

Mawlana Bhashani Science and Technology University



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MBSTU.

1. a) What is telecommunication? Briefly describe it. 6
- b) What is protocol testing? What types of tool used in testing? 5
- c) What is buffering? 3
2. a) What is Broadband? 4
- b) Differentiate Router & switch. 6
- c) Describe simple network management protocol. 4
3. a) What is the need of QoS message in ISUP protocol? 6
- b) Describe both synchronous & asynchronous transmission? 5
- c) What is bridging? 3

4. a) Describe wireless pre-cellular system? 6
b) Describe the characteristic of C/I ratio? 6
c) What is Roaming? 2
5. a) Describe different types of registration? 6
b) Differentiate GSM & CDMA network? 6
c) What is MTU? 2
6. a) What is fading? 2
b) Write down the connection types in telecommunication. 6
c) Describe crossbar switching? 6
7. a) How does telecommunication network working? 7
b) For 10^8 number of devices covering total area of 147570 km^2 . The radius of wire is 2mm. Find the depth of wiring? 7

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8. a) Briefly describe - multipath fading? 3
b) Describe - multi access method. 8
c) What is frequency equalization? 3

Answer to the Question No: 1(a),

Telecommunication: is the exchange of information over significant distance by electronic means, relating to all types of voice data & video transmission.

This is a broad term of both wired & wireless communication.

In telecommunication data is transmitted in the form of electrical signals known as carrier waves, which are modulated into analog or digital signals for transmitting information. Analog modulation such as that used in radio broadcasting is an amplitude-modulation. Digital modulation is the update form.

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Answer to the Question No: 1(b)

Testing the functionality of the node to some standard message flow for compliance is known as protocol testing.

The testing tools used for protocol testing are:

1. Gulosim simulator → 100 nodes.

2. Abacus 5000 → test SIP

3. EtherPeek → test IP

4. Nethawk → SS7 testing

5. Wireshark → IP & SS7

6. K120X → GI20 techronics.

Answer to the Question NO: 1(c)

Buffering is the process of preloading data into a reserved area of memory that is called a buffer. Buffering is when the software downloads a certain

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a-mont ab data before it begins the video or -music.

Answers to the Question No: 2 (a)

Broadband is an internet access with high speed data transmission. Unlike dial-up connection, broadband connection is permanently connected. It allows internet & telephone calls to take place simultaneously.

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Answers to the Question No: 2(b)

Differences between routers & switches are follows:

Router	Switch
1. Appears in Network layers.	1. Appears in Data link layers.
2. PDU is Packet.	2. PDU is Frame.
3. Every port has its own Broadcast domain.	3. Switch has only one Broadcast domain.
4. Bandwidth sharing is dynamic.	4. No option for bandwidth sharing.
5. Have memory.	5. Switch has no memory.
6. Store IP address in the routing table.	6. Store MAC address in the lookup table.

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Answer to the Question NO: 2(c)

Simple network management protocol is one of the UDP-based protocols. It is monitoring network attached devices for various administrative attentions. It has application layer - database schema, protocol & a group of data objects.

Answer to the Question NO: 3(a)

CPEI - message is sent by the switch towards originator. When the switch receives the setup, the call is forwarded. After that the call is progressing. During the setup or active phase of call, a message

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is sent. This signifies the relayed to the originating has occurred.

Answer to the Question No: 3(b)

Synchronous transmission:

1. Synchronous transmission does not use start & stop bits, hence data transfer rate is quicker.
2. It uses clock signals that are built at each component.
3. Continual stream of data is sent between two nodes.
4. This method uses check digit instead of parity bits.

Asynchronous transmission:

1. It uses the start & stop bits.
2. It is used when data need to be sent data intermittently.
3. It recognizes the second packet at the information.
4. The starts & stop bits are supposed to be opposite polarity.

Answer to the Question NO: 3 (i)

Bridging is one of the forward techniques to use in packet switched networks. Bridge makes no assumption about the address location of the network it's stored in MAC address table.

Answer to the Question NO: 4(a)

Wireless transmission was originally shown as a method to remain in continuous contact with ships. In precellular system.

1. A group of frequency allocated to a large geographic zone.
2. When moving to a new zone, calls had to be reinitiated.
3. Due to pooritter technology the channel frequency was 120 KHz.
4. Half duplex system.
5. Most users not connected to PSTN
6. Later progressed to GPRS.

Answer to the Question No: 4(b)

Characteristic of C/I ratio is as follows:

1. The carrier-to-interference ratio, C/I, of the signal at the mobile from the transmitters in a given cell, can be found in an approximate manner by summation of interference from all base stations using the same frequency. Here

$$\frac{C}{I} = \frac{R^{-n}}{\sum_{i=1}^M D_i}$$

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2. If we assume all base stations are identically spaced & are at the centers of their cells we have

$$\frac{C}{I} = \frac{(\sqrt{3}R)^n}{M}$$

Answer to the Question NO: 4 (c)

Roaming means that the user jumps between different mobile networks when we are abroad where our carrier doesn't have coverage to all text or use mobile data. This costs a lot ex around the world except Europe.

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Answer To The Question NO: 5(a)

Registration is the process of notifying the network that a phone is active on the system. When a phone is switched on, it registers by signalling to the MSC via the base station on a set-up or control channel.

1. Periodic registration is when the phone announces itself on a regular basis.
2. Forced registration is when the phone monitors a control channel which provides information including the cell identification.

