading code (in DSSS), (x) Slow & Fast hopping (in FHSS)</p>	10	CO1
4(a)	<p>Show the layers in Bluetooth Protocol stack (show possible overlapping among layers, if any).</p> <p>With a state transition diagram, explain the operational states of a Bluetooth device?</p>	3+3	CO2
4(b)	<p>What is fading? Enlist the factors responsible for fading? With a tree diagram discuss relationship between various basic types of fading?</p>	1+1 +2	CO3
5.	<p>Discuss the salient features of the following medium access control protocols:-</p> <p>(i) Slotted-ALOHA, (ii) CSMA and its variants, (iii) MACA, (iv) MACAW, (v) DFWMAC – IEEE 802.11 DCF</p>	2x5	CO2
6.	<p>Describe the detail features and functioning of <u>any one</u> of the following:-</p> <p>(i) Low Energy Adaptive Clustering Hierarchy (ii) PEGASIS (iii) IEEE 802.11 MAC frame Format & usage of 4 addresses therein</p>	10	CO2

Answer all questions.

		Marks	CO
1)	(a) With a block diagram discuss different components of a sensor node? Show clearly the connections / interaction pattern among the components.	2	2
	(b) Discuss typical applications of the following commercial products (i) Mica2 (ii) Mica2DOT (iii) MicaZ?	3	3
	(c) Differentiate between following network deployment schemes: (i) Random, (ii) Regular, (iii) Gaussian deployment?	3	2
	(d) Distinguish between different query patterns of typical WSN applications?	2	2
2)	(a) What is meant by "gain" of a directional antenna? Compare Omni and Directional antenna in terms of extent of the following parameters: Spatial Reuse, Connectivity, Interference, Cost and Complexity?	1+2	3
	(b) Suppose a channel transmitting at 100 kbs, has a Coherence time of 70 mili seconds. Calculate the bit time? What type of fading will occur in the channel, state reasons?	1+2	2
	(c) Consider free space transmission situation in Fig. 1 below. (i) Give an expression of actual Received signal power P_R , if G_T and G_R are Transmitter & Receiver antenna gains respectively and the signal is transmitted with transmit power P_T ? (ii) Give an expression of the Received signal power using Empirical path loss formula?	2+2	1

