Victoria University of Bangladesh
Dept. of Computer Science & Engineering
Program:- B.Sc in CSIT
Semester:- ▓▓▓ Fall 2023

Course title:- Data Communication
Course code:- CSE 435

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Batch:- 20

Final Assesment

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Ans to the Q no - 1(a)

⊙ A protocol is one of the components of a data communications system. Without protocol communication cannot occur. The sending device cannot just send the data ~~receiving dev~~ and expect the receiving device to receive and further interpret it correctly.

⊙ When the sender sends a message it may consists of text, numbers, images, etc. which are converted into bits and grouped into blocks to be transmitted and often certain additional information called controlled information is also added to help the receiver interpret the data.

⊙ For successful communication to occur, the sender and receiver must agree upon certain rules called protocol.

⊙ A protocol is defined as a set of rules that governs data communications.

Elements of Protocol:-

There are 3 Key elements of a protocol:

① Syntax:-
   ⊞ It means the structure or format of the data.
   ⊞ It is the arrangement of data in a particular order.

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2. Semantics:-

⊡ It tells the meaning of each section of bits and indicates the interpretation of each section.

⊡ It also tells what decisions to be taken based on the interpretation.

3. Timing:-

⊡ It tells the sender about the readiness of the receiver to receive the data.

⊡ It tells the sender at what rate the data should be sent to the receiver to avoid overwhelming the receiver.

Ⓥ Standards are necessary in networking to ensure inter connectivity and interoperability between various network hardware and software components.

Ⓥ Without standards we would have proprietary products creating isolated islands of users which cannot interconnu

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Data communication standards are classified into two categories:-

① De facto Standard:-

▣ These are the standards that have been traditionally used and mean by fact or by convention.

▣ These standards are not approved by any organized body but are ~~adoptade~~ adopted by widespread use.

② De jure Standard:-

▣ It means by law or by ~~regul~~ regulation.

▣ These standards are legislated and approved by an body that is ~~a~~ officially recognized.

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Ans to the Q.No - 1(b)

(v) Applications of co-axial cable:-

1. **Television:-** Coaxial cable used for television would be 75 Ohm and RG-6 coaxial cable.

2. **Internet:-** Coaxial cables are also used for carrying internet signals, RG-6 cables are used for this.

3. **CCTV:-** The coaxial cables are used in cctv systems and both RG-59 and RG-6 cables can be used.

4. **Video:-** The coaxial cables are also used in video transmission. The RG-6 is used for better digital signals and RG-59 for lossless transmission of video signals.

5. **HDTV:-** The HDTV uses RG-11 as it provides more space for signals to transfer.

(vi) Disadvantages of fibre optic cable:-

1. **Production & Installation cost:-**
The cost to produce optic fibre cabling is higher than that of copper. Installation is also more expensive as special test equipment is usually required.

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② Fragility:-

As they are made of glass, fibre optic cables are more fragile than electrical wires like copper cabling. If you bend them too much they'll break.

③ Splicing difficulties:-

Properly slicing fibres during network deployment or expansion is crucial to prevent disruption and ensure signal quality.

④ Installation & Construction risk:-

Due to how small and compact size of fibre optic cables make them ~~susceptibel~~ susceptible to damage during installation or renovation, necessitating consideration of restoration, backup, and survivability.

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Ans to the Qno-1(c)

(Y) Comparison between guided media and unguided media:-

⊞ The Guided Media is also called wired communication or bounded transmission media.

The Unguided media is also called wireless communication and or unbounded transmission media.

⊞ Guided media is used for point to point communication. Unguided media is generally suited for radia broadcasting in all direction.

⊞ ~~Gate Gate~~ Guided media is cost effective.

Unguided media is expensive.

⊞ Discrete network topologies are formed by guided media. Continous network topologies are formed by the unguided media

⊞ Examples of guided media are – twisted pair wires, co-axial cables and optical fibre cables.

Examples of unguided media are microwave or radio links and infrared light.

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(V) **Internetwork :-**

Internetworking refers to the interconnection of different nodes or segments, often between public, private commercial, Industrial or governmental networks, it involves the use intercessor devices like routers or gateways to create a large network, encompassing various products and procedures.

Network nodes use TCP or IP protocols for communication, enabling constant communication between networks. Internetworking resolves packet delivery through multiple links.

There is chiefly 3 units of a internetworking :-
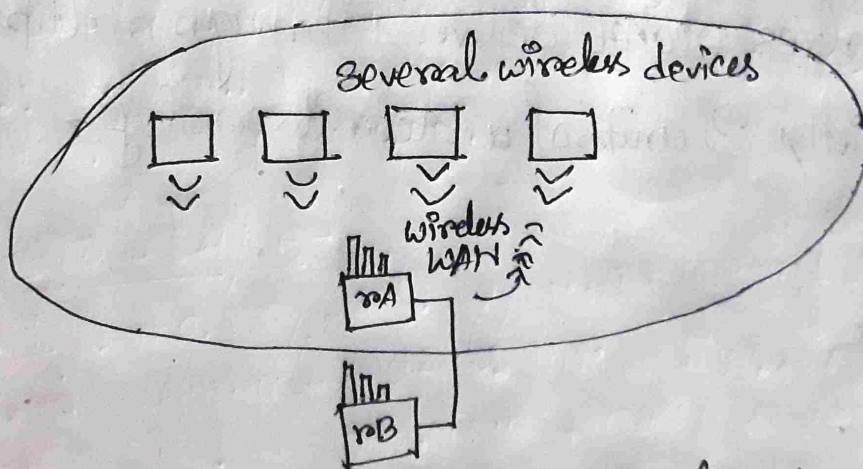
① Extranet

② Intranet

③ Internet.