Answer to the Question NO: 5(b)

Differences between GISM & CDMA are follows :

CDMA	GISM
1. More reliable	1. Less reliable
2. Code division	2. Time & Frequency division.
3. More comfortable	3. Less comfortable.
4. Maintenance cost less	4. High maintenance cost.
5. Reused factors.	5. No reused factors.
6. Less signal deterioration.	6. Higher data rates.

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Answer to the Question No: 5 (c)

Maximum transmission unit refers to the largest packet size. MTU is logic passing a communication protocol - logic. A given layer's communication interfaces such as NIC, serial port are associated with MTU parameters.

Answer to the Question No: 6 (a)

In wireless communications, fading is variation of the attenuation of a signal with various variables. These variables include time, geographical position & radio frequency. Fading is often modeled as a random process.

Answer to the Question No: 6(b)

There are 4 types of connection in telecommunication is as follows:

1. Local call connection between two subscribers in the system.
2. Outgoing call connection between a subscriber and an outgoing trunk.
3. Incoming call connection between an incoming trunk & a local subscriber.
4. Transit call connection between an incoming trunk & an outgoing trunk.

Answer to the Question No: 6(c)

Crossbar Switching: It was developed in 1940s. They achieve full access & non blocking capabilities with the

Crossbar switches & common control equipment, used in the Crossbar exchanges.

The active elements called Crosspoints are placed between the input & output lines.

Crossbar switch features:

1. While processing a call, the common control system helps in the sharing of sources.
2. The specific route functions of call processing are hardwired because of the Wicce logic computers.
3. The flexible system design helps in the appropriate ratio selection is allowed for a specific switch.
4. Fewer moving parts ease the maintenance of crossbar switching system.

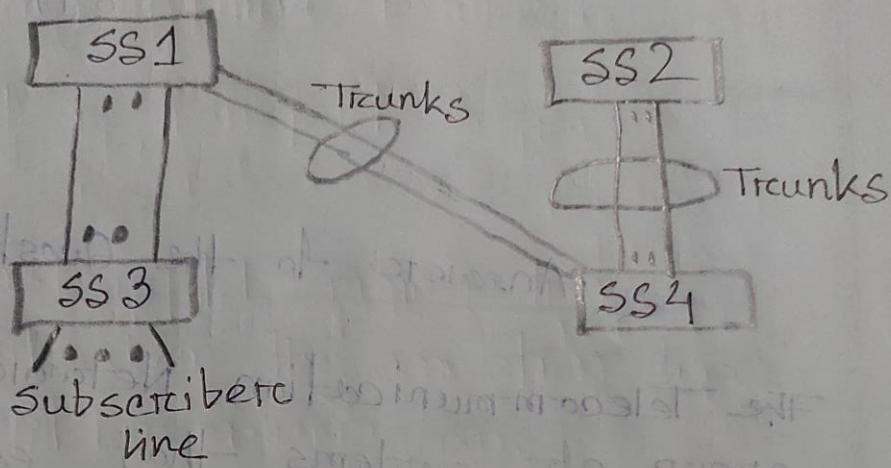
Answer to the Question No: 7(a)

The Telecommunication Network: It is a group of systems that establishes a distant call. The switching systems are part of a telecommunication network.

The switching sections provide connection between different subscribers. The switching systems are connected by using lines called the "trunks".

The lines that run to the subscriber premises are called the "subscriber lines."

The following figure shows a telecommunication network.



When a person needed to make a distant call, the call was first routed to the operator at the nearest switching center & then the number & location of called subscriber was noted down. That's how it works.

Answer to the Question No: 7(b)

Hence $n = 10^8$ connection area $= 2 \times 10^3 \text{ km}^2$
 $\& r = 1 \text{ m.m} = 2 \times 10^{-3} \text{ m}$ Total area $= 147570 \text{ km}^2$

Fully connected $= \frac{n(n-1)}{2}$

~~$\approx \frac{n^2}{2}$~~

$\approx \frac{n^2}{2} = \frac{(10^8)^2}{2} = \frac{10^{16}}{2}$

$= 5 \times 10^{15}$ pairs

Avg pairwise pair at cross section

$= \pi r^2$

$= \pi (2 \times 10^{-3})^2$

$= 12.5 \times 10^{-12} \text{ km}^2$

Therefore $\text{wiring volume} = 5 \times 10^{15} \times 12.5 \times 10^{-12} \times 2 \times 10^3$
 $= 125 \times 10^6 \text{ km}^3$

$\therefore \text{Dept of wiring} = \frac{\text{wiring volume}}{\text{Total area}}$

$$\text{Depth of wiring} = \frac{125 \times 10^6}{147570}$$

$$= 847.06 \text{ km}$$

Ans.

Answer to the Question No: 8(a)

If one or more paths arrives somewhat later than the first group of paths, the gain over the transmission bandwidth will not be constant.

$$\text{Total power} = \cos(2\pi 800t) + \cos(2\pi 800(t+1))$$

The coherence bandwidth is the bandwidth over which the channel response is somewhat flat. $B_C \approx \frac{1}{5\sigma_f}$

Answer to the Question No: 8(b)

Multi-access (MA) method in which radio resources are allocated into voice channels.

FDMA : Frequency division, each voice channel is assigned a separate frequency.

TDMA : Time division, each voice channel is assigned segments of time.

CDMA : Code division, each voice channel is assigned a specific code. At the receiver, the voice channels can be separated with minimal interference.

Answer to the Question No: 8(c)

Equalization : If the transmission bandwidth of the channel is greater than the approximate coherence bandwidth of the channel, frequency equalization may be required at the receiver.