applied must conform to the raised cosine shape. In many communications systems, the designer places one-half of the filter function at each end of the communication channel. When this is done, the filter response at each end is the square root of the complete filtering function, so the filter used on each end is often described as a root raised cosine filter. Note that the filters at the transmit and receive ends must be matched to each other and collectively are often referred to as matched filters.

Two Marks

1.What is meant by DPSK?

In DPSK, the input sequence is modified. Let input sequence be d(t) and output Sequence be b(t). Sequence b(t) changes level at the beginning of each interval in which d(t)=1 and it does not changes level when d(t)=0.

2.What is Signal constellation diagram?

Suppose that in each time slot of duration T seconds, one s2(t), . . (t) is transmitted with equal probability, 1/M For geometric representation, the signal si (t), = 1, 2, ..., M, is applied to a bank of correlators. The correlator outputs define the signal vector si. The set of message points corresponding to the set of transmitted signals {si(t))} i=1..M is called a signal constellation.

3.What is the purpose of using an eye pattern?

Eye pattern can be used for :
i) To determine an interval over which the received wave can be sampled without error due to ISI.
ii) To determine the sensitivity of the system to timing error.
iii) The margin over the noise is determined from eye pattern.

4.Why do you need adaptive equalization in a switched telephone network.
In switched telephone network the distortion depends upon
i) Transmission characteristics of individual links.
ii) 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

5.How does pulse shaping reduce inter symbol interference?

• The shape of the pulse is selected such that at the instant of detection, the interference due to all other symbols is zero.
• The effect of ISI is totally eliminates if signal is sampled at $T_b, 2T_b, 3T_b, \ldots..$ and so on.

6.Why do we need equalization in base band pulse transmission?

When the signal is passed through the channel, distortion is introduced in terms of (i) amplitude and (ii) delay. This distortion creates the problems 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 correct the channel distortion

7.Define error probability.

• Error probability is defined as the number of bits or symbols that are detected wrongly in a given number of total bits or symbols.
• For example error probability of 10^{-4} indicates that 1 bit will be detected wrongly in 10,000 bits. Here $\frac{1}{10^{-4}} = 10,000$.
• Error probability is the important measure to evaluate performance of receivers.

8.From the eye pattern, how is the best time for sampling determined?

It is preferable to sample the instant at which eye is open widest. At this instant, the chances of error are minimum

9.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 giving an external trigger of $\frac{1}{T_b} Hz$. This makes one sweep of beam equal to $'T_b'$ seconds.

10. **What are eye patterns?**
Eye pattern is used to study the effect of ISI in baseband transmission.

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

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

iii) Height of the eye opening at sampling time is called margin over noise

11. What is meant by a matched filter?

The shape of the impulse response of the matched filter is similar (or matched) to the shape of the input signal $x(t)$. Hence it is called matched filter.

12. What are the necessity of adaptive equalization?

Most of the channels are made up of individual links in switched telephone network,the distortion induced depends upon
1) transmission characteristics of individual links
2) number of links in connection

13. Explain coherent detection?

In coherent detection, the local carrier generated at the receiver is phase locked with the carrier at the transmitter. The detection is done by correlating received noisy signal and locally generated carrier. The coherent detection is a synchronous detection.

14. What is raised cosine spectrum?

In the raised cosine spectrum, the frequency response P(f) decreