



“Assignment ON”

“Mobile & Telecommunication Final Assignment”.

Course code: CSE-443

Course Title: Mobile & Telecommunication

Submitted To

Md. Ashraful Islam

Associate Professor

Department of CSE

University of South Asia

Submitted By

Name: Khaleda Akter

ID: 183-0034-028

Batch: 23th

Date of Submission: 24/12/2020

Answer to the question no: (part-A)

1. What is full form FDMA, TDMA, SDMA and CDMA?

Answer:

FDMA = Frequency Division Multiple Access.

TDMA = Time Division Multiple Access.

SDMA = Spatial Division Multiple Access.

CDMA = Code Division Multiple Access.

2. What is full form ASCII?

Answer:

ASCII = American Standard code for Information Interchange.

3. What is full form OFDMA?

Answer:

OFDMA = Orthogonal Frequency Division Multiple Access.

4. What is full form NSS & SLIP?

Answer:

NSS = National Service Scheme.

SLIP = Serial Line Internet Protocol.

5. What is full form DNS, BCC, & PPP?

Answer:

DNS = Domain Name System.

BCC = Blind Carbon Copy.

6. What is full form IBM & BCD?

Answer:

IBM = International Business Machines.

BCD = Binary Code Decimal.

7. What is full form AMPS, UMTS & SON?

Answer:

AMPS = Advance Mobile Phone System.

UMTS = Universal Mobile Telecommunications Service.

8. What is full form LTE, RAT, Wi-Fi, & HDLC?

Answer:

LTE = Long-Term Evolution.

RAT = Radio Access Technologies.

Wi-Fi = Wireless Fidelity.

HDLC = High Level Data Link Control.

9. What is GSM?

Answer:

GSM = The Global System for Mobile Communications.

10. What is SMTP?

Answer:

SMTP = Simple Mail Transfer Protocol.

Answer to the question no: (Part no-B)

1. What are different types of polling?

Answer: The Types of polling are -

- a) Roll call polling (polling list)
- b) Fast select polling (several terminals)
- c) Hub polling (station to station)
- d) Token passing (token)

2. What are types of Duplexing?

Answer: Three types of Duplex. There are –

- a. Simplex
- b. Half Duplex
- c. Full Duplex

3. Define of Cellular?

Answer: A cellular network or mobile network is a communication network where the last link is wireless. The network is distributed over land areas called "cells", each served by at least one fixed-location transceiver, but more normally, three cell sites or base transceiver stations.

4. Draw a wavelength division multiplexing?

Answer:

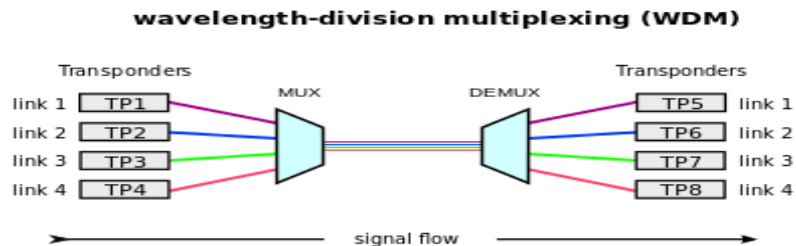


Fig: Wavelength Division Multiplex

5. What are Hybrid multiple accesses?

Answer: Among the classical multiple access schemes (TDMA, FDMA, CDMA, SDMA)

6. What is Bandwidth efficient protocol?

Answer: Mobile and hoc networks have dynamic irregular topologies by nature and suffer from inherent limitations such as limited bandwidth and power. A number of routing protocols have been proposed in the past years to deal with this issue efficiently.

7. What is fading? Write the types of fading?

Answer: **Fading:** In wireless communications, fading is variation of the attenuation of a signal with various variables. These variables include time, geographical position, and radio frequency. Fading is often modeled as a random process. A fading channel is a communication channel that experiences fading.

The type of fading is given below

Four type of Fading. There are-

- a) Fast Fading
- b) Slow Fading
- c) Flat Fading
- d) Selective Fading.

8. What is the Synchronous?

Answer: **Synchronous:** Synchronous learning refers to a learning event in which a group of students are engaging in learning at the same time. Before learning technology allowed for synchronous learning environments, most online education took place through asynchronous learning method.

9. What is scrambling?

Answer: Scrambling is a binary bit-level processing applied to the transmission rate signal in order to make the resulting binary sequence appear more random. For a proper reconstruction of the original bit stream the shift registers in the descrambler should get synchronized to their counterparts in the scrambler.

10. What are reflection, diffraction and scattering?

Answer:

Reflection: Reflection is the change in direction of a wave front at an interface between two different media so that the wave front returns into the medium from which it originated. Common examples include the reflection of light, sound and water waves.

Diffraction: Diffraction refers to various phenomena that occur when a wave encounters an obstacle or opening. It is defined as the bending of waves around the corners of an obstacle or through an aperture into the region of geometrical shadow of the obstacle/aperture.

