BCSE2370 –Data Communication and Networking

Question Bank

Unit-1 Introduction Concepts

2marks Questions with Answers

1. Define Data communication.

   Data communication is the exchange of data between two or more devices via some form of transmission medium. It is nothing but the transportation of information from one point to another through a communication media.

2. What is a network?

A network is a collection of computers which are connected together. It allows computers to communicate with each other and share resources and information.

3. List the Seven layers of the OSI Model

1. Application Layer
2. Presentation Layer
3. Session Layer
4. Transport Layer
5. Network Layer
6. Data Link Layer
7. Physical Layer

4. What do you meant by an unguided media?

Unguided media transport electromagnetic waves, without using a physical conductor. Signals are broadcast through air. No physical medium is necessary.

5. Define Packet switching.

In packet switching data are transmitted in discrete units of variable length blocks. Longer transmissions are broken into multiple packets. Packets are sent over the network node to node.

6. What is the goal of ISDN?

ISDN incorporates all communication connections in a home or building into a single interface. ISDN integrates customer services with the IDN. ISDN allows all communication connections occur via a single interface.

7. List the various unguided media used for transmission?

Radio wave transmission
Microwave transmission
Satellite transmission
Cellular telephony

8. What is circuit switching?

Circuit switching creates a direct physical connection between two devices such as phones or computers. Instead of point to point connection between devices here it reduces the number of links using some switching technology.

9. What is analog data communication?

Analog data communication is the transmission of data in a continuous wave form or these signals are continuous in nature.

10. Define bridge.

Bridges can divide a large network into smaller segments. Bridges contain logic that allows them to keep the traffic for each segment separate. It operates in both the physical and data link layers of the OSI model.

11. What do you meant by ring topology?

In ring topology a signal is passed along the ring in one direction from device to device, until it reaches its destination. Ring topology has a dedicated point-to-point line Configuration type.

12. What is LAN?

Local Area Networks is two or more components directly linked within a small, well defined area such as a room, office, building or a campus.

13. List the various guided media used for transmission.

Twisted pair cable
Shielded twisted pair
Unshielded twisted pair
Co-axial cables
Fiber optic cables

14. List any four applications of networks.

Marketing and sales
Financial services
Manufacturing (CAD/CAM)
Electronic messaging

Information services
Teleconferencing
Cellular telephone
Cable television

15. What are the main components of data communication?

Data source, data sinks, communication media, message and protocols.

16. What is a protocol?

A protocol is a set of rules that govern data communication. Without a protocol a communication between devices will not occur.

17. What are the types of topology?

Bus topology, Ring topology, Star topology, Mesh topology, Tree topology

18.What are the types of Network?

Local Area Network (LAN),
Metropolitan Area Network (MAN),
Wide Area Network (WAN)

19. What is Aperiodic Signal and periodic Signal?

Aperiodic signal: A signal which does not repeat itself after a specific interval of time is called aperiodic signal.

Periodic signal: A signal that repeats its pattern over a period is called a periodic signal.

Important Questions - 8 Marks

1. Explain in detail about transmission media,
2. Discuss about OSI reference model.
3. Explain TCP/IP protocol suite.

UNIT-2 Digital to Analog Transmission

2marks Questions with Answers

1**.** What is Modulation?

Modulation is the process of converting data into radio waves by adding information to an electronic or optical carrier signal. It is usually applied to electromagnetic signals: radio waves, lasers/optics, and computer networks.

2. What are different types of Modulation?

There are 3 basic types of modulation:

- **Amplitude modulation:** Amplitude modulation is a modulation technique used in electronic communication, most commonly for transmitting information via a radio carrier wave..
- **Frequency modulation:** Frequency modulation is the encoding of information in a carrier wave by varying the instantaneous frequency of the wave.
- **Phase modulation:** Phase modulation is a modulation pattern for conditioning communication signals for transmission. It encodes a message signal as variations in the instantaneous phase of a carrier wave. Phase modulation is one of the two principal forms of angle modulation, together with frequency modulation.

