INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

ELECTRONICS AND COMMUNICATION ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	**Wireless LANS AND PANS**
Course Code	:	**BES002**
Class	:	M. Tech I semester
Branch	:	EMBEDDED SYSTEMS
Year	:	2017 – 2018
Course Coordinator	:	Dr M.RAMESH BABU, Professor, ECE
Course Faculty	:	Ms. M.Kalyani, Assistant Professor, Department of ECE

I. COURSE OBJECTIVES

The course should enable the students to:

S. No	Description
I	Understand different WLAN topologies and transmission techniques.
II	Interpret Bluetooth and Zigbee technologies .
III	Enhance the understanding of 3G systems and 4G networks.

II. COURSE LEARNING OUTCOMES

Students who complete the course will have demonstrated the ability to do the following

CBES002.01	Understand and Analyze First and Second Generation Cellular Systems.
CBES002.02	Analyze Cellular Communications from 1G to 3G.
CBES002.03	Explain Wireless 4G systems, The Wireless Spectrum.
CBES002.04	Distinguish Random Access Methods.
CBES002.05	Describe Carrier Sense Multiple Access (CSMA), Carrier Sense Multiple Access with Collision Detection (CSMA/CD), Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA).
CBES002.06	Describe importance of Wireless LANs.
CBES002.07	Explain WLAN Topologies.
CBES002.08	Analyze Transmission Techniques
CBES002.09	Distinguish wired and Wireless LANs.
CBES002.10	Explain Network Architecture.
CBES002.11	Analyze MAC Layer issues.
CBES002.12	Describe importance of Wireless PANs.
CBES002.13	Explain Bluetooth technology

CBES002.14	Explain Bluetooth specifications.
CBES002.15	Analyze Enhancements to Bluetooth
CBES002.16	Describe IEEE 802.15.3, The IEEE 802.15.4
CBES002.17	Understand ZigBee components and network topologies.
CBES002.18	Analyze Device architecture.

TUTORIAL QUESTION BANK

UNIT - I			
WIRELESS SYSTEMS AND RANDOM ACCESS PROTOCOLS			
PART – A (SHORT ANSWER QUESTIONS)			
S. No	**QUESTION**	**Blooms Taxonomy Level**	**Course Learning Outcomes**
1.	Define Bit rate?	Knowledge	CBES002.01
2	List the difference between bit rate and baud rate?	Knowledge	CBES002.01
3	What are random access protocols?	Understand	CBES002.04
4	What are the types of controlled access protocols?	Understand	CBES002.04
5	What is the throughput of ALOHA based on poison distribution ?	Knowledge	CBES002.04
6	Define slotted ALOHA?	Knowledge	CBES002.04
7	What are the drawbacks of first and second generation cellular system?	Knowledge	CBES002.01
8	Explain the wireless spectrum?	Understand	CBES002.03
9	What is mean by ALOHA?	Understand	CBES002.04
10	Write the needs of a random access protocols?	Understand	CBES002.14
11	What are the specifications of a 4G cellular systems?	Knowledge	CBES002.13

PART - B (LONG ANSWER QUESTIONS)			
1.	Discuss about the technical issues in wireless communication and explain the drawbacks of first and second generation cellular mobile communications.	Understand	CBES002.01
2.	Explain Slotted ALOHA in detail. Consider the Pure ALOHA, Slotted ALOHA and Non-persistent CSMA. Which one will you use at high load? Why?	Understand	CBES002.04
3.	Ten thousand airline stations are competing for the use of a single slotted ALOHA channel. The average station makes 18 requests/hour. A slot is 125 micro-sec. What is the approximate total channel load?	Knowledge	CBES002.04
4.	Sixteen stations, numbered 1 through 16, are contending for the use of a shared channel by using the adaptive tree walk protocol. If stations 2, 3, 5, 9, 12, 14 suddenly become ready at once, how many bit slots are needed to resolve the contention.	Knowledge	CBES002.04

5.	What is the performance techniques used in the design of CD protocol and also Show that the maximum efficiency of pure ALOHA is 1/ (2e)	Knowledge	CBES002.04
6.	What is collision? How does carrier sense multiple access protocol/ collision detection protocol detect and handle collisions?	Understand	CBES002.05
7.	With the help of block diagram explain the operation of cellular systems and write a short notes on first, second, third and fourth generation of cellular mobile communications	Understand	CBES002.01
8.	Explain in detail the operation of slotted ALOHA. Consider the delay of pure ALOHA versus slotted ALOHA at low load. Which one will provide less delay?	Understand	CBES002.03
9.	Assume CSMA/CD protocol. Find the minimum frame length for a 1Mbps bit rate and maximum network span of 10 kilometers with no repeaters. Assume a medium propagation delay of 4.5 nanoseconds per meter. Is CSMA/CD a reasonable protocol for a network of this span and bit rate.	Knowledge	CBES002.05
10.	Explain about ALOHA, CSMA, CSMA/CD and CSMA/CA protocols and compare their performances.	Understand	CBES002.05