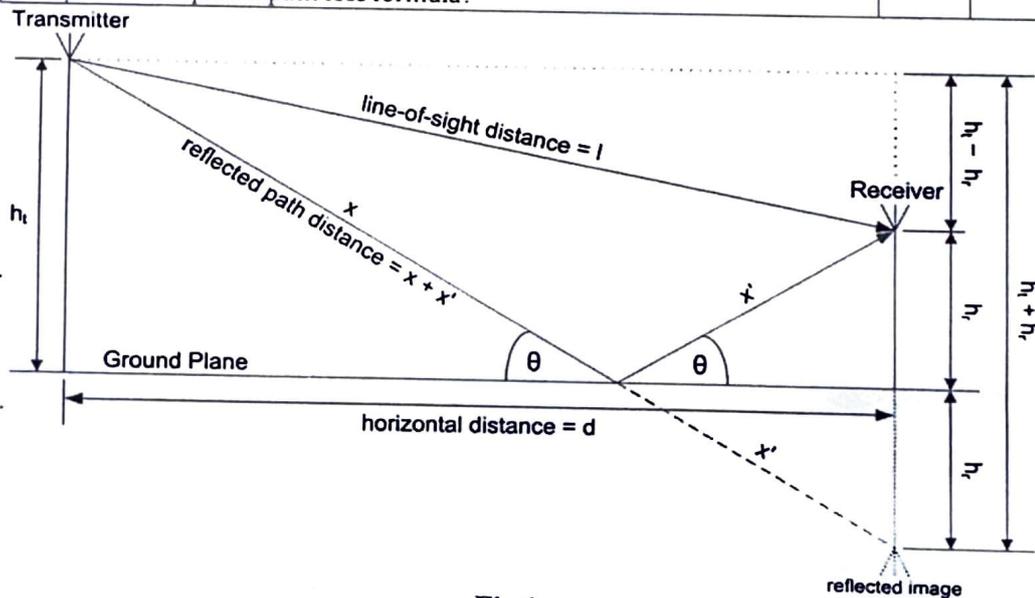


Fig.1

3)	(a) What are the advantage and disadvantages of Sender-Based Auto-rate fallback protocol? Considering the following situation, estimate the rate at which actual data will be transmitted, using receiver based adaptive modulation scheme?	2+1	1
	<p style="text-align: center;"> $\text{A} \xrightarrow{\text{RTS (2 Mbps)}} \text{B}$ $\text{B} \xrightarrow{\text{CTS (1 Mbps)}} \text{A}$ </p>		
	(b) What are the different components in IEEE 802.11-infrastructure network? What is the difference between BSS and IBSS?	2+1	1
(c) Discuss different Traffic services and Medium access methods in IEEE 802.11 MAC layer.?	2+2	3	

National Institute of Technology Silchar
Mid-Semester (UG) Examinations, March 2023

Subject Code CS 442,
 Semester: 8th,
 Duration: One Hour,

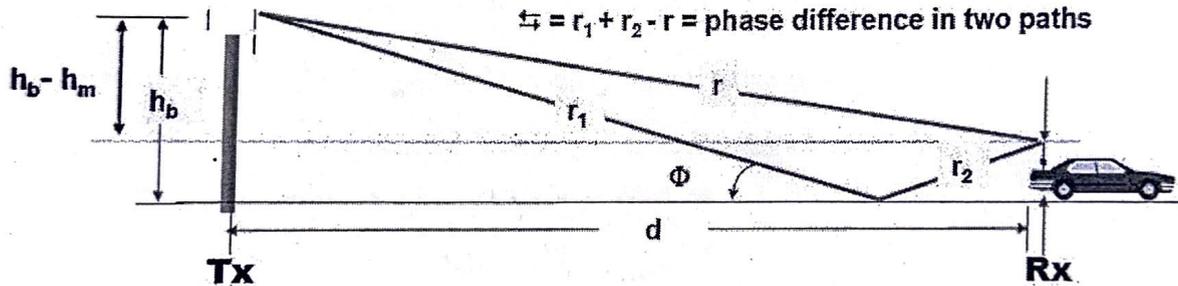
Subject: Wireless sensor network
 Department: CSE
 Total Marks: 30

Answer all questions.

		Marks	CO
1. (a)	Show the <i>inter-connections among different components of a WSN node?</i>	2	CO-1
(b)	Discuss the <i>challenges</i> of WSN deployment in following aspects:- (i) Communications (ii) Target coverage (iii) Target tracking	3	CO-1
(c)	List the <i>important varieties sensors</i> needed for following applications: (i) Debris flow monitoring (ii) Habitat Monitoring on Great Duck Island (iii) Precision agriculture like Wine making (iv) In LCD plants, to prevent shaking of the glass substrate during processing (v) Interactive LED wall	5	CO-3
2. (a)	Give an expression for <i>free space loss for isotropic antennas with gains at transmitter and receiver.</i> Write the <i>empirical path loss formula in Two ray model.</i>	2+1	CO-3
(b)	Define for a signal the following: <i>bit time & coherence time, coherence bandwidth, signal bandwidth?</i>	3	CO-2
(c)	With respect to above in Question 2(b), discuss the conditions when following may happen: <i>fast fading, slow fading, flat fading, and frequency selective fading?</i>	4	CO-2
3. (a)	In FHSS how the discrete <i>changes of carrier frequency</i> is determined? What are the two <i>versions</i> of FH in FHSS? How they differ? Which one is more robust DSSS or FHSS?	1+2+1	CO-2
(b)	Discuss the various <i>Components of IEEE 802.11 adhoc and infrastructure network?</i>	6	CO-1

Figures in the right hand margin indicates full marks for the question
All questions are compulsory.

