

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2022****Subject Code:2171004****Date:07-01-2023****Subject Name:Wireless Communication****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Define : 1) Mobile assisted handoff 2) Roamer 3) Paging	03
	(b) Compare : HSCSD, GPRS and EDGE for 2.5G.	04
	(c) Draw and explain GSM architecture and briefly describe functions of MSC, BSC, VLR, HLR, AUC.	07
Q.2	(a) Explain concept of Trunking and Grade of service (GOS).	03
	(b) Compare cell splitting, sectoring and microcell zone concept.	04
	(c) A cellular system has 32 cells, each cell has 1.6 km radius and the system reuse factor of 7. The system is to support 336 traffic channels in total. Determine the total geographical area covered, the number of traffic channels per cell and total number of simultaneous calls supported by this system.	07
OR		
	(c) Explain Co-channel interference in cellular system. A cellular system has a cluster size 7 and path loss exponent $n = 3$. Determine the S/I for the system. Now, if each cell is sectorized in 120° sectors, what will be the improvement in S/I compared to non-sectorized system in dB?	07
Q.3	(a) Calculate the Brewster angle Θ_B for a wave impinging on poor ground, having a permittivity of $\epsilon_r = 4$ at the frequency of 100 MHz. Also calculate same for typical ground with permittivity of $\epsilon_r = 15$.	03
	(b) Briefly describe mean excess delay, RMS delay spread, coherence bandwidth and Doppler spread.	04
	(c) In a cellular radio operating at 800 MHz, the transmitter and the receiver are separated by 500m from each other. The knife-edge diffraction object between them has a height of 30m. The diffraction object is 100m from transmitter. Find:	07
	(i) The excess path length	
	(ii) The phase difference corresponding to the excess path length.	
	(iii) The Fresnel-Kirchhoff diffraction parameter.	
	(iv) The radius of the second Fresnel zone.	
OR		
Q.3	(a) Enlist types of small scale fading.	03
	(b) Explain path loss mechanism in Hata's prediction model.	04
	(c) Explain impulse response model of a multipath channel with necessary equations.	07
Q.4	(a) A WLAN system operates at 2Mbps, calculate data transfer time required in seconds for 42 MB file.	03

- (b) Explain space diversity techniques in brief. **04**
- (c) Describe working of RAKE receiver in detail. **07**

OR

- Q.4**
- (a) Compare FDMA/FDD and TDMA/FDD. **03**
 - (b) Explain: I-persistent CSMA, non-persistent CSMA, p-persistent CSMA. **04**
 - (c) Write a short note on Software Defined Radio. **07**

- Q.5**
- (a) Explain concept of spread spectrum. **03**
 - (b) Explain GSM frame structure. **04**
 - (c) Explain call flow showing the process of call origination to call termination in GSM. **07**

OR

- Q.5**
- (a) Explain basic concept of wireless ad-hoc network. **03**
 - (b) Describe soft handoff concept in CDMA. **04**
 - (c) Briefly discuss security threats in wireless network and suggest possible ways of protection. **07**
