



## Computer 11

### Unit 3: Data Communication

#### Short Questions + Long Questions

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**Long Question No. 1: Define Data Communication. Explain components of Data communication.**

**Q1: Define Data communication.**

Data Communications is the exchange of data between two devices through some form of transmission media such as wire cable.

**Q2: Write names of different elements/Components of data communication system.**

The basic components of data communication system are: 1. Message 2. Sender 3. Receiver 4. Medium 5. Encoder/Decoder.

**Q3: What is message?**

The message is the information or data that is to be communicated. It may be in the form of text, numbers pictures, sounds, videos or any combination of these.

**Q4: What is sender? / Role of sender in data communication.**

Sender is a device that sends the data. It is also called transmitter/source. A sender may be computer, fax machine, telephone or camera etc.

**Q5: What is receiver? / Role of receiver in data communication.**

Receiver is a device that Receive the data. It is also called sink. A receiver may be computer, fax machine, telephone or TV etc.

**Q6: What is meant by Communication Medium/Chanel? / Transmission Medium/Chanel.**

The physical path through which data is transmitted from one location to another is called transmission medium. It is also called communication channel. It may be a wire. fiber optics, telephone line etc.

**Q7: What is Encoder/Decoder? / What is the Role of Encoder and decoder in communication? / Why do we need Encoder/ Decoder in data communication?**

An encoder is a device that converts digital signals into an analogue signal which can pass through transmission medium.

A decoder is a device that converts an analogue signal into digital data that is understandable for receiver.

**Long Question No. 2: Discuss signals in detail.**

**Q8: What are signals?**

The data is transmitted from one place to another in the form of electromagnetic or light waves through communication medium. The electromagnetic or light waves representing data are called signals. There are two forms of signals: Digital and analog.

**Q9: What are Analog Signals?**

The analog signals are continuous electrical signals in the form of waves. These waves are called carrier waves. The light waves, sound waves or radio waves are examples of analog signals.

**Q10: Define two characteristics of analog signals?**

Following are the two basic characteristics of analog signals:

**Frequency:** The number of times a wave repeats during a specific time interval is called frequency. It is measured in Hertz (Hz).

**Amplitude:** The height of a wave within a given period of time is called Amplitude.

**Q11: What are digital signals??**

A digital signal is a sequence of voltage represented in binary form. Actually, digital signals are on- off electrical pulses in discontinuous form (or in discrete form). Most of the computers are digital. Data is represented inside these computers in the form of binary numbers.



Analog Signal



Digital Signal

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**Long Question No. 3: Describe different types of data.**

**Q12: What is text data?**

**Text:** The text consists of words, sentences and paragraphs. Text processing refers to the ability to manipulate words, lines and pages.

**Q13: What is Numeric?**

**Numeric:** Numeric data consist of digits from 0 to 9. +(positive) or — (negatives) sign and a decimal point It can be integer type or real type data.

**Q14: What is Image data?**

**Image:** This type of data includes chart, graph, pictures and freehand drawing, The information in this form is more comprehensive.

**Q15: What is Audio data?**

**Audio:** Sound is a representation of audio. It is converted into digital code by sampling the sound waves 44,056 times per second and converting each sample into a 16-bit number.

**Q15: What is Video data?**

**Video:** Video can be produced either as a continuous entity (by a camera), or it can be a combination of images, each a discrete entity, arranged to convey the idea of motion. Video creates action and movements.

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**How is data represented in computer memory?**

Computer works with binary numbers, binary means two digits. These are 0 and 1. An electrical pulse inside the computer represents each number. 1 is represented by a pulse of electrical inside the computer and 0 by an absence of a pulse.

**Long Question No. 4: What is meant by encoding of data? Explain different encoding schemes**

**Q16: What is encoding of data? Why do we need it?**

A computer works with data in binary form. Therefore, all data (numeric or non-numeric) must be converted into binary form before entering inside the computer. The process of converting data into binary form is called encoding of data.

**Q17: What is BCD code?**

BCD Code stands for Binary Coded Decimal. It is a 4-bit code representing decimal numbers (0-9). Early computers processed BCD but were slower and more complicated compared to modern computers. It was limited to numerical representation and less efficient for handling alphanumeric data.

**Q18: What is EBCDIC Code?**

EBCDIC Code stands for Extended Binary Coded Decimal Interchange Code. It is 8-bit code primarily used by IBM. It was used for efficient data transfer between hosts using EBCDIC internally.

**Q19: What is ASCII Code?**

ASCII Code stands for American Standard Code for Information Interchange. It is 7-bit code, making 128-character combinations, where an 8-bit can make 256 combinations. It was developed by ANSI for handling alphanumeric data.

**Q20: What is Unicode?**

Unicode stands for Universal Code. It is 16-bit code, supporting up to 65,536 symbols. It has replaced ASCII in many applications. It supports a comprehensive set of symbols, including mathematical and technical symbols.

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**Long Question No. 5: What are the Modes of Data Communication?**

**Q21: What are the Modes of Data Communication?**

The way in which data is transmitted from one place to another is called data transmission mode. It is also called the data communication mode. It indicates the direction of flow of information.

**Q22: What is Simplex Mode?**

In simplex mode, data is transmitted only in one direction. A device with simplex mode can either send or receive data. Television broadcast is an **example** of simplex mode.

**Q23: What is Half Duplex Mode?**

In half duplex mode, data can be transmitted in both directions but only in one direction at a time. Speed of half-duplex is slow. Internet surfing is an **example** of half duplex transmission.