- 1a) With a schematic block diagram describe the components of a typical sensor node? (2)
- 1b) Give a pictorial representation for a sensor network deployment where sensor data are routed back to the end user by a multi hop infrastructure less network through the sink. Illustrate the protocol stack used by the sink and all sensor nodes. (3)
- 1c) A smart car parking area with deployed sensor field extensively using RSSI is shown below. Assume G_T and G_R be the antenna gain of the Transmitter and Receiver respectively. Give expression of received signal power at receiver wrt. transmitted power. What will be the path loss (dB), if any. (5)



- 2a) What similarities and differences you observed between Mobile adhoc Network and Wireless Sensor Network? (3)
- 2b) Draw the timing diagram for DFWMAC and explain the usage of SIFS, DIFS, PIFS. (3)
- 2c) Briefly describe two state of the art applications of WSN in each the following domains:- (4)
 (i) Military (ii) Environmental monitoring
- 3a) Discuss how SPIN addresses the 3 major problems in Flooding? (4)
- 3b) Compare the standard and technology of the following wrt. key distinguishing factors:- (6)
 (i) IEEE 802.11 Wifi network,
 (ii) IEEE 802.15.1 Bluetooth network, and
 (iii) IEEE 802.15.4 and ZigBee network.

Summarise your observations in a tabular form.

National Institute of Technology, Silchar
End-Semester (UG) Examinations, May' 2019

Subject Code:- CS 1453, Subject:- Wireless Sensor Network
Semester:- 8th(UG), 2nd(PG) Department:- CSE
Duration: Two Hours, Total Marks: 50

Figure in the right hand margin indicates full marks for the question.

Answer any 5 (five) questions.

Answer briefly and to the point

1. (a) Describe clearly the functions and message transfers in the various phases of Low Energy Adaptive Clustering Hierarchy (LEACH) protocol? 5
- (b) How LEACH-C tries to improve the LEACH protocol? 1
- (c) Discuss the short comings of LEACH and LEACH-C protocol 4
2. (a) In Bluetooth protocol stack discuss the functions of the following:- L2CAP, SDP, HCI. 5
- (b) (i) In IEEE 802.15.4 beacon enabled network give the structure of a MAC Superframe. 3
- (ii) Define the two parameters that control the structure of Superframe. 2
3. (a) What is the usage of four 6-byte addresses in IEEE 802.11 frame format? 4
- (b) Which field or subfield of the 802.11 frame indicates or determines the usage of these addresses. 2
- (c) Explain how the value of the field or subfield of the 802.11 frame determines the meaning of the four addresses? 4

Contd. to next page

4. (a) (i) Describe clearly Directed diffusion routing protocol? 3
(ii) Illustrate its key difference with SPIN? 2
- (b) (i) Compare the listening schemes in SMAC and TMAC 4
protocols with appropriate timing diagram.
(ii) Which protocol has higher latency? 1
5. (a) Explain how synchronization is achieved in DESYNC- 3
TDMA.
- (b) What measure is taken to limit the query forwarding in 4
Rumor Routing? What happens if a query did not reach its
target?
- (c) Derive how each node computes its cost to a particular 3
region in the network from its learned cost and estimated cost
Geographical and Energy Aware Routing (GEAR).
6. Explain the following with figures and examples wherever 10
necessary:- (Each carries 2 marks)
- (a) RSSI
(b) k-covered field
(c) DPM scheme
(d) MACA-BI
(e) Hidden Terminal and Exposed Terminal problem

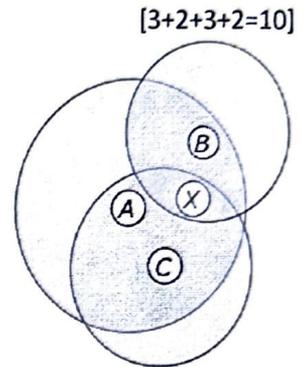
National Institute of Technology, Silchar
End-Semester(UG/PG/PhD) Examinations, May' 2018