Scattering: Scattering is a term used in physics to describe a wide range of physical processes where moving particles or radiation of some form, such as light or sound, is forced to deviate from a straight trajectory by localized non-uniformities (including particles and radiation) in the medium through which they pass.

Answer to the question no: (Part-C)

1. Describe Mobile Radio Propagation Effects?

Answer:

Mobile Radio Propagation: Radio propagation is the behavior of radio waves as they travel, or are propagated, from one point to another, or into various parts of the atmosphere. ... Line-of-sight propagation means radio waves which travel in a straight line from the transmitting antenna to the receiving antenna.

Effects on Mobile Radio Propagation: The wireless medium introduces difficulties for communication by its inherent nature. The atmospheric medium most relevant to terrestrial radio propagation may be specified as that of The troposphere is the first layer above the surface of the earth, and contains approximately half of the earth's atmosphere. This is the layer at which weather takes place. The ionosphere is where ions and electrons

exist in sufficient quantities to reflect and/or refract the electromagnetic radio waves. For our specified model, it suffices to consider two types of electromagnetic waves: ground waves and sky waves. The ground wave is the portion of the transmitted signal that propagates along the contour of the earth. Understandably, such waves are directly affected by the earth's terrain. Ground waves are the dominant mode of propagation for frequencies below 2 MHz. As frequency increases the sky wave separates from the sky wave, enabling long distance communication. More specifically, the sky wave propagates in space and returns to the earth by reflection in either the ionosphere or the troposphere, thereby enabling beyond the horizon communication through successive reflection. It is interesting to note that above 30 MHz the sky wave propagates in a straight line, and actually propagates through the ionosphere. This property is taken advantage of for satellite communication.

Frequency Band	Frequency Range (Wavelength)	Propagation Modes
ELF (Extremely Low Frequency)	Less than 3 KHz($\lambda > 100 \text{ km}$)	Ground wave
VLF (Very Low Frequency)	3-30 KHz (10 km $\leq \lambda < 100$)	Earth-Ionosphere guided
LF (Low Frequency)	30-300 KHz (1 km $\leq \lambda < 10$)	Ground wave
MF (Medium Frequency)	300 KHz-3 MHz (100m $\leq \lambda < 1$ km)	Ground/sky wave for short/long distance.
HF – (High Frequency)	3-30 MHz (10m $\leq \lambda < 100$ m)	Sky wave
VHF (Very High Frequency)	30-300 MHz (1m $\leq \lambda < 10$ m) 30-60 MHz (5m $\leq \lambda < 10$ m)	Space wave Space wave
UHF (Ultra High Frequency)	300MHz-3 GHz (10 cm $\leq \lambda < 1$ m)	Space wave
SHF (Super High Frequency)	3 GHz-30 GHz(1cm $\leq \lambda < 10$ cm)	Space wave
EHF (Extremely High Frequency)	30 GHz-300 GHz (1mm $\leq \lambda < 10$ mm)	Space wave

2. Describe TDMA system. Write advantage & disadvantage of TDMA?

Answer:

TDMA system: Time-division multiple access is a channel access method for shared-medium networks. It allows several users to share the same frequency channel by dividing the signal into different time slots. The users transmit in rapid succession, one after the other, each using its own time slot.

Advantage of TDMA:

- a) TDMA can easily adapt to the transmission of data as well as voice communication.
- b) It has the ability to carry 64 kbps to 120 Mbps of data rates.
- c) No interference from simultaneous transmission.
- d) TDMA is the **cost**-effective technology to convert an analogue system to digital.

Disadvantage of TDMA:

- a) TDMA technology is that the user has a predefined time slot. When moving from one cell site to other, if all the time slots in this cell are full the user might be disconnected.
- b) Another problem in TDMA is that it is subjected to multipath distortion.

3. What are multiple access techniques? Write Types of Multiple Access Techniques.

Answer: The three most common multiple access techniques are:

- 1) Frequency division multiple access (FDMA)
- 2) Time division multiple access (TDMA)
- 3) Code division multiple access (CDMA)
- 4) Spatial division multiple access (SDMA)

Types of Multiple Access Techniques: Three types of Multiple Access Techniques. There are -

1. FDMA:

Frequency division multiple access (FDMA) is a channel access method used in some multiple-access protocols.

FDMA advantage:

- a) .Reduces the bit rate information and the use of efficient numerical codes increases the capacity.
- b) .It reduces the cost and lowers the inter symbol interference (ISI)
- c) .Equalization is not necessary

FDMA disadvantage:

- a) It does not differ significantly from analog systems; improving the capacity depends on the signal-to-interference reduction, or a signal-to-noise ratio (SNR).
- b) The maximum flow rate per channel is fixed and small.
- c) Guard bands lead to a waste of capacity

2. **TDMA:** Time-division multiple access (TDMA) is a channel access method for shared-medium networks. It allows several users to share the same frequency channel by dividing the signal into different time slots. The users transmit in rapid succession, one after the other, each using its own time slot.