**Q24: What is Full Duplex Mode?**

In full duplex mode, data can be transmitted in both directions at the same time on the same channel. It is the fastest directional mode of communication. The telephone communication system is an **example** of full duplex communication Mode.

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**Long Question No. 6: Discuss different types of Data Transmission.**

**Q25: What is Parallel Transmission?**

Parallel Transmission is concurrent flow of bits of data through separate communications lines. Inside a computer, data is transferred in parallel mode. **Example:** This method is often used between a computer and a printer, especially when they are close to each other.

**Q26: What is Serial data transmission?**

Serial data transmission sends bits of information one after the other along a single communication path, similar to cars on a one-lane street. **Example:** It's commonly used for data sent over telephone lines. Serial transmission is slower because it sends data sequentially, bit by bit.

**Q27: Define Asynchronous transmission?**

Asynchronous transmission is a communication method that relies on flow control rather than a clock to synchronize data between the source and destination. In this transmission one byte (single character) is sent at a time. **Example:** Keyboard-to-computer transmission.

Start 0	Character A = 1000001	Stop 1
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**Q28: Define Synchronous transmission?**

Synchronous transmission is a type of communication that utilizes a clock to control the timing of bits being sent. It allows the transmission of large volumes of information at a single time.

Start	Message	Error Check bit	Stop
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**Q29: What is bandwidth?**

Each type of communication media has different transmission speed. The Bandwidth is a measure of the transmission rate of communications channel.

**Q30: What is Baseband?**

Digital signals are commonly called base signals. Baseband is a communications technique in which digital signals are directly transmitted over transmission line without changing into analog signals (without modulation). Its suitable for short distance. **Example:** Token ring and Ethernet use baseband signals.

**Q31: What is Broadband?**

Broadband is another communication technique in which large amount of data (such as voice and video) is transmitted over long distance at the same time. The data is sent by modulation each signal onto different frequency. For this purpose, FDM (Frequency Division Multiplexing) technique is used, in which multiple signals can be transmitted at the same time.

**Q32: What is communication Media?**

A path through which data is transmitted from one place to another is known as communication media. It is also known as communication channel. Following are **examples** of communication media: Twisted pair wires, Fiber optic and Microwave.

**Long Question No. 7: Explain Guided Media in detail.**

**Q33: What is Guided Media??**

In guided communication media, communication devices are directly linked with each other via cables or physical path for transmission of data. The data signals are bounded to a cabling media. Therefore, guided media is also called bounded media.

**Q34: Write a short on twisted pair cable.**

Twisted pair cable is widely used for communication in LANs for computer data and in phone lines for voice data. Wires are twisted to reduce interference from other pairs in the cable. Its bandwidth is limited compared to coaxial cables and fiber optics.

**Q35: Write a short on Coaxial cable.**

Coaxial cables are used for high-frequency transmission in telephone lines and LANs. They can handle 80 times more transmissions than twisted pair cables. Coaxial cables are sturdy and often used for underwater lines. They have low distortion, less interference, and low error rates.

**Q36: Write a short on Fiber optic cable.**

Fiber optic cables use light to transmit data at very high speeds. They consist of thin glass fibers that can carry information at frequencies beyond visible light. A typical fiber optic cable has a core, cladding, and protective jacket.

**Advantages:** Fiber optics offer high transmission capacity, security, reliability, and cost-effectiveness compared to copper and coaxial cables.

**Long Question No. 8: Explain Unguided Communication Media in detail.**

**Q37: What is meant by unguided communication media ?**

In unguided communication media, data is communicated between devices in the form of wave. Unguided media provides mean to transmit data signals but does not guide them along a specific path. The data signals are not bounded to a cabling media. Therefore, unguided media is also called unbounded media.

**Q38: What is Microwave transmission ?**

Microwave transmission uses high-frequency radio waves to transmit data through the air in straight lines. It's typically used for communication within a specific city or community, and for longer distances, high-altitude antennas are used to send data between locations.

**Q39: What is satellite /satellite communication ?**

Satellites are used to transfer microwave messages between locations. Satellite Communication involve sending signals from Earth stations to satellites and receiving them back on Earth.

**Example:** Satellite communications support various transmissions, including calls, TV channels and Internet.

**Q40: What is satellite delay / Uplink and Downlink?**

**Satellite delay**, also known as satellite latency, refers to the time it takes for a signal to travel from Sending Earth station to a satellite (**Uplink**) and then back down to a receiving Earth Station (**Downlink**).

**Q41: What is mobile communication?**

Mobile communication is a radio-based network that transmits data to and from the mobile computers. The data is communicated through radio signals from one location to another. The computers can be connected to the network through wireless connections or through wires.

**Example:** Cellular communication.

**Long Question No. 9: What is the purpose of Modem? Explain different types of modems.**

**Q42: What is Modem/ Modulation Demodulation?**

Modem is a device that performs modulation and demodulation. **Modulation** is the process of converting digital signals into analog signals. **Demodulation** is the process of converting analog signals into digital signals.

**Q43: What do you know about Wireless Modem?**

Wireless modem transmits the data signals through air instead of using a cable. Wireless modem is called radio frequency modem. This type of modem is designed to work with cellular technology, and wireless local area networks.

**Q44: Explain external modem?**

External modem is attached to the system unit as an external device through telephone line. This modem is connected to computer using serial cable to COM1 or COM2 port. It requires external power supply. It is easy to setup.

**Q45: Explain internal modem?**

Internal modem is a circuit board that is inserted into an expansion slot on the motherboard. It cannot be moved from one computer to another easily. It is difficult to setup than other types of modems.

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