Subject Code : CS-1453
 Semester: 8th(UG), 2nd(PG/PhD)
 Duration: Two Hours

Subject:- Wireless Sensor Network (Elective)
 Department: CSE
 Total Marks: 50

*Answer briefly & to the point. Figure in the right hand margin indicates full marks for the question.
 Answer any five questions.*

- 1) Consider a Wifi network shown in right hand side with an access point, X and three hosts, A, B and C. The large circles indicate the coverage areas of the three hosts. The coverage area for X includes all the three hosts. Assume RTS/CTS are not used. Suppose X is transmitting a packet at time 0 and finishes sending it at time 100 μ s. Also,



- Node A gets a packet to send at time 50 that takes 100 μ s to send and is assigned a backoff timer of 100.
- Node B gets a packet at time 70 that takes 200 μ s and is assigned a backoff timer of 50.
- Node C gets a packet at time 90 that takes 150 μ s and is assigned a backoff timer of 150.

- (a) For each of the three hosts, what time do they start sending their packets? Ignore the IFSS and the time required for ACKs.
- (b) Of the three packets sent, which are successfully delivered on the first attempt?
- (c) For each packet that is not successfully delivered on the first attempt, approximately when does the sending host learn that the packet was lost and must be sent again?
- (d) Now, suppose RTS/CTS is enabled. In this case, approximately when does each host send its data packet? Assume that the time needed to send RTS, CTS and ACK packets is negligible.
- 2) (a) In a table, give the comparative statement among 802.11b, Bluetooth & ZigBee, in respect of the following parameters:-(i) Different Channel options, (ii) Nodes supported, (iii) Latency, (iv) Data Rate. [4]
 (b) Discuss different PHY layer primitives for Data and management services in ZigBee Networks? [2]
 (c) Which technique is used for clear channel assessment in ZigBee. [1]
 (d) In a Bluetooth network, the hopping rate of 1600 hops per second is used that carries 240 bits in one slot packet. If each frame of a voice packet carries 160 bits of sample speech, what is the efficiency of packet transmission? How often the voice packets are sent to support 64 kbps voice in each direction? [3]
- 3) (a) What is the usage of DS packet in MACAW? [2]
 (b) How individual nodes determine its state in Schedule exchange protocol in TRAMA? [2]
 (c) "T-MAC is a contention free MAC protocol" – True or False? State clearly how T-MAC addresses the shortcomings of S-MAC? [2]
 (d) What is Guaranteed Time Slot, where and How is it used? [2]
 (e) Discuss how dynamic power management is utilized to obtain energy efficiency in WSN MAC? [2]
- 4) (a) Give taxonomy of the routing protocols for WSN? [2]
 (b) How SPIN differs from Directed Diffusion? [2]
 (c) With an example demonstrate how nodes update their event table in Rumor routing? [2]
 (d) How the nodes detect the asymmetric links in OLSR? [2]
 (e) Discuss different forwarding strategies in Greedy perimeter stateless routing? [2]

- 5) Describe an energy efficient state-of-the-art clustering protocol for WSN other than LEACH. Discuss clearly the following:- [10]
- (a) Exact name of the protocol, Author(s) and year of discovery;
 - (b) Background / Network assumptions;
 - (c) CH selection method;
 - (d) Cluster Members inclusion methods;
 - (e) Data forwarding scheme adopted for transmission of data from Nodes to the BS and Vice versa;
 - (f) Illustrate the various advantages the stated protocol achieves in comparison to other similar contemporary protocols;
 - (g) Explain the short comings (if any) of the stated protocol, and
 - (h) the reason it fails to achieve its objectives efficiently / effectively (if so)?
- 6) (a) Discuss why node location is important in application specific Sensor network? [2]
- (b) Describe an efficient sensor network localization technique. Discuss clearly the following:- [8]
- (i) Exact name of the scheme, Author(s) and Year of discovery,
 - (ii) the Methodology used for localization with appropriate illustrations,
 - (iii) Illustrate the advantages it achieves in comparison to other similar contemporary protocols?
 - (iv) Explain the short comings (if any) and the reason it fails to achieve its objectives efficiently / effectively (if so)?

