Sub Code: BECT801 **ROLL NO……..……..**

EVEN SEMESTER EXAMINATION, 2023 – 24

4th year B.Tech. – Electronics & Communication Engineering

Wireless Communications

Duration: 3:00 hrs **Max Marks: 100**

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	Answer any four parts of the following. a) Explain how multipath propagation affects signal quality. What techniques can be employed to mitigate its adverse effects ? b) What are the components of a wireless communication link? Explain in short. c) What is the working principle of Cellular Code Division Multiple Access (CDMA)? What are its advantages compared to other multiple access techniques? d) Explain the concept and importance of transmit diversity with example. e) Define the different types of diversity in wireless communication. Explain how diversity improves communication reliability in fading environments. f) Explain the different modes of wireless communication.	5x4=20
Q 2.	Answer any four parts of the following. a) Explain the spectrum limitations in wireless communication and describe the spectrum management strategies to address these limitations. b) Write the difference between QPSK and BFSK. c) Describe the concept of power control in Spread Spectrum Systems. d) What are narrowband and wideband models in wireless communication? e) What is the difference between macrodiversity and microdiversity in wireless communication systems. f) Explain the various types of channels used in wireless communication.	5x4=20
Q 3.	Answer any two parts of the following. a) Describe the different types of services provided by wireless communication systems and also write their specific requirements. b) Explain the advantages and limitations of selection diversity, maximal ratio combining (MRC), and equal gain combining (EGC). c) Explain how multipath propagation affects signal reception, interference, and system performance in CDMA networks.	10x2= 20
Q 4.	Answer any two parts of the following. a) Explain the Path Loss Components in wireless communication. b) Describe the principles of OFDM and its application in various wireless communication standards. c) Write the difference between block codes, convolutional codes, and turbo codes and also explain the principles and algorithms used in speech coding for efficient voice transmission over wireless channels.	10x2= 20
Q 5.	Answer any two parts of the following. a) Calculate the link budget for a wireless communication link operating at a frequency of 2.4 GHz with the following parameters: - Transmit power: 20 dBm - Antenna gain at transmitter: 5 dBi	10x2= 20

	- Antenna gain at receiver: 3 dBi - Receiver sensitivity: -90 dBm - Path loss exponent: 3.5 - Distance between transmitter and receiver: 1 km - System losses (including cable losses, connector losses, etc.): 3 dB Assume no additional losses or gains in the propagation path. b) Explain the principles and characteristics of MSK and GMSK modulation techniques and also write their advantages over other modulation schemes in wireless communication. c) Explain the fundamental principles that enable efficient and reliable wireless communication over a wide area. Additionally, compare at least two multiple access schemes used in wireless communication.	

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