Advantage of TDMA:

- a) TDMA can easily adapt to the transmission of data as well as voice communication.
- b) It has the ability to carry 64 kbps to 120 Mbps of data rates.
- c) No interference from simultaneous transmission.

Disadvantage of TDMA:

- a) TDMA technology is that the user has a predefined time slot. When moving from one cell site to other, if all the time slots in this cell are full the user might be disconnected.
- b) Another problem in TDMA is that it is subjected to multipath distortion.

3. **CDMA:** Code-division multiple access (CDMA) is a channel access method used by various radio communication technologies. CDMA is an example of multiple accesses, where several transmitters can send information simultaneously over a single communication channel.

CDMA advantage:

- a) The CDMA does not require any synchronization.
- b) It has more number of users can share the same bandwidth.
- c) It is well-matched with other cellular technologies.

CDMA disadvantage:

- a) The system is more complicated.
- b) Guard band and guard time both are required to be provided.

- c) As the number of users increases, the overall quality of services decreases.

4. What is protocol? Describe the Protocol Concepts in details.

Answer:

Protocol: The protocol defines the rules, syntax, semantics and synchronization of communication and possible error recovery methods.

The Protocol Concepts: A protocol is a standard set of rules that allow electronic devices to communicate with each other. These rules include what type of data may be transmitted, what commands are used to send and receive data, and how data transfers are confirmed.

You can think of a protocol as a spoken language. Each language has its own rules and vocabulary. If two people share the same language, they can communicate effectively. Similarly, if two hardware devices support the same protocol, they can communicate with each other, regardless of the manufacturer or type of device. For example, an Apple phone can send an email to an Android device using a standard mail protocol. A Windows-based PC can load a webpage from a Unix-based web server using a standard web protocol. Protocols exist for several different applications.

Examples: include wired networking (e.g., Ethernet), wireless networking (e.g. 802.11ac), and Internet communication (e.g. IP). The Internet protocol suite, which is used for transmitting data over the Internet, contains dozens of protocols. These protocols may be broken up into four categories:

1. Link layer - PPP, DSL, Wi-Fi, etc.
2. Internet layer - IPv4, IPv6, etc.
3. Transport layer - TCP, UDP, etc.
4. Application layer - HTTP, IMAP, FTP, etc.

5. Describe Simplex, Half duplex and full duplex with figure in details?

Answer:

Simplex: In simplex transmission mode, the communication between sender and receiver occurs in only one direction. The sender can only send the data, and the receiver can only receive the data. The receiver cannot reply to the sender. Simplex transmission can be thought of as a one-way road in which the traffic travels only in one direction no vehicle coming from the opposite direction is allowed to drive through.



Fig: Simplex

Example: the keyboard can only send the input to the monitor, and the monitor can only receive the input and display it on the screen. The monitor cannot reply, or send any feedback, to the keyboard.

Half Duplex: The communication between sender and receiver occurs in both directions in half duplex transmission, but only one at a time. The sender and receiver can both send and receive the information, but only one is allowed to send at any given time. Half duplex is still considered a one-way road, in which a vehicle traveling in the opposite direction of the traffic has to wait till the road is empty before it can pass through.



Fig: Half duplex

Example: in walkie-talkies, the speakers at both ends can speak, but they have to speak one by one. They cannot speak simultaneously.

Full Duplex: In full duplex transmission mode, the communication between sender and receiver can occur simultaneously. The sender and receiver can both transmit and receive at the same time. Full duplex transmission mode is like a two-way road, in which traffic can flow in both directions at the same time.

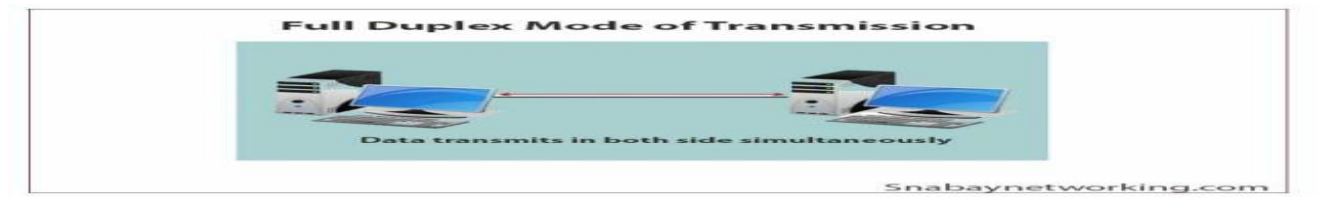


Fig: Full duplex

Example: In a telephone conversation, two people communicate, and both are free to speak and listen at the same time.