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## **B.Tech DEGREE EXAMINATION, NOVEMBER 2023**

Seventh Semester

## 18ECE314T - WIRELESS COMMUNICATION NETWORKS

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

## Note:

i. Part - A should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40<sup>th</sup> minute.

ii. Part - B and Part - C should be answered in answer booklet.

Time: 3 Hours				Max. Marks: 100				
	PART - A (20 × 1 = Answer all Qu	,	Marl	ks BL	CO			
1.	The communication systems that se	end brief messages to subscriber are	1	1	1			
	(A) Transceiver (C) Subscriber	(B) Paging (D) Duplexer						
2.	What is the responsibility of MSC in cells (A) Connection of mobile to base stations	lar telephone system? (B) Connection of mobile to PSTN	1	1	1			
	(C) Connection of base station to PSTN	(D) Connection of base station to MSC						
3.	Name the type of antenna used for center (A) Dipole antenna (C) Sectored antenna	excited cells. (B) Grid antenna (D) Omnidirectional antenna	1	2	1			
4.	A fraction of total available channels reser (A) Queue (C) RSSI	rved for handoff requests are  (B) Cluster  (D) Guard channel	1	2	Person			
5.	Calculate the path loss if the wavelength Assume unity gain for antennas.  (A) 33dB  (C) 53dB	h is 0.6m and Fraunhofer distance is 7m.  (B) 63dB  (D) 43dB	1	5	2			
6.	The variations in received signal strengt between the transmitter and receiver is kno (A) Shadowing (C) Interference	th due to specific geometries of the path	1	2	2			
7.	Calculate the Brewster angle for a wave i of sr=3.  (A) 84.7  (C) 64.7	impinging on ground having a permittivity  (B) 74.7  (D) 54.7	1	5	2			
8.		rate for predicting the large-scale signal	1	1	2			
9.	The factor that does not influences small so (A) Speed of mobile (C) Multipath propagation	(B) Power density of base station (D) Speed of surrounding objects	. 1	1	3			

10.	What is the range of frequency of Do spectrum?  (A) Zero  (C) One	ppler spread in the available Doppler  (B) Infinite  (D) Non zero	1	3	3
11.	The envelope of a sinusoid plus bandpass not (A) Uniform (C) Rayleigh	oise has distribution (B) Ricean (D) Gaussian	1	2	3
12.	The path loss increases by (A) 10dB (C) 20dB	(B) 6dB (D) -10dB	1	2	3
13.	Interleaving is used to obtain divers (A) Time (C) Polarization	ity. (B) Frequency (D) Space	1	2	4
14.	Which is used to obtain time diversity in adding any overhead?  (A) Rake receiver  (C) Search window	(B) Interleaving (D) Diversity reception	1	2	4
15.	Space diversity is also known as div (A) Polarization (C) Time	versity (B) Antenna (D) Angle	1	2	4
16.	. Improves the quality of a wair interface without increasing power or bat (A) Equalization (C) Channel coding	vireless link without altering the common andwidth  (B) Diversity  (D) Modulation	1	2	4
17.	Super frame structure of GSM contains (A) 51 Multiframe (C) 56 Multiframe	(B) 24 Multiframe (D) 75 Multiframe	1	2	5
18.	When band of Orthogonal Frequency Divis sub bands, it diminishes effects of (A) Channel noise (C) Interference	(B) Collision (D) Signals absence	1	1	5
19.	The modulation scheme used by GSM is (A) BPSK (C) GMSK	(B) QPSK (D) BFSK	1	1	5
20.	is the interference at a bas subscriber units in the surrounding cells. (A) Forward channel interference (C) Receiver interference	(B) Carrier interference (D) Reverse channel interference	1	1	5
	PART - B (5 × 4 = 20 Marks) Answer any 5 Questions				со
21.	What is meant by frequency reuse? Explain	the significance of hexagonal structures.	4	2	1
	. Compare fixed and dynamic channel assignments.				1
	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.				2
24.			4	2	3

1	What are the merits and demerits of RAKE receiver?	4	2	4
46.	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) Answer all Questions	Mar	ks BL	CO
28.	(a) Illustrate the various handoff strategies used in mobile communication systems and discuss the methods that prioritise handoff.  (OR)	12	3	1
	(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 channe] 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.			
29.	(a) Deduce the necessary expressions for path loss in two ray ground reflection model.	12	2	2
	(OR)			
	(b) Derive relevant expressions for outage probability under path loss and shadowing			
30.	(a) i. Write the most important effects of small scale multipath propagation. ii. Discuss about Ricean fading effect.	12	2	3
	(OR)  (b) Elaborate and deduce expressions for impulse response model of a multipath channel.			
31.	(a) Explain the operation of a RAKE receiver in CDMA system with necessary diagrams.	12	2	4
	(OR)			
	(b) Discuss the various MIMO configurations and derive the MIMO capacity on fading channels			
32.	(a) Elaborate in detail the GSM frame structure and its interfaces.  (OR)	12	2	5
	(b) Discuss about the 4G LTE architecture in detail.			

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