3. Enlist some advantages of Modulation?

Some of the advantages of implementing modulation in communication systems are

- Reduction of antenna size.
- No signal mixing.
- Increased communication range.
- Multiplexing of signals.
- Possibility of bandwidth adjustments.
- Improved reception quality.

4. what is Square Law Modulator?

Square law modulators are used for Amplitude Modulation. They have non-linear current-voltage characteristics. Square law modulators are highly nonlinear in low voltage region.

5. What is Demodulator?

A **demodulator** is an electronic circuit (or computer program in a software-defined radio) that is used to recover the information content from the modulated carrier wave.

6. What are Transmitters?

A **transmitter** is an electronic device used in telecommunications to produce radio waves in order to transmit or send data with the aid of an antenna. A transmitter is also known as a radio transmitter.

7. What are communications receivers?

A **communications receiver** is a type of radio receiver used as a component of a radio communication link. This is in contrast to a broadcast receiver which is used to receive radio broadcasts.

8. What is Sampling?

Sampling is considered a set of values used for functions that vary in specific time and space. In analog communication, the process of converting continuous-time signals into a sequence of discrete-time signals is known as Sampling. A certain set of data is continuously sampled in the sampling process.

9. What are the types of FM demodulation?

- Slope Detector.
- Foster-Seeley Discriminator.
- Ratio Detector.
- Pulse-Averaging Discriminators.
- Quadrature Detectors.
- Phase-Locked Loops.

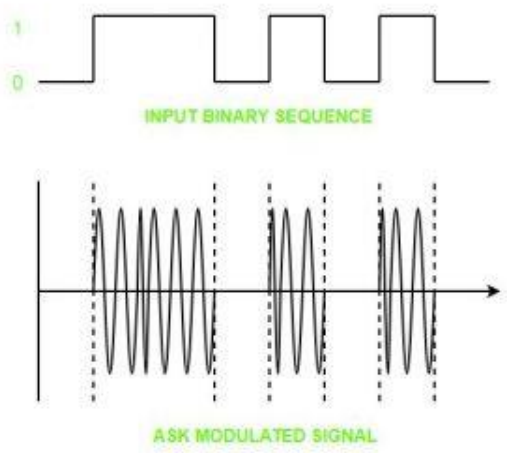
10. What is DAC?

A **DAC (Digital-to-Analog Converter)** is a device that converts digital audio information (comprised of a series of 0s and 1s) into an analog audio signal that can be sent to a headphone amp. In most cases, you cannot connect a headphone directly into a DAC.

11. Write short notes on ASK,FSK and PSK.

1. Amplitude Shift keying – Amplitude Shift Keying is a technique in which carrier signal is analog and data to be modulated is digital. The amplitude of analog carrier signal is modified to reflect binary data.

The binary signal when modulated gives a zero value when the binary data represents 0 while gives the carrier output when data is 1. The frequency and phase of the carrier signal remain constant.



Advantages of amplitude shift Keying –

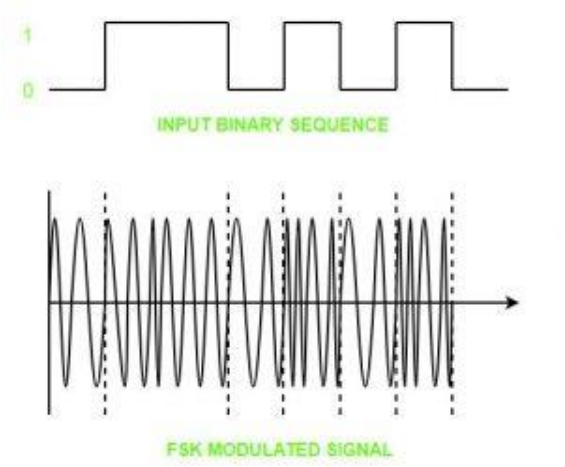
- It can be used to transmit digital data over optical fiber.
- The receiver and transmitter have a simple design which also makes it comparatively inexpensive.
- It uses lesser bandwidth as compared to FSK thus it offers high bandwidth efficiency.

