INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad - 500043

MODEL QUESTION PAPER -I

Four B.Tech VI Semester End Examinations, May - 2019
Regulation: IARE-R16

WIRELESS COMMUNICATION AND NETWORKS
(Electronics and Communication Engineering)

Time: 3 Hours   **Max Marks: 70**

Answer any ONE question from each Unit
All questions carry equal marks
All parts of the question must be answered in one place only

UNIT – I

1 a) Define Handoff? Explain the various types of handoff processes available with a neat block [7M] diagram.
   b) Mention the significance of frequency reuse in cellular networks. Explain about frequency [7M] reuse strategies?

2 a) Discuss different techniques used for improving coverage and capacity in cellular systems. [7M]
   b) Distinguish between fixed channel assignment and dynamic channel assignment in cellular [7M] networks?

UNIT – II

3 a) How the received signal strength is predicted using the free space propagation model? Explain? [7M]
   b) Define Multipath channel? Derive the equation for the Impulse response model of a Multipath [7M] channel.

4 a) Find the fraunhoher distance for an antenna with maximum dimension of 1m and operating [7M] frequency of 900MHz.If antenna have unity gain. Calculate the path loss?.
   b) Write the advantages and disadvantages of two ray ground reflection model in the analysis of [7M] the path loss.

UNIT – III

5 a) For a Rayleigh fading signal find [7M]
       i) Number of zero level crossings
       ii) The average fade duration for threshold levels $\rho=0.1$ and $\rho=1$ when Doppler frequency is 20Hz.
   b) What are the parameters of mobile multipath channels? Write brief notes of each parameter of [7M] mobile multipath channels?

6 a) Discuss in detail about frequency domain channel impulse response measurement system with a [7M] neat block diagram?
   b) Explain how the two-ray model is used when a single ground reflection dominates the [7M] multipath effect.

UNIT – IV

7 a) Explain a simplified communications system using an adaptive equalizer at the receiver with neat diagram? [7M]

   b) Define Receiver diversity? What are the different Receiver diversity combining techniques? Explain. [7M]

8 a) Discuss in detail about Maximum Likelihood Sequence Estimation (MLSE) Equalizer with a neat block diagram? Give its advantages also. [7M]

   b) Discuss in detail about with a neat block diagram of an M branch rake receiver implementation? [7M]

UNIT – V

9 a) State and explain in detail about the various fields in a IEEE 802.11 MAC frame with a neat sketch. [7M]

   b) Discuss in detail about wireless local loop? List out the advantages and disadvantages of the wireless loop? [7M]

10 a) State and explain about IEEE 802.11a standard? Determine the properties of IEEE 802.11a. [7M]

   b) Explain in detail about the performance of integration of the existing wireless networks.. [7M]

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COURSE OBJECTIVES

The course should enable the students to:

S.No	Description
I	Provide fundamental treatment about many practical and theoretical concepts that forms basic of wireless communications.
II	Equip various kinds of wireless networks and its operations.
III	Understand the concept of frequency reuse, and be able to apply it in the design of mobile cellular system.
IV	Understand various modulation schemes and multiple access techniques that are used in wireless communications,

COURSE OUTCOMES (COs):

S.No	Description
CO1	Demonstrate their understanding on functioning of wireless communication system and evolution of different wireless communication systems and standards..
CO2	Compare different technologies used for wireless communication systems operations.
CO3	Explain the architecture, functioning, protocols capabilities and application of various wireless communication networks
CO4	Demonstrate an ability explain multiple access techniques for Wireless Communication
CO5	Demonstrate an ability to evaluate design challenges, constraints and security issues associated with Ad-hoc wireless networks.

COURSE LEARNING OUTCOMES

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

CLO Code	CLO's	At the end of the course, the student will have the ability to:
AEC524.01	CLO 1	Understand the principles and fundamentals of wireless communications.
AEC524.02	CLO 2	Demonstrate cellular system design concepts in wireless mobile communication networks.
AEC524.03	CLO 3	Understand the fundamental Radio Wave Propagation Mechanisms.
AEC524.04	CLO 4	Analyze perspective on Fundamentals of Equalization and Mobile Radio Propagation Multipath Measurements.
AEC524.05	CLO 5	Analyze various multiple access schemes and techniques used in wireless communication.
AEC524.06	CLO 6	Discuss the Parameters of Mobile Multipath Channels and Types of Small-Scale Fading- Fading effects.
AEC524.07	CLO 7	Examine the perspective on Fundamentals of Equalization, Linear Equalizers, Non-linear Equalization.
AEC524.08	CLO 8	Study and understand the Diversity Techniques and RAKE Receiver in Radio Propagation.
AEC524.09	CLO 9	Demonstrate wireless local area networks and their specifications in communication system.
AEC524.10	CLO 10	Understand the analytical perspective on the design and analysis of the traditional and emerging wireless networks
AEC524.11	CLO 11	Discuss the nature of and solution methods to the fundamental problems in wireless networking.
AEC524.12	CLO 12	Understand the architecture of the various wireless wide area networks such as GSM, IS-95, GPRS and SMS.

CLO Code	CLO's	At the end of the course, the student will have the ability to:
AEC524.13	CLO 13	Understand the operation of the various wireless wide area networks such as GSM, IS-95, GPRS and SMS.
AEC524.14	CLO 14	Understand the existing and emerging wireless standards in wireless wide area networks
AEC524.15	CLO 15	Examine the emerging techniques OFDM and its importance in the wireless communications.

MAPPING OF SEMESTER END EXAMINATION TO COURSE LEARNING OUTCOMES:

SEE Question No.			Course Learning Outcomes	Course Outcomes	Blooms Taxonomy Level
1	a	AEC524.01	Understand the principles and fundamentals of wireless communications.	CO1	Understand
	b	AEC524.01	Understand the principles and fundamentals of wireless	CO1	Understand
2	a	AEC524.02	Demonstrate cellular system design concepts in wireless	CO1	Remember
	b	AEC524.02	Demonstrate cellular system design concepts in wireless	CO1	Remember
3	a	AEC524.02	Demonstrate cellular system design concepts in wireless	CO2	Remember
	b	AEC524.03	Remember fundamentals of Radio Wave Propagation Basic	CO2	Remember
4	a	AEC524.03	Remember fundamentals of Radio Wave Propagation Basic	CO2	Understand
	b	AEC524.03	Remember fundamentals of Radio Wave Propagation Basic	CO2	Remember
5	a	AEC524.04	Analyze perspective on Fundamentals of Equalization and	CO3	Understand
	b	AEC524.05	Analyze various multiple access schemes and techniques	CO3	Understand
6	a	AEC524.06	Discuss the Parameters of Mobile Multipath Channels and	CO3	Understand
	b	AEC524.06	Discuss the Parameters of Mobile Multipath Channels and	CO3	Remember
7	a	AEC524.07	Examine the perspective on Fundamentals of Equalization,	CO4	Understand
	b	AEC524.08	Remember the Diversity Techniques and RAKE Receiver in	CO4	Remember
8	a	AEC524.07	Examine the perspective on Fundamentals of Equalization,	CO4	Remember
	b	AEC524.08	Remember the Diversity Techniques and RAKE Receiver in	CO4	Remember
9	a	AEC524.14	Familiar with some of the existing and emerging wireless	CO5	Understand
	b	AEC524.14	Familiar with some of the existing and emerging wireless	CO5	Remember
10	a	AEC524.11	Discuss the nature of and solution methods to the fundamental	CO5	Understand
	b	AEC524.13	Understand the operation of the various wireless wide area	CO5	Understand

Signature of Course Coordinator   **HOD, ECE**