GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VII EXAMINATION – SUMMER 2025

Subject Code:3171004 **Date:21-05-2025**

Subject Name:Wireless Communication

Time:02:30 PM TO 05:00 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 following terms with respect to wireless communication: 1)Control channel (2) Forward Channel (3) Mobile switching Center (MSC)	**03**
	(b)	Give the full form of : (1) PSTN (2) HSCSD (3) GPRS (4) EDGE (5) GSM (6) PDC (7) IS-95 (8) UMTS	**04**
	(c)	With neat diagram explain the concept of: frequency reuse.	**07**
Q.2	**(a)**	If a spectrum of 30MHz of is allocated to a wireless FDD cellular telephone System which uses two 25 KHz simplex channels to provide full duplex voice and Control channels; compute the number of channels available per cell if a system uses: (1) Four cell reuse (2) seven cell reuse and (3) 12 cell reuse.	**03**
	(b)	Explain channel assignment strategies in detail.	**04**
	(c)	With neat diagram explain Hand off strategies in detail. Illustrate handoff scenario at cell boundary.	**07**
		OR	
	(c)	Explain Trunking and Grade of service in detail. Also discuss the traffic intensity with the help of necessary equation.	**07**
Q.3	**(a)**	With neat diagram explain Umbrella cell approach clearly.	**03**
	(b)	Explain the concept of Interference and System capacity.	**04**
	(c)	With neat diagram explain Cell Splitting in detail.	**07**
		OR	
Q.3	**(a)**	Explain how repeaters can be used for range extension.	**03**
	(b)	Explain channel planning for wireless communication systems.	**04**
	(c)	With neat diagram explain Sectoring in detail.	**07**
Q.4	**(a)**	Find the Fraunhofer distance for an antenna with maximum dimension of 1 m and operating frequency of 900 MHz. If antennas have unity gain calculate the path loss.	**03**
	(b)	Explain Microcell Zone concept with neat diagram.	**04**
	(c)	With necessary equations explain Free space propagation model for wireless communication. Finally derive the equation for received power.	**07**
		OR	
Q.4	**(a)**	Explain three basic propagation mechanisms briefly.	**03**

(b)	Just draw: GSM system architecture. Write full forms of abbreviations used in diagram.	**04**
(c)	Assuming free space propagation, a receiver is located 10 km away from a 50 W transmitter. The carrier frequency is 900 MHz, antenna gain at transmitter and receiver is 1 and 2 respectively, calculate:	**07**

        (1) Power received at receiver

        (2) The magnitude of the E-field at the receiver antenna

        (3) The power flux density

        (4) The rms voltage applied to the receiver input. The receiver antenna has 50Ω impedance and is matched to the receiver.

Q.5	**(a)**	Define: Brewster angle with the help of equation.	**03**
	(b)	With necessary equations describe: Impulse response Model of a multipath channel.	**04**
	(c)	With necessary diagrams explain Ground Reflection (Two-ray) Model in detail. Derive the equation for total E-field.	**07**

OR

Q.5	**(a)**	Explain Frequency Division Multiple Access (FDMA) briefly.	**03**
	(b)	With necessary equation Define: Doppler Shift.	**04**
	(c)	Explain the factors influencing Small-scale fading in detail.	**07**

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