① Wireless WAN:- is the only thing is that the connectivity is wireless providing regional nationwide and global coverage. It is used in daily life for telephonic

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calls, web pages, streaming video and data sharing. WWAN uses telecommunication cellular network technologies such as 2G, 3G, 4G. LTE and 5G to transfer data. WWAN refers to both wide and closed areas with large geographic coverage, such as MANET (Mobile ad hoc networks) and LPWANs. It is used in IoT applications for small packets of information. A common example is a laptop with a WWAN card for secure, fast connections.

The below figure illustrates the wireless connection to Wide Area Network.

several wireless devices

wireless WAN

rA

rB

The figure shows various wireless devices configured with WLAN, Router 1 (rA) and Router 2 (rB) connected via ethernet and WAN via DD-WRT wireless flashing.

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(Y) Wireless LAN:- is a local area network that uses radio communication to provide mi mobility to users while maintaing connectivity to the wired network. It is built by attaching an access point (AP) to the edge of the wired network and communicating with it using a wireless network adapters. WLAN offers high performance coverage within a campus or building and is affordable and can be set up in 24 hours.

WLAN transmits data over radio signals and the data is sent in the form of a packet. Each packet consists of layers, labels and instructions with unique MAC addresses assigned to endpoints. This enables routing data packets to correct locations.

Ans to the Qno - 3(a)

(1) <u>Implicit congestion signals:-</u>
There is no communication between the congested node or nodes and the source. The source guesses that there is a congestion somewhere in the networks from other symptoms. For example, when a source sends several packets and there is no acknowledgement for a while, one assumption is that the network is congested. The delay in receiving and acl acknowledgement is interpreted as conde congestion in the network; the source should slow down.

④ Transmission delay may increase with congestion.

④ Packet may be discarded.

④ Source can detect these as implicit indications of congestion.

④ Useful on connectionless (datagram) networks — eg IP based

④ Used in frame relay LAPF.

Ans to the Q no — 3(b)

④ The seven OSI model layers:-

The OSI model is split into seven abstraction layers: Physical, data link, network, transport, session, presention and application.

① Physical Layer:-

Layer 1 is the physical layer, converting raw unstructed data into electrical signals for devices, involving hardware like networks hubs, modems, adapters, cabling and controlling controllers like Bluetooth, Ethernet and USB.

② The Data Link:-

The data link layer manages data in fames, facilitating node-to-node transfer. It comprises two sublayers:

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Media Access Control (MAC) for node connections and Logic Link Control (LLC) for frame flow and synchronization. Protocols like PPP and MACsec can be applied.

③ The network layer:-

The network layers sends and receives data frames in packet using routers. It may split or fragment messages exceeding network packet sizes. The layers uses IP protocols to locate locations and specify message and recipient node address.

④ Transport layer:-

The transport layer optimizes data transmission by segmenting data and adjusting package size or rate. Protocol include TCP and UDP, tunneling protocols and five classes of connection-mode transport protocol.

⑤ Session layer:-

The session layer manages communication between computers, creating a "session" using protocol, and facilitating connection and authentication between clients or servers, including actions like logon, lookup, log off, and session termination.

⑥ Presentation layer:-

The presentation layer is responsible for data translation and formatting, handling encryption, decryption,

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compression and decompression. It transformation transforms data into a syntax that fits the application layer's constructs, such as XML or JSON for graphic display.

⑦ Application Layer:-

The application layer, the top layer of the OSI Model, is ~~closet onto~~ closest to end-users applications and interacts with them through high-level protocols like HTTP and FTP.

Ans to the Q.no- 3(c)

ⓐ Comparison between Analog and Digital signal:-

Definition:-

Analog:- A signal for conveying information which is a continuous function of time is known as analog signal.

Digital:- A signal which is a discrete function of time, i.e. non-continuous signal is known as digital signal.

Typical representation:-

Analog:- An analog signal is typically represented by a sine wave function. There are many ~~are~~ more

representations for the analog signals also.

Digital:- The typical representation of a signal is given by a square wave function.

Signal values:-

Analog:- Analog signals use a continious range of values to represent the data and information.

Digital:- Digital signals utilize discrete values, specifically 0 and 1, to represent data and information.

Signal bandwith:-

Analog:- The bandwith of an analog signal is low.

Digital:- The bandwith of a digital signal is relatively high.

Suitability:-

Analog:- Analog signals are ideal for transmitting audio, video and other information through communication channels.

Digital:- Digital signals are ideal for computing and digital electronic operations like data storage.

Example:-

Analog:- Temperature, current voltage, voice, pressure, speed, etc.

Dft. <u>Digital</u>:- Data stored in a computer memory.

<u>Application</u>:-

<u>Analog</u>:- Used in land line phones, thermometers, electric fan, volume knob of a radio etc.

<u>Digital</u>:- Used in computers, keyboards, digital watches, smartphones, etc.

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