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Question Paper Code	12985
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B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024
 Sixth Semester
Electronics and Communication Engineering
20ECPC603 - WIRELESS COMMUNICATION
 Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (MCQ) (20 × 1 = 20 Marks)
 Answer ALL Questions

	<i>Marks</i>	<i>K- Level</i>	<i>CO</i>
1. Which of the following is an ideal antenna? (a) Directional antenna (b) Dipole antenna (c) Loop antenna (d) Isotropic antenna	1	K1	CO1
2. The Doppler shift in a small-scale fading model primarily affects _____. (a) frequency of the transmitted signal (b) transmission power (c) received signal's frequency due to relative movement (d) antenna polarization	1	K1	CO1
3. Which fading model is best suited for scenarios with no line-of-sight and strong multipath reflections? (a) Rayleigh fading model (b) Ricean fading model (c) Effective two-ray model (d) Free space path loss model	1	K1	CO1
4. _____ is based on sequences of numbers called chips. (a) FDMA (b) TDMA (c) CDMA (d)SDMA	1	K1	CO2
5. The capacity of FDMA is limited primarily by _____. (a) number of time slots (b) power of each user (c) bandwidth assigned per user (d) processing gain from spreading codes	1	K1	CO2
6. The bandwidth of FDMA channels is _____. (a) narrow (b) wide (c) infinite (d) zero	1	K1	CO2
7. Interference on voice channels causes _____. (a) blocked calls (b) cross talk (c) missed calls (d) queuing	1	K1	CO3
8. The time over which a call can be maintained within a cell without handoff is called _____. (a) run time (b) peak time (c) dwell time (d) cell time	1	K1	CO3
9. What are co-channel cells? (a) Cells having different base stations (b) Cells using different frequency (c) Cells using adjacent frequency (d) Cells using the same frequency	1	K1	CO3
10. Which of the following does not impact the bit error rate in mobile communication systems? (a) Mobile velocity (b) Channel delay spread (c) Modulation format (d) Base station	1	K1	CO4
11. Minimum shift keying is similar to _____. (a) BPSK (b) CPFSK (c) BFSK (d) QPSK	1	K1	CO4
12. 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
13. Equalization is to compensate _____. (a) Peak Signal to Noise Ratio (b) ISI (c) channel fading (d) signal noise	1	K1	CO5
14. In a frequency-selective fading channel, which technique is most effective in minimizing inter-symbol interference? (a) Spatial Diversity (b) Frequency Diversity (c) Adaptive Equalization (d) Time Diversity	1	K1	CO5

15. What is a primary disadvantage of equalization techniques in multipath channels? 1 K1 CO5
 (a) They require significantly more bandwidth
 (b) They can introduce latency and require more processing power
 (c) They are only effective in time-selective channels
 (d) They can only be used with CDMA systems
16. In a high-speed mobile communication environment, which multipath mitigation technique is most likely to suffer from performance degradation due to the rapid variation in the channel's characteristics? 1 K1 CO5
 (a) Spatial diversity (b) Frequency diversity
 (c) Adaptive equalization (d) Rake Receiver
17. The key requirement for effective beam forming is _____. 1 K1 CO6
 (a) high mobility of the transmitter (b) channel state information
 (c) low power consumption (d) single antenna usage
18. What is the main goal of transmitter diversity? 1 K1 CO6
 (a) To increase transmission range (b) To send multiple copies of the same signal
 (c) To utilize more frequency bands (d) To reduce the number of antennas
19. Perfect CSI allows for _____. 1 K1 CO6
 (a) Optimal power allocation and signal processing (b) Increased latency
 (c) Simplified receiver design (d) Reduced signal-to-noise ratio
20. Which technique is NOT typically used in MIMO systems? 1 K1 CO6
 (a) Spatial multiplexing (b) Time-division multiplexing
 (c) Beam forming (d) Precoding

PART - B (10 × 2 = 20 Marks)

Answer ALL Questions

21. Define EIRP. 2 K1 CO1
22. State the factors affecting small-scale fading. 2 K1 CO1
23. List any four important features of FDMA. 2 K1 CO2
24. Draw the structure of a TDMA frame. 2 K2 CO2
25. Justify the use of hexagonal-shaped cells in cellular communication. 2 K2 CO3
26. Define Cell dragging. 2 K1 CO3
27. List the linear modulation techniques. 2 K1 CO4
28. Rayleigh distribution is widely used in wireless communications. Why? 2 K1 CO4
29. What is Equalization? 2 K1 CO5
30. List the application of MIMO. 2 K1 CO6

PART - C (6 × 10 = 60 Marks)

Answer ALL Questions

31. a) Discuss how effective is the link budget in calculating the transmitted or received power with the knowledge of the losses incurred in a fading channel. 10 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. 10 K2 CO1
32. a) Describe the working principle of the CDMA system. Also, list out the features of the CDMA system. 10 K2 CO2
OR
 b) The GSM TDMA system uses a 270.833 kbps data rate to support 8 users per frame. Evaluate the following: 10 K2 CO2
 (a) What is the raw data rate provided for each user? (b) If guard time, ramp-up time, and synchronization bits occupy 10.1 kbps, determine the traffic efficiency for each user.

33. a) Elaborate on co-channel interference and adjacent channel interference in detail. 10 K2 CO3
- OR**
- b) Explain how handoff is prioritized using the guard channel and umbrella cell approaches. 10 K2 CO3
34. a) Explain the GMSK transmitter and receiver. Draw its PSD. 10 K2 CO4
- OR**
- b) Illustrate the Structure of a wireless communication link with a neat diagram. List the advantages of digital modulation schemes. 10 K2 CO4
35. a) i) Explain about the adaptation algorithms for Mean – square error equalizers. 5 K2 CO5
 ii) Elaborate on the parameters that influence the performance of adaptation algorithms. 5 K2 CO5
- OR**
- b) What is the principle of Combining Diversity? Explain in detail about various combining techniques with neat block diagrams and necessary equations. 10 K2 CO5
36. a) Explain in detail the concept of capacity in fading and non-fading channels with respect to CSI. 10 K2 CO6
- OR**
- b) Write about Channel State Information (CSI) and how algorithms are classified based on CSI. 10 K2 CO6