UNIT-II

WIRLESS LANS

PART - A (SHORT ANSWER QUESTIONS)

1	What are the applications of Wireless LANs?	Understand	CBES002.06
2	Classify wired media and wireless media ?	Understand	CBES002.06
3	Define direct sequence spread spectrum?	Understand	CBES002.03
4	Difference between fast and slow frequency hopping systems?	Understand	CBES002.07
5	What are the security issues in wireless networks?	Understand	CBES002.09
6	Define spread spectrum technology?	Knowledge	CBES002.07
7	List out the properties of pseudo noise code?	Understand	CBES002.07
8	What are the applications of spread spectrum technology?	Understand	CBES002.07
9	What is narrow band frequency and write its applications	Understand	CBES002.07
10	What is ultra high frequency band and write its applications	Understand	CBES002.10
11	What are WLAN topologies	Knowledge	CBES002.07

PART – B (LONG ANSWER QUESTIONS)

1.	Classify wired media and wireless media and explain infrared, microwave and radio frequency systems corresponding to ISM bands.	Knowledge	CBES002.09
2.	How many categories does digital wireless transmission techniques divided according to their applications. Explain each one of them briefly.	Knowledge	CBES002.08
3.	What are the requirements and applications of wireless LANs and explain the security issues in wireless networks	Knowledge	CBES002.09
4.	Consider a LAN with maximum distance of 2 km. at what bandwidth would the propagation delay is equal transmit delay for 100-byte packets? What about 512- byte packets?	Knowledge	CBES002.06
5.	Interpret the performance of direct sequence spread spectrum in noise and hammer and demodulation techniques used in frequency hopped spread spectrum	Understand	CBES002.07
6.	Interpret fast and slow frequency hopping spread spectrum technology with example.	Understand	CBES002.07

7.	Discuss Fast frequency hopping spread spectrum technology(FFHSS) with neat block Diagram and relate it with slow frequency spread spectrum technology(SFHSS)	Understand	CBES002.07
8.	Generate the pseudo noise sequence using four bit D-flipflop shift register and verify the balance property.	Understand	CBES002.08
9.	Classify Narrowband technology and Ultra High Frequency narrow band technology With applications.	Knowledge	CBES002.08
10.	What are the drawbacks in analog communication system and explain how the bandwidth is improve with the help of spread spectrum technology	Knowledge	CBES002.07

UNIT-III

THE IEEE 802.11 STANDARD FOR WIRELESS LANS

PART – A (SHORT ANSWER QUESTIONS)

1	What is BSS mode in network topology?	Knowledge	CBES002.10
2	What is ESS mode in network topology?	Understand	CBES002.10
3	What is the significance of physical layer?	Knowledge	CBES002.10
4	What are the different sub layers present within the physical layer	Understand	CBES002.10
5	Write about design representation for the system level synthesis	Understand	CBES002.10
6	Define conjestion?	Knowledge	CBES002.11
7	Define MAC frame format	Understand	CBES002.11
8	List out the general principals of conjestion control	Understand	CBES002.11
9	What are the services offered by MAC layer?	Understand	CBES002.11
10	Illustrate MAC layer challenges in wireless sensor network	Knowledge	CBES002.11

PART – B (LONG ANSWER QUESTIONS)

1.	Discuss how the channel allocation is done in IEEE802.11a Standard.	Understand	CBES002.10
2.	Write about PMD and PLCP layers in IEEE 802.11 Infrared WLAN Standard with neat diagrams.	Understand	CBES002.10
3.	Compare IEEE 802.11A and IEEE 802.11B WLAN standards.	Knowledge	CBES002.10
4.	What is Hidden Terminal Problem?	Understand	CBES002.11
5.	Write about IEEE 802.11e MAC protocol	Understand	CBES002.11
6.	Discuss Mac Layer Issues.	Understand	CBES002.11
7	What is meant by Conjestion? List the general principles of conjestion control.	Knowledge	CBES002.11
8	Describe the services offered by MAC and MAC management sub layers of IEEE 802.11 wireless LAN	Understand	CBES002.11
9	Classify the following corresponding to 802.11 Mac sub layer i) Reliable data delivery ii) Access control iii) MAC frame format	Knowledge	CBES002.11
10	Interpret IEEE 802.11 Distributed coordination function (DCF) protocol with backoff mechanism with example consider two nodes and backoff intervals.	Knowledge	CBES002.11