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National Institute of Technology, Silchar
Special Examinations (UG) , August 2018

Subject Code : CS 1453

Semester: 8th

Duration: **Three Hours,**

Subject: WSN (EL IV)

Department: CSE

Total Marks : 80

Figure in the right hand margin indicates full marks for the question.

Answer any eight Questions.

1. Explain the difference between the following:- **4+3+3**
 - (a) IBSS, BSS and ESS
 - (b) WLAN and WiMAX
 - (c) DSSS and CCK modulation schemes

2. (a) Explain how WLC works when considering packet transfer? **5+5**
(b) Describe the basic guidelines for implementing CAPWAP.

3. (a) What Are The Different Types Of Transmission Impairments? **4+3+3**
(b) What Do You Mean By The Term Frequency-hopping Spread Spectrum (fhss)?
(c) How Frequency Hopping Is Used For Security In Bluetooth?

4. Explain The Following Terms:- **2X5**
 - (a) Icmp, (b) Arp, (c) Unicast (d) Multicast, (e) Broadcast

5. (a) Describe DFWMAC protocol with appropriate timing diagram? **5X2**
(d) Explain clearly how DFWMAC if different form MACA and MACAW?

6. Discuss the following MAC protocols for WSN:- **3+3+4**
 - (a) SMAC (b) TMAC (c) WiseMAC

7. (a) Describe LEACH protocol? How it differs from LEACH-C protocol? **5X2**
(b) Describe PEGASIS protocol? What are the demerits of PEGASIS protocol?

8. (a) How gradient is setup and used in DD protocol? **5X2**
(b) Describe various flavours of SPIN protocol along with their differences?

9. (a) Describe GPSR protocol? Discuss how GPSR is different from GAF? **5X2**
(b) Write a short note on Threshold-sensitive Energy Efficient Protocols (TEEN and APTEEN) for WSN.

National Institute of Technology, Silchar
End-Semester(UG/PG/PhD) Examinations, May' 2018

Subject Code : CS-1453
 Semester: 8th(UG), 2nd(PG/PhD)
 Duration: Two Hours

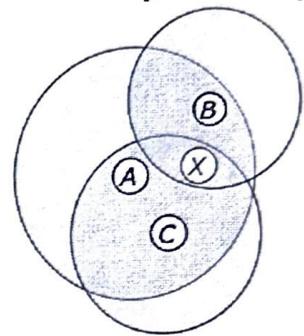
Subject:- Wireless Sensor Network (Elective)
 Department: CSE
 Total Marks: 50

Answer briefly & to the point. Figure in the right hand margin indicates full marks for the question.

Answer any five questions.

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[3+2+3+2=10]



- Node A gets a packet to send at time 50 that takes 100 μ s to send and is assigned a backoff timer of 100.
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(b) Of the three packets sent, which are successfully delivered on the first attempt?

(c) For each packet that is not successfully delivered on the first attempt, approximately when does the sending host learn that the packet was lost and must be sent again?

(d) Now, suppose RTS/CTS is enabled. In this case, approximately when does each host send its data packet? Assume that the time needed to send RTS, CTS and ACK packets is negligible.

- 2) (a) In a table, give the comparative statement among 802.11b, Bluetooth & ZigBee, in respect of the following parameters:-(i) Different Channel options, (ii) Nodes supported, (iii) Latency, (iv) Data Rate. [4]

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(b) How individual nodes determine its state in Schedule exchange protocol in TRAMA? [2]

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(d) What is Guaranteed Time Slot, where and How is it used? [2]

(e) Discuss how dynamic power management is utilized to obtain energy efficiency in WSN MAC? [2]

- 4) (a) Give taxonomy of the routing protocols for WSN? [2]

(b) How SPIN differs from Directed Diffusion? [2]

(c) With an example demonstrate how nodes update their event table in Rumor routing? [2]

(d) How the nodes detect the asymmetric links in OLSR? [2]

(e) Discuss different forwarding strategies in Greedy perimeter stateless routing? [2]

- 5) Describe an energy efficient state-of-the-art clustering protocol for WSN other than LEACH. Discuss clearly the following: [10]
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 - (g) Explain the short comings (if any) of the stated protocol, and
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- (b) Describe an efficient sensor network localization technique. Discuss clearly the following: [8]
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 - (iv) Explain the short comings (if any) and the reason it fails to achieve its objectives efficiently / effectively (if so)?

