

10. What is the range of frequency of Doppler spread in the available Doppler spectrum? (A) Zero (B) Infinite (C) One (D) Non zero	1	3	3
11. The envelope of a sinusoid plus bandpass noise has _____ distribution (A) Uniform (B) Ricean (C) Rayleigh (D) Gaussian	1	2	3
12. The path loss increases by (A) 10dB (B) 6dB (C) 20dB (D) -10dB	1	2	3
13. Interleaving is used to obtain _____ diversity. (A) Time (B) Frequency (C) Polarization (D) Space	1	2	4
14. Which is used to obtain time diversity in a digital communications system without adding any overhead? (A) Rake receiver (B) Interleaving (C) Search window (D) Diversity reception	1	2	4
15. Space diversity is also known as _____ diversity (A) Polarization (B) Antenna (C) Time (D) Angle	1	2	4
16. _____ Improves the quality of a wireless link without altering the common air interface without increasing power or bandwidth (A) Equalization (B) Diversity (C) Channel coding (D) Modulation	1	2	4
17. Super frame structure of GSM contains _____ (A) 51 Multiframe (B) 24 Multiframe (C) 56 Multiframe (D) 75 Multiframe	1	2	5
18. When band of Orthogonal Frequency Division Multiplexing (OFDM) is divided into sub bands, it diminishes effects of _____ (A) Channel noise (B) Collision (C) Interference (D) Signals absence	1	1	5
19. The modulation scheme used by GSM is _____ (A) BPSK (B) QPSK (C) GMSK (D) BFSK	1	1	5
20. _____ is the interference at a base station receiver that comes from the subscriber units in the surrounding cells. (A) Forward channel interference (B) Carrier interference (C) Receiver interference (D) Reverse channel interference	1	1	5

PART - B (5 × 4 = 20 Marks)

Answer **any 5** Questions

	Marks	BL	CO
21. What is meant by frequency reuse? Explain the significance of hexagonal structures.	4	2	1
22. Compare fixed and dynamic channel assignments.	4	1	1
23. If a transmitter produces 50 watts of power, express the transmit power in units of (a) dBm, and (b) dBW. If 50 watts is applied to a unity gain antenna with a 900 MHz carrier frequency, find the received power in dBm at a free space distance of 100 m from the antenna, What is P (10 km) 2 Assume unity gain for the receiver antenna.	4	5	2
24. What are the differences between flat fading and frequency selective fading?	4	2	3

What are the merits and demerits of RAKE receiver?	4	2	4
26. What is the need for cyclic prefix in OFDM?	4	3	5
27. List out the data rates and frequency allocations of 4G & 5G.	4	2	5

PART - C (5 × 12 = 60 Marks)

Marks BL CO

Answer **all** Questions

28. (a) Illustrate the various handoff strategies used in mobile communication systems and discuss the methods that prioritise handoff. (OR) (b) A certain city has an area of 1,300 square miles and is covered by a cellular system using a 7-cell reuse pattern. Each cell has a radius of 4 miles and the city is allocated 40 MHz of spectrum with a full duplex channel bandwidth of 60 kHz. Assume a GOS of 2% for an Erlang B system is specified. If the offered traffic per user is 0.03 Erlangs, compute (a) the number of cells in the service area, (b) the number of channels per cell, (c) traffic intensity of each cell, (d) the maximum carried traffic; (e) the total number of users that can be served for 2% GOS, (f) the number of mobiles per channel, and (g) the theoretical maximum number of users that could be served at one time by the system.	12	3	1
29. (a) Deduce the necessary expressions for path loss in two ray ground reflection model. (OR) (b) Derive relevant expressions for outage probability under path loss and shadowing	12	2	2
30. (a) i. Write the most important effects of small scale multipath propagation. ii. Discuss about Ricean fading effect. (OR) (b) Elaborate and deduce expressions for impulse response model of a multipath channel.	12	2	3
31. (a) Explain the operation of a RAKE receiver in CDMA system with necessary diagrams. (OR) (b) Discuss the various MIMO configurations and derive the MIMO capacity on fading channels	12	2	4
32. (a) Elaborate in detail the GSM frame structure and its interfaces. (OR) (b) Discuss about the 4G LTE architecture in detail.	12	2	5

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