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Assignment No1

(1) Illustrate Foma technique with the help of an example.

=> Frequency Division multiple Access is a channel access method used in telecommunication particularly in radio communication.

- In Foma the available Freqeency Spectrum is divided into multiple non overlapping frequency bands as each users is assigned a unique frequency band for communication.
- consider an example wher FomA is used in a simple wireless communication system with three users, user A, user B, User C the available Frequency spectrum is divided into three non-overlapping frequency band for communication Frequency Spectrum : 900 MHz - 1000 MHz.
- User A : Assigned Frequency band FRO 900MM to 920 MHz
- user B : Assigned Frequency band 920 MM TO 940 MHz
- UESR C : Assigned Frequency band From 940 MHz to 960 MHz

Each user will use their allocated Frequency band For both transmitting are receiving data For instance

- If user A wants to sends a message it will transmit within the Frequency range of 900 MHz to 920 MHz

What is OFDM? What is diff between OFDM and OFMDA?

OFDM	OFDMA
OFDM supports multiple users via TDMA basis only	OFDMA supports either on TDMA or FDMA basis or both at same time.
OFDD can only support one user at a given moment	OFDMA supports simultaneous low data rate transmission From several users.
OFDM needs to maintain same power for all sub carrier OFDMA allocate user in time	OFDMA supports per channel or sub carrier. power. OFDMA allocate user in time domain only & Frequency.

Orthogal Frequency division multiplexing is a method of data transmission where a single information stream is split among several closely spaced narrowband Subchannel Frequency.
It is mostly used in wireless data transmission but may used in wireless data transmis., but may be employed in wired as Fiber optic communications as well.

(3) discuss the requirement of 5G

→ • 5G or Fifth generation wireless technology represents a significant advancement in mobile communication offering to connect a massive number of device simultaneously. The requirements of 5G are designed to meet the growing demand for high speed reliable and low latency connectivity.

Key Requirment of 5G.

• High data Rates.

5G aims to deliver significantly higher data rates compared to previous generation

• low latency.

5G targets extremely low latency with value as 5G target millisecond or even lower

• massive Device connectivity

5G is designed to support a massive number of connected device per square kilometer.

• Energy Efficiency

Energy efficiency is a key concern for 5G network As the number of connected devices increase optimizing power consumption become essential.

(4) Describe the evolution of 1G, 2G, 3G, 4G, 5G mobile phone system.

→ The evolution of mobile phone system from 1G to 5G represents significant advancement in wireless communication technology

- 1G :- 1G marked the first generation of mobile phone system and was introduced in the early 1980s It primary used analog signal for voice communication
- Analog cellular technology allowed users to make voice calls but it lacked the data capabilities we enjoy
- 2G - 2G emerged in the early 1990s and introduced 2G emerged in the early 1990s, and digital communication enabling the transmission of both voice and data, 2G introduced digital modulation better call quality & improved spectral efficiency
- 3G - 3G was rolled out in early 2000s bringing enhanced data transmission capabilities and enabling allowing faster data transfers and supporting multimedia applications
- 4G was introduced in the late 2000s focusing on providing high speed data, low latency and improved overall network performance 4G networks were designed to deliver high data rates using technologies like LTE and wimax.