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National Institute of Technology, Silchar
End-Semester (UG) Examinations (RE-EXAMINATION), Jan-June'19 Session

Subject Code:- CS 1453, Subject:- Wireless Sensor Network
Semester:- 8th(UG), 2nd(PG) Department:- CSE
Duration: Two Hours, Total Marks: 50

Figure in the right hand margin indicates full marks for the question.

Answer any 5 (five) questions.

1. (a) Describe the components of IEEE 802.11 network along with their functioning and the services offered. (5)
- (b) Give a comparative analysis of PHY specifications between IEEE 802.11 and IEEE 802.15.4? (5)
2. Compare the following MAC schemes with clear timing diagrams:- (10)
 - (a) Slotted ALOHA
 - (b) CSMA-CD
 - (c) CSMA-CA
 - (d) DFWMAC
 - (e) MACA-BI
3. Describe the following protocols in detail:- (5x2=10)
 - (a) LEACH-C
 - (b) DSYNC-TDMA
4. Compare the following:- (5x2=10)
 - (a) SMAC, TMAC, WiseMAC
 - (b) IEEE 802.15.4 and IEEE 802.15.1 standard
5. (a) Compare the following protocols:- (6)
 - (i) Directed Diffusion
 - (ii) SPIN-RC
 - (iii) GEAR
 - (iv) DSR
- (b) How RSSI and TDMA along with CDMA is used in LEACH. (4)
6. Explain complete PHY, MAC and ROUTING layer specification for ZigBee networks. (10)

National Institute of Technology Silchar
Mid-semester (UG) Examinations, March 2025

Subject Code: - CS 442
Semester: - 8th
Duration: - One Hour

Subject:- Wireless Sensor Network
Dept.:- Computer Science & Engineering
Total Marks:- 30

Answer all questions.

		Marks	CO
1)	(a) Give a taxonomy / classification of various types sensors used in typical WSN applications?	3	1
	(b) With an illustrative diagram show the components of a typical sensor node along with interconnections among the components.	2	1
	(c) Discuss different factors influencing the sensor network design?	3	3
	(d) State the similarities and differences of Wireless Sensor Network and Mobile Adhoc Network?	2	1
2)	(a) Explain antenna diversity? What are different forms of antenna diversity?	1+2	3
	(b) Using Friis transmission formula give the expression for path loss (in dB) of a signal of wavelength λ propagating over a distance d in free space signal propagation model?	2	3
	(c) Compare frequency hopping spread spectrum (FHSS) with respect to direct sequence spread spectrum (DSSS). Explain the difference between Fast hopping FHSS and Slow hopping FHSS?	3	3
	(d) Explain the received signal power & loss in 2-Ray ground reflection model?	2	3
3)	(a) Explain the following with respect to Wifi networks:- (i) DFWMAC protocol, (ii) Physical carrier sense, (iii) Virtual carrier sense?	3	2
	(b) What is LoWPAN? State variety of IEEE standards that supports LoWPAN?	2	1
	(c) Explain the usage of following Inter-frame space values:- SIFS, PIFS & DIFS?	3	2
	(d) State different station services and distribution services supported by IEEE 802.11 standard?	2	2

1

CSB
D4
CSB

NATIONAL INSTITUTE OF TECHNOLOGY SILCHAR
MID TERM EXAMINATION, JAN-JUNE 2017
SUBJECT NAME:- WIRELESS SENSOR NETWORK (ELECTIVE IV)
SUBJECT CODE:- CS 1453

BRANCH:- CSE SEMESTER: 8TH
MAXIMUM MARKS:- 30 TIME:- ONE HOUR

(Answer all questions. Answer in brief and to the point. All questions are self explanatory. Right hand side figures indicate the marks for that question)

