

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII EXAMINATION – SUMMER 2025

Subject Code:3171608

Date:19-05-2025

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) Give a brief on Wireless Local Loop (WLL).	03
	(b) List out and discuss the evolution of different generations of wireless communication.	04
	(c) Draw Bluetooth Protocol Architecture stack and demonstrate each protocol in details.	07
Q.2	(a) List out the techniques to improve coverage and channel capacity in cellular systems?	03
	(b) Distinguish between soft handoff and hard handoff.	04
	(c) If a signal-to-interference ratio of 15 dB is required for satisfactory forward channel performance of a cellular system, what is the frequency reuse factor and cluster size that should be used for maximum capacity if the path loss exponent is (a) $n = 4$, (b) $n = 3$? Assume that there are six co-channel cells in the first tier, and all of them are at the same distance from the mobile. Use suitable approximations.	07
	OR	
	(c) Consider a transmitter which radiates a sinusoidal carrier frequency of 1850 MHz. For a vehicle moving 60 mph, compute the received carrier frequency if the mobile is moving: a) directly towards the transmitter b) directly away from the transmitter c) In a direction which is perpendicular to the direction of arrival of the transmitted signal.	07
Q.3	(a) Why the hexagon is used as a cell shape?	03
	(b) Differentiate: FDMA and OFDM.	04
	(c) List the factors influencing small scale fading and explain the factors.	07
	OR	
Q.3	(a) Give the equation for average large scale-path loss between the transmitter and receiver as a function of distance.	03
	(b) How cell splitting is different from cell sectorization?	04
	(c) Explain in details: Cellular network architecture.	07
Q.4	(a) Assume a receiver is located 10 km from a 50 W transmitter. The carrier frequency is 6 GHz and free space propagation is	03

assumed, $G_t = 1$ and $G_r = 1$. Find the power at the receiver in dbm.

- (b) Explain briefly on CSMA Protocols. **04**
- (c) With the help of neat sketch, describe GSM Architecture. **07**

OR

- Q.4**
- (a) A mobile is located 5 km away from a base station and uses an antenna with a gain of 2.55 dB to receive cellular radio signals. Suppose transmitted power is 1 watt, find the received power at the mobile using the 2-ray ground reflection model. **03**
 - (b) Discuss about IEEE 802.11. **04**
 - (c) With the help of neat sketch, describe GPRS Architecture. **07**

- Q.5**
- (a) Explain: zigbee technology **03**
 - (b) What are the main differences between WiFi and WiMAX? **04**
 - (c) Explain various methods to increase system capacity of a cellular network. **07**

OR

- Q.5**
- (a) Give a brief on Security issues in a Wireless network. **03**
 - (b) Explain in detail about Advantages and disadvantages of Wireless Adhoc Networks. **04**
 - (c) Describe how UWB radio functions, including its characteristics, benefits, and drawbacks. **07**