UNIT-IV			
WIRLESS PANS			
PART – A (SHORT ANSWER QUESTIONS)			
1	What is Adhoc Networking?	Understand	CBES002.12
2	What is the importance of Wireless PANS	Understand	CBES002.12
3	What are the applications of Bluetooth technology?	Understand	CBES002.13
4	Difference between piconet and scatternet architecture.	Knowledge	CBES002.12
5	What are the random access methods for mobile data services.	Knowledge	CBES002.12
6	Draw the diagram of protocol stack in Bluetooth.	Understand	CBES002.13
7	Write about dynamic slot assignment.	Understand	CBES002.12
8	Explain master slave switch.	Knowledge	CBES002.12
9	write about scatternet formation.	Understand	CBES002.12
10	What is Bluetooth security	Knowledge	CBES002.13
11	What are the Bluetooth interference issues.	Understand	CBES002.14

PART– B (LONG ANSWER QUESTIONS)			
1.	What is Adhoc Networking? Distinguish Bluetooth piconet architecture and Bluetooth scatternet architecture with neat block diagram	Knowledge	CBES002.12
2.	Mention the specifications of Voice and data transmission in Bluetooth and interpret the two types of data and voice applications.	Understand	CBES002.13
3.	Write a technical note on physical and MAC layers of Bluetooth. In what way connection management is achieved?	Knowledge	CBES002.13
4.	Explain about the random access methods for mobile data services and wireless LAN data services.	Understand	CBES002.13
5.	Interpret IEEE 802.15.3 high rate WAPNs with respect of protocol stack and network topology.	Knowledge	CBES002.16
6.	With neat sketch draw the diagram of Bluetooth protocol stack and what are the steps in Master / slave in role switching	Understand	CBES002.13
7.	With neat sketch draw the high level overflow of Bluetooth security architecture together with the Security components.	Understand	CBES002.13
8.	Explain Bluetooth star architecture .What are the security modes in Bluetooth generic access profile.	Knowledge	CBES002.15
9.	What are the attacks against WLANs and explain security measures. What is a benefit of IrDA as compared to Bluetooth?	Understand	CBES002.14
10.	Illustrate the following with architecture and physical and MAC layer details i) WPAN ii) Home RF	Knowledge	CBES002.15

UNIT-V			
THE IEEE 802.15 WORKING GROUP FOR WPANS			
PART – A (SHORT ANSWER QUESTIONS)			
1	What is Zigbee technology?	Knowledge	CBES002.17
2	What are the zigbee components and network topologies.	Understand	CBES002.17
3	Draw the architecture for IEEE 802.15.4 WLAN	Understand	CBES002.16
4	What is IEEE 802.15 3a ultra wide band	Knowledge	CBES002.18

5	What is Zigbee RF4CE version?	Understand	CBES002.17
6	Explain Zigbee frame structure	Understand	CBES002.18
7	What is the highest possible data rate of an IrDA device?	Knowledge	CBES002.17
8	What is the need to integrate Ad-Hoc networks with mobile IP?	Understand	CBES002.18
9	LIST the classification of routing protocols for Ad-Hoc networks	Understand	CBES002.17
10	Bluetooth is RF or IR. Justify.	Knowledge	CBES002.18
11	Explain IEEE 802.16 WiMAX standard and its protocol stack in detail	Knowledge	CBES002.18

PART – B (LONG ANSWER QUESTIONS)			
1.	Classify Zigbee technology with Wi-Fi and Bluetooth. What are IEEE 802.15.3 Wireless personal area network standard applications.	Understand	CBES002.16
2.	Interpret ZigBee Technology and its applications? Explain the architecture with Zigbee components and network topologies,	Knowledge	CBES002.18
3.	Mention how many frequency channels are supported in zigbee in different PHY versions. What is Zigbee RF4CE version?	Understand	CBES002.17
4.	Explain Zigbee frame structure and explain different fields and explain Zigbee routing protocol.	Knowledge	CBES002.17
5.	Interpret IEEE 802.15.4 LR-WPAN Device architecture with block diagram and what are the drawbacks present in this architecture	Knowledge	CBES002.17
6.	Discuss about the IEEE 802.16 WiMAX standard and its protocol stack in detail. What is the highest possible data rate of an IrDA device?	Understand	CBES002.16
7.	Mention the three error correction mechanism used by Bluetooth system and what is the benefit of IrDA as compared to Bluetooth.	Knowledge	CBES002.15
8.	Bluetooth is RF or IR. Justify and discuss the Bluetooth protocol stack compared to OSI protocol model.	Understand	CBES002.15
9.	What are the characteristics of ideal Routing Protocols in Ad-Hoc Wireless network and give the classification of routing protocols for Ad-Hoc networks, based on routing information mechanism.	Knowledge	CBES002.15
10.	What is the need to integrate Ad-Hoc networks with mobile IP? Explain	Knowledge	CBES002.16
11	Why does TCP not perform well in Ad-Hoc wireless networks? What are the changes made to traditional networks to suit Ad-Hoc networking environment.	Understand	CBES002.18

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