Disadvantages of amplitude shift Keying –

- It is susceptible to noise interference and entire transmissions could be lost due to this.
- It has lower power efficiency.

2. Frequency Shift keying – In this modulation the frequency of analog carrier signal is modified to reflect binary data.

The output of a frequency shift keying modulated wave is high in frequency for a binary high input and is low in frequency for a binary low input. The amplitude and phase of the carrier



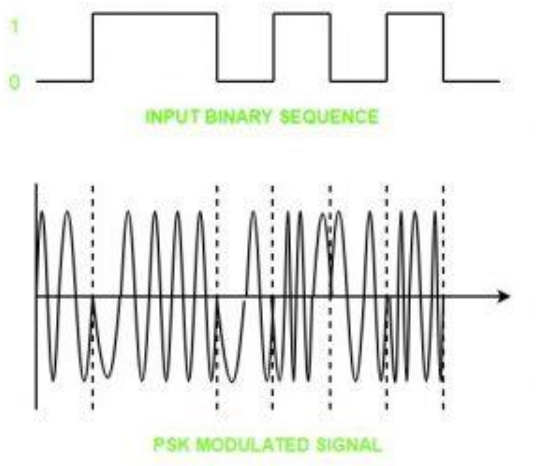
Advantages of frequency shift Keying –

- Frequency shift keying modulated signal can help avoid the noise problems beset by ASK.
- It has lower chances of an error.
- It provides high signal to noise ratio.
- The transmitter and receiver implementations are simple for low data rate application.

Disadvantages of frequency shift Keying –

- It uses larger bandwidth as compared to ASK thus it offers less bandwidth efficiency.
- It has lower power efficiency.

3. Phase Shift keying – In this modulation the phase of the analog carrier signal is modified to reflect binary data.The amplitude and frequency of the carrier signal remains constant.



It is further categorized as follows:

1. **Binary Phase Shift Keying (BPSK):**
   BPSK also known as phase reversal keying or 2PSK is the simplest form of phase shift keying. The Phase of the carrier wave is changed according to the two binary inputs. In Binary Phase shift keying, difference of 180 phase shift is used between binary 1 and binary 0.

   This is regarded as the most robust digital modulation technique and is used for long distance wireless communication.

2. **Quadrature phase shift keying:**
   This technique is used to increase the bit rate i.e we can code two bits onto one single element. It uses four phases to encode two bits per symbol. QPSK uses phase shifts of multiples of 90 degrees.

   It has double data rate carrying capacity compare to BPSK as two bits are mapped on each constellation points.

Advantages of phase shift Keying –

- It is a more power efficient modulation technique as compared to ASK and FSK.
- It has lower chances of an error.
- It allows data to be carried along a communication signal much more efficiently as compared to FSK.

Disadvantages of phase shift Keying –

- It offers low bandwidth efficiency.

- The detection and recovery algorithms of binary data is very complex.
- It is a non coherent reference signal.

12. what is PCM?

The most common technique to change an analog signal to digital data is called pulse code modulation (PCM). A PCM encoder has the following three processes:

a. Sampling
b. Quantization
c. Encoding

13. What is sampling?

Sampling – The first step in PCM is sampling. Sampling is a process of measuring the amplitude of a continuous-time signal at discrete instants, converting the continuous signal into a discrete signal.

14. State Nyquist Theorem.

One important consideration is the sampling rate or frequency. According to the Nyquist theorem, the sampling rate must be at least 2 times the highest frequency contained in the signal. It is also known as the minimum sampling rate and given by:
Fs =2*fh

Important Questions-8 Marks

1. Explain about Digital to Analog conversion

2. Illustrate about Analog to Digital conversion

3. Describe about the following terms.

a. Pulse code modulation

b. Delta modulation

c. ASK, FSK and PSK