KUMARAGURU
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B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Seventh Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U18ECT7002: Wireless Communication

COURSE OUTCOMES

CO1:   Compare various Wireless communication standards.
CO2:   Analyse different propagation models.
CO3:   Illustrate cellular communication techniques.
CO4:   Analyze modulation schemes used in wireless standards.
CO5:   Compare diversity techniques in wireless communication.
CO6:   Distinguish different MIMO techniques.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1. List the different WPAN technologies.	CO1	[K_1]
2. How is security achieved in Bluetooth technology?	CO1	[K_2]
3. If the RMS delay spread is 7 ms, determine the coherence bandwidth of the wireless channel. Suggest the minimum frequency separation between the channels must be maintained to ensure frequency diversity gain.	CO2	[K_3]
4. Compute the cluster size for a hexagonal cell, if the i=3 and j=2. Describe how to reach the nearest co-channel cell.	CO3	[K_3]
5. What are the methods used to reduce cell dropping during handoff?	CO3	[K_2]
6. Draw the signal space diagram of 8 – PSK signal.	CO4	[K_2]
7. Compare Maximum Ratio Combining and Equal Gain Combing.	CO5	[K_3]
8. Draw the block diagram of RAKE receiver.	CO5	[K_2]
9. Compare Multiple Input Multiple Output technology (MIMO) with Single Input Single Output (SISO) technology.	CO6	[K_3]
10. What is the maximum number of resolvable MIMO channels possible if we use 4X4 MIMO? If the channel capacity of a SISO channel is 10 Mbps what is the channel capacity of the 4X4 MIMO channel?	CO6	[K_3]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Compare 2G, 3G and 4G cellular standards and discuss the implementation issues in the 4G LTE.	10	CO1	[K4]
	b)	Classify the statistical wireless channel models based on time and frequency coherence.	6	CO2	[K3]
12.		What are path loss models? Where does it apply? What is the significance of the two-ray path loss model? Derive the two-ray path loss model.	16	CO2	[K3]
13.	a)	Elucidate the different channel assignment strategies used in cellular systems.	8	CO3	[K2]
	b)	What are the techniques used to increase the capacity of the cellular system? Explain and compare any two techniques.	8	CO3	[K2]
14.	a)	What is M ary Quadrature Amplitude Modulation (QAM)? Define a 16-QAM signal and demonstrate the transmitter and receiver signal processing.	8	CO4	[K3]
	b)	Demonstrate the Direct Sequence Spread Spectrum (DSSS) technique and the Code Division Multiple Access technique using an example.	8	CO5	[K3]
15.		Describe the discrete implementation of OFDM using illustrations. What is the use of cyclic prefix added in the OFDM signal? List the implementation issues in OFDM.	16	CO5	[K3]
16.	a)	Explain the details about beamforming technique.	6	CO6	[K3]
	b)	Derive the expression for the STBC 2X1 decoder output signal, considering the channel state information is known only at the receiver.	10	CO6	[K3]

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