- 1.(a). With a schematic diagram, show the architecture of a typical wireless sensor network device (node) & briefly discuss its functional components. 2
- 1.(b). Discuss the challenges of a wireless sensor network deployment with respect to the following issues:- (i) Coverage, (ii) Communication, (iii) Data gathering 3
- 1.(c). (i) What are STA and AP in WLAN? 1
(ii) What are the messages exchange between STA and AP in WLAN? Explain the function of each of the messages. 4
- 2.(a). How priorities are incorporated in IEEE 802.11 MAC frames with IFSSs. Discuss with a suitable timing diagram. 4
- 2.(b). What are the values and usage of Address-1, Address-2, Address-3 in IEEE 802.11 frame format for different kinds of network configurations. 4
- 2.(c). With a suitable state transition diagram, show the various states/modes of the devices in a bluetooth network. 2
- 3.(a). (i) With a schematic diagram demonstrate the channel division of the frequency bands with respect to the IEEE 802.15.4 PHY specifications. 3
(ii) What are differences between FFD and RFD in ZigBee network? 2
- 3.(b). How Unicast period differs from Broadcast period in Y-MAC algorithm. 2
- 3.(c). Discuss the functioning of Setup phase and Steady-State phase in each round of network operation in LEACH protocol. 3

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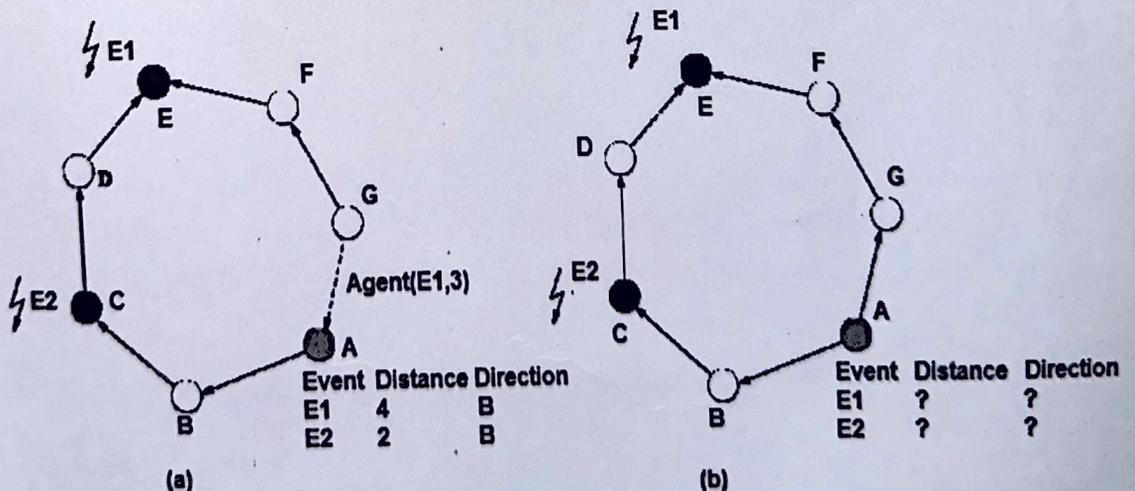
National Institute of Technology, Silchar
End-Semester(UG) Examinations, May' 2017

Subject Code:- CS-1453
Semester:- 8th B.Tech. / Ph.D.
Duration:- Two Hours

Subject:- Wireless Sensor Network (EL IV)
Department:- CSE
Total Marks:- 50

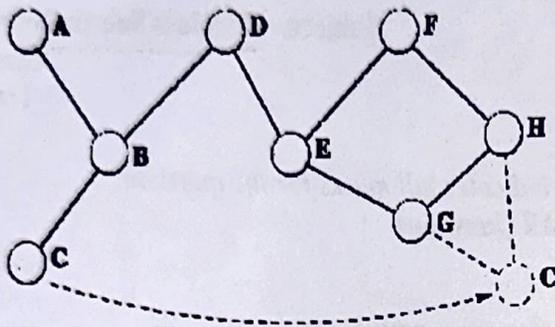
Figure in the right hand margin indicates full marks for the question.
Answer All Questions

