

ASSIGNMENT 2

ITAD302 - Mobile
Computing

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B.Tech IT

1. List all the multiple access techniques used for wireless communication. Do a neat comparison between TDMA, FDMA and CDMA.

Multiple Access Techniques

In Wireless Communication, multiple access techniques allow multiple users to share the same physical channel (spectrum) efficiently. These techniques ensure that signals from different users don't interfere with each other.

1. FDMA (Frequency Division Multiple Access):

- * Each user is assigned a unique frequency band
- * Channels are separated in frequency.
- * Simpler to implement but inefficient use of spectrum
- * Used in 1G analog systems.

2. TDMA (Time Division Multiple Access):

- * Users share the same frequency channel but are assigned different time slots.
- * Data is transmitted in bursts.
- * Requires synchronization
- * Used in 2G GSM network.

3. CDMA (Code Division Multiple Access):

All users occupy the same frequency band simultaneously.

Differentiation is done using unique code

Highly efficient, supports more users.

Used in 3G systems (like WCDMA)

Feature	FDMA	TDMA	CDMA
Basis of Access	Frequency	Time	code
Bandwidth Usage	Divided frequency	Same frequency, divided time	Same frequency and time
Synchronization	Not required	Strictly required	Not required
Complexity	Low	Medium	High
Used in Generation.	1G	2G (GSM)	3G (WCDMA)

Question 2: EDGE as an Add-on to BSS in GSM/GPRS

What is EDGE?

EDGE (Enhanced Data Rates For GSM Evolution) is an upgrade to GSM/GPRS that provides higher data transmission rates. It is sometimes referred to as 2.75G technology.

Key Features:

- Uses GFSK (Gaussian Frequency Shift Keying) modulation for higher data rates.
- Provides data speeds up to 384 kbps
- Backward compatible with GSM/GPRS.

Protocol Enhancements:

- Introduction of new modulation techniques
- Enhanced error correction protocols.
- Optimized radio resource management.

Impact on GSM/GPRS Networks:

- No change to the core network is required
- Only Base Station Subsystem (BSS) needs upgrades (new transceivers and software).
- Cost-effective way to offer quasi-3G services

Why EDGE is an "Add-on" for GPRS:

- It enhances only the radio access network, particularly at the base station
- Core elements like MSC (Mobile Switching Center) and SGSN (Serving GPRS Support Node) remain untouched.
- Enables rapid deployment and low-cost enhancement of existing infrastructure.