UNIT–2: MULTIPLE ACCESS TECHNIQUES (3-MARK ANSWERS)

1) Need for Multiple Access
- Multiple users share limited bandwidth
- Avoids collisions and interference
- Improves spectrum efficiency

2) CSMA Protocol
- Channel sensed before transmission
- Transmit only if channel is idle
- Reduces collision probability

3) CSMA/CD
- Used in Ethernet
- Detects collision during transmission
- Stops, sends jam signal and retries

Diagram:
Node A ----X---- Node B

4) CSMA/CA
- Avoids collision before transmission
- Uses RTS/CTS and backoff
- Preferred in wireless due to no collision detection

5) CSMA/CD vs CSMA/CA
- CD detects collision, CA avoids collision
- CD for wired, CA for wireless
- CA is safer but slower

6) TDMA
- Channel divided into time slots
- Each user gets a slot
Advantages:
- No collision
Disadvantages:
- Requires synchronization

7) FDMA
- Channel divided into frequency bands
- Each user has unique band
Applications:
- Satellite, 1G systems

8) CDMA
- Same time and frequency
- Users separated by codes
- High interference resistance

9) OFDM
- Bandwidth divided into orthogonal subcarriers
Advantages:
- High data rate
- Resistant to multipath

10) TDMA vs FDMA vs CDMA
- TDMA: Time based
- FDMA: Frequency based
- CDMA: Code based

11) Types of CSMA
- 1-persistent: transmit immediately
- Non-persistent: wait random time
- p-persistent: transmit with probability p

12) Performance Issues in CSMA
- Delay increases with load
- Throughput reduces due to collisions
- High collision probability

13) CSMA vs TDMA
- CSMA: distributed, collision possible
- TDMA: controlled, no collision

14) Role of OFDM
- Supports high data rate
- Efficient spectrum usage
- Used in LTE and 5G

15) Comparison of Multiple Access Techniques
- FDMA: low efficiency, low complexity
- TDMA: medium efficiency
- CDMA: high efficiency, complex
- OFDM: very high efficiency