UNIT III

BASEBAND TRANSMISSION

1. What is inter symbol interference in baseband binary PAM systems?

In baseband binary PAM, symbols are transmitted one after another. These symbols are separated by sufficient time durations. The transmitter, channel and receiver acts as a filter to this baseband data. Because of the filtering characteristics, transmitted PAM pulses are spread in time.

2. What are eye pattern?

Eye pattern is used to study the effect of ISI in baseband transmission.

1. Width of eye opening defines the interval over which the received wave can be sampled without error from ISI.

2. The sensitivity of the system to timing error is determined by the rate of closure of the eye as the sampling time is varied.

3. Height of the eye opening at sampling time is called margin over noise.

3. How is eye pattern obtained on the CRO?

Eye pattern can be obtained on CRO by applying the signal to one of the input channels and given an external trigger of $1/T_b$ Hz. This makes one sweep of beam equal to T_b seconds.

4. What is correlative coding?

Correlative level coding is used to transmit a baseband signal with the signaling rate of 2Bo over the channel of bandwidth Bo. This is made physically possible by allowing ISI in the transmitted in controlled manner. This ISI is known to receiver. The correlative coding is implemented by duo binary signaling and modified duo binary signaling.

5. Define Duo binary baseband PAM system.

Duo binary encoding reduces the maximum frequency of the baseband signal. The word duo means to double the transmission capacity of the binary system. Let the PAM signal ak represents k^{th} bit. Then the encoder the new waveform as

$$C_k = a_k + a_{k-1}$$

Thus two successive bits are added to get encoded value of the kth bit. Hence Ck becomes a correlated signal even though a_k is not correlated. This introduces intersymbol interference in the controlled manner to reduce the bandwidth.

6. What are the three broad types of synchronization?

1. Carrier synchronization
2. Symbol & Bit synchronization
3. Frame synchronization.

7. What is carrier synchronization?

The carrier synchronization is required in coherent detection methods to generate a coherent reference at the receiver. In this method the data bearing signal is modulated on the carrier in such a way that the power spectrum of the modulated carrier signal contains a discrete component at the carrier frequency.

8. What are the two methods for carrier synchronization?

1. Carrier synchronization using Mth Power loop
2. Costas loop for carrier synchronization

9. What it is called symbol or bit synchronization?

In a matched filter or correlation receiver, the incoming signal is sampled at the end of one bit or symbol duration. Therefore the receiver has to know the instants of time at which a symbol or bit is transmitted. That is the instants at which a particular bit or symbol status and when it is ended. The estimation of these times of bit or symbol is called symbol or bit synchronization.

10. What are the two methods used in bit and symbol synchronization?

1) Closed loop bit synchronization
2) Early late gate synchronizer

11. What are the disadvantages of closed loop bit synchronization?

1) If there is a long string of 1's and 0's then y (t) has no zero crossings and synchronization may be lost.

2) If zero crossing of y(t) are not placed at integer multiples of Tb, the synchronization suffers from timing Jitter.

12. What it is called frame synchronization?

Depending on bits used for encoding, the word length is defined. Thus each word container some fixed number of bits. The receiver has to know when a particular frame status and when its individual message bits status. This type of synchronization is called frame synchronization.

13. Why synchronization is required?

The signals from various sources are transmitted on the single channel by multiplexing. This requires synchronization between transmitter and receiver. Special synchronization bits are added in the transmitted signal for the purpose. Synchronization is also required for detectors to recover the digital data properly from the modulated signal.

14. Why do you need adaptive equalization in a switched telephone network?

In switched telephone network the distortion depends upon

1. Transmission characteristics of individual links.

2. Number of links in connection.

Hence fixed pair of transmit and receive filters will not serve the equalization problem. The transmission characteristics keep on changing. Therefore adaptive equalization is used.

15. Define the principle of adaptive equalization. (Dec-08)

The filters adapt themselves to the dispersive effects of the channel that is .the coefficients of the filters are changed continuously according to the received data. The filter coefficients are changed in

such a way that the distortion in the data is reduced

16. Define duo binary encoding.

Duo binary encoding reduces the maximum frequency of the base band signal the "word duo" means to the double transmission capacity of the binary system

17. Write a note on correlative level coding.

Correlative level coding allows the signal scaling rate of 2Bo in the channel of bandwidth Bo. This is made physically possible by allowing ISI in the transmitted signal in controlled manner this ISI is known to the receiver.

18. Define the term ISI. (Dec-10)

The presence of outputs due to other bits interference with the output of required bit .This effect is called inter symbol interference (ISI)

19. Write the performance of data transmission system using eye pattern technique.

The width of the eye opening defines the interval over which the received wave can be sampled without error from inter symbol interference. The sensitivity of the system to timing error is determined by the rate of closure of the eye as the sampling time is varied

20. What is the necessity of equalization?

When the signal is passed through the channel distortion is introduced in terms of

1) Amplitude

2) Delay this distortion creates problem of ISI. The detection of the signal also becomes difficult this distraction can be compensated with the help of equalizer.

21. What is matched filter? (May-09)

The matched filter is a baseband signal receiver, which works in presence of white Gaussian noise. The impulse response of the matched filter is matched to the shape of the input signal.

22. Why do we need equalization in base band transmission? (May-07, Dec-08)

When the signal is passed through the channel, distortion is introduced in

terms of i) Amplitude. Ii) Delay.

This distortion creates of ISI.The detection of the signal also becomes difficult. This distortion can be

compensated with the help of equalizers. Equalizers are basically filters which connect the channel distortion.

23. List the primary causes for the noise in communication system. (DEC-11)

    i) Band limited nature of the channel.

    ii) Environmental effects such as lighting, humidity, temperature etc.

    iii) EMI and RFI

    iv) Thermal noise due to electronic components.

24. Define modulation rate.

It is defined as the rate at which signal level is changed depending On the nature of the

format used to represent the digital data. It is measured in Bauds or symbols per second.

25. State NRZ Unipolar format.

In this format binary 0 is represent by no pulse and binary 1 is represented by the positive pulse.

26. State NRZ polar format.

Binary 1 is represented by a positive pulse and binary 0 is represented by a Negative pulse.

27. State NRZ bipolar format.

Binary 0 is represented$_{www}$bynopulse$_{.studentsfocus}$andbinaryoneisrepreentedbythealternative$_{.com}$psitiveand negative pulse.

28. State Manchester format.

Binary 0 Æ The first half bit duration negative pulse and the second half Bit duration positive pulse. Binary 1Æ first half bit duration positive pulse and the second half Bit duration negative pulse