

ASSIGNMENT - 2

1) Multiple Access Technique in wireless communication

- FDMA - Frequency Division Multiple access.
- TDMA - Time Division Multiple Access.
- CDMA - Code Division Multiple Access.
- OFDMA - Orthogonal Frequency Division Multiple Access.
- SDMA - Space Division Multiple Access.
- NOMA - Non-Orthogonal Multiple Access.

Comparison :-

TDMA VS FDMA VS CDMA

Feature	TDMA	FDMA	CDMA
Basic Principle	Divides time into slots	Divides bandwidth into frequencies	Uses unique codes for each user
Bandwidth Usage	shared in time	Divide into fixed frequency slots	Entire bandwidth shared.
Synchronization	Strict timing required	Less synchronization required	Requires complex synchronization
Complexity	medium	Low	High

spectral efficiency	Moderate	Low	High
Hard off	lower than FDMA	complex	soft handoff
Used in	GSM	Analog system (1G)	3G (WCDMA) (2G+ 3G)

(2) EDGE as an Add-on to GSM / GPRS (BSS Enhancement)

EDGE (Enhanced data rate for GSM evolution) is a technology developed to increase the data capacity of GSM (GPRS) network without changing the existing core network. It is often described as an add-on for the following reasons.

Modulation Enhancement:

EDGE uses GMSK modulation in addition to the GMSK used in GSM evolution into data rates.

NO Core Network Changes:

It operates over the existing GSM core with (MSC, SGSN, GGSN) the upgrades are limited to the base station (BSS)

Software / Hardware upgrades:

Only the BSS and BSC require software and minor hardware enhancement to avoid the need for costly infrastructure replacement.

Backward compatibility:-

EDGE supports fall to GPRS/GSM for non-compatible devices or areas, ensuring seamless connectivity.

Improved throughput:

Enables data rates up to 384 Kbps machine it enables for 3G services like mobile internet, MMS and streaming.

Conclusion :-

EDGE serves as a bridge between 2G and 3G,
leveraging existing investment while providing
enhanced capabilities and is considered a cost-
effective upgrade path for operators.