1. (a) Discuss the differences between ESS and Independent BSS LANs. [2]
 (b) Enumerate the entries of "Frame Control Field" in IEEE 802.11 MAC Header. [2]
 (c) With suitable diagram define Hidden terminal and exposed terminal problem. [2]
2. Give a taxonomy of the routing protocols for WSN. Name at least one protocol in each class. [5]
3. (a) Define Relative neighborhood Graph (RNG). Write an application of the above graph for sensor network routing? [2+1]
 (b) With an illustrative diagram show how flooding occurs in Sensor Protocols for Information via Negotiation - Point to point (SPIN-PP)? [2]
4. Discuss the directed diffusion(DD) protocol. Elaborate reinforcement in DD. Compare DD with SPIN. [2+2+1]
5. (a) Consider the following network. Node E reports new event E1 using agent. Use Rumor routing and Calculate and Mention the changes if any in the Event Table at Node A in Fig (b). [2]



- (b) Discuss the three traffic spreading techniques used by GBR to balance traffic over the network. [3]

6. (a) Consider the following network. Re-Calculate the complete routing table at Node D after the C moved to the new position as shown. Use Destination-Sequenced Distance Vector (DSDV). [2]



(b) With a suitable diagram show how OLSR uses multipoint relays (MPR). [1+2]

7. (a) Discuss the usage of the various fields in RREQ and RREP packets in Ad Hoc On-Demand Distance Vector protocol. [2+2]

(b) How the "list of visited nodes" in RREQ packet is used and modified in DSR protocol. [2]

(c) What are the advantages and drawbacks of PEGASIS protocol. [2]

(d) Discuss the packet forwarding strategies in GPRS. [2]

8. (a) What are the states of a node in Geographic Adaptive Fidelity (GAF) protocol. How the forwarding node is decided in GAF. [2+1]

(b) Give the expression for Estimated cost and learned cost of reaching a destination in GEAR protocol. [2]

(c) How the concept of Virtual node is used in RBMulticast protocol. [2]

(d) What are the entries of Neighbor table in SPEED? [2]

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National Institute of Technology Silchar
Supplementary Examination (UG), July 2024

Subject code: CS 442
Semester: 8th
Duration: 3 Hours

Subject: Wireless Sensor Network
Department: CSE
Total Marks: 80

Answer any 8 (eight) questions

		Marks	COs
1	Describe the use of WSN in following each of the following domains of applications with an example. Clearly mention the type of sensors required, salient features of the deployment, specific advantages and challenges in each case:- (a) Military Applications, (b) Environment and Ecology, (c) Health Care, (d) Smart Home, (e) Industrial applications	5x2=10	CO1
2	Discuss how the following factors influence sensor network design (a) Fault Tolerance, (b) Scalability, (c) Power Consumption, (d) Sensor Network Topology, (e) Transmission Media	5x2=10	CO3
3	Discuss the following with respect to Wireless communication networks:- (a) Five basic propagation mechanisms, (b) 2-ray model – Path loss	5x2=10	CO3
4	Describe different Spread Spectrum techniques along with schematic diagrams for the circuitry used for different SS techniques.	5x2=10	CO3
5	Describe the PHY and MAC specifications following Wireless standards:- (a) IEEE 802.11 (b) IEEE 802.15.1	5x2=10	CO2
6	Describe the salient features of IEEE 802.15.4 & Zigbee networks.	10	CO1
7	Discuss the difference among the following:- (a) CSMA, (b) CSMA/CA, (c) MACA (d) MACAW (e) TDMA	5x2=10	CO2
8	Describe the following routing protocols:- (a) Directed Diffusion, (b) SPIN	5x2=10	CO2
9	Discuss the functioning of the following Hierarchical protocols for WSN:- (a) LEACH, (b) PEGASIS	5x2=10	CO2
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