Reg. No.															

Question Paper Code	13591

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Sixth Semester

Electronics and Communication Engineering

20ECPC603 - WIRELESS COMMUNICATION

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Free space propagation model is to predict _____. (a) received signal strength (b) transmitted power (c) transmitted gain (d) receiver gain	1	K1	CO1
2.	Which of the following is an ideal antenna? (a) Directional antenna (b) Dipole antenna (c) Loop antenna (d) Isotropic antenna	1	K1	CO1
3.	The bandwidth of FDMA channels is _____. (a) narrow (b) wide (c) infinite (d) zero	1	K1	CO2
4.	In a CDMA system, increasing the number of users in the system primarily impacts the system capacity due to (a) Increased bandwidth for each user (b) Increased power requirements for each user (c) Higher interference due to overlapping code sequences (d) Enhanced signal quality from spreading gain	1	K2	CO2
5.	The frequency reuse factor for CDMA system is _____. (a) one (b) two (c) three (d) four	1	K1	CO3
6.	MAHO stands for _____. (a) MSC assisted handoff (b) Mobile assisted handoff (c) Machine assisted handoff (d) Man assisted handoff	1	K1	CO3
7.	Minimum shift keying is similar to _____. (a) CPFSK (b) BPSK (c) BFSK (d) QPSK	1	K1	CO4
8.	In fading channels, which modulation scheme is known for being the most robust with low bit error probability under severe fading conditions? (a) 64-QAM (b) BPSK (c) 16-QAM (d) OFDM	1	K1	CO4
9.	Which of the following does not hold true for MLSE? (a) Minimizes probability of sequence error (b) Require knowledge of channel characteristics (c) Requires the statistical distribution of noise (d) Operates on continuous time signal	1	K1	CO5
10.	Perfect CSI allows for _____. (a) Optimal power allocation and signal processing (b) Increased latency (c) Simplified receiver design (d) Reduced signal-to-noise ratio	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Define coherence time.	2	K1	CO1
12.	Calculate the power received at a distance of 10km if the power at 100 meters is -20 dBm.	2	K2	CO1
13.	List any four important features of TDMA.	2	K1	CO2
14.	A mobile receives a signal of -80 dBm at 100 m. Using a path loss exponent of 3, estimate the received power at 400 m.	2	K2	CO2

15.	Define Dwell time.		2	K1	CO3
16.	State Erlang B formula.		2	K1	CO3
17.	Mention the advantages of $\pi/4$ QPSK.		2	K2	CO4
18.	State Coherent Detection.		2	K2	CO4
19.	Differentiate selection and combining diversity.		2	K1	CO5
20.	Define optimum combining.		2	K2	CO5
21.	Write the significance of beamforming.		2	K2	CO6
22.	Assume four-branch diversity is used, where each branch receives an independent Rayleigh fading signal. If the average SNR is 20 dB, determine the probability that the SNR will drop below 10 dB. Compare this with the case of a single receiver without diversity.		2	K2	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Discuss in detail about fading effects due to Doppler spread. Explain the parameters of mobile multipath channels.	11	K2	CO1
		OR			
	b)	Explain the ground wave propagation model with a neat diagram and derive the expression for the total received power and electric field strength.	11	K2	CO1
24.	a)	Explain briefly the features of FDMA. How many channels can an FDMA system handle and how does the system combat non-linear effects?	11	K2	CO2
		OR			
	b)	Describe the working principle of TDMA systems. Also, derive the expression to calculate the efficiency and the number of channels the system supports.	11	K2	CO2
25.	a)	Explain the different channel assignment strategies used in cellular communication.	11	K2	CO3
		OR			
	b)	Explain frequency reuse in detail and elaborate on the frequency reuse factor.	11	K2	CO3
26.	a)	Explain QPSK transmission and receiver techniques with block diagrams.	11	K2	CO4
		OR			
	b)	Illustrate the Structure of a wireless communication link with a neat diagram. List the advantages of digital modulation schemes.	11	K2	CO4
27.	a)	Explain various micro diversity techniques to compact small-scale fading in detail.	11	K2	CO5
		OR			
	b)	Explain in detail the working principles, advantages, and applications of various types of equalizers such as linear, non-linear, adaptive equalizer.	11	K2	CO5
28.	a)	Illustrate the effect of CSI on system performance and how it can be used to optimize communication strategies such as adaptive modulation and beamforming.	11	K3	CO6
		OR			
	b) i)	Explain with relevant diagrams the layered space-time structure for MIMO systems.	7	K3	CO6
	ii)	Explain in detail the concept of Precoding.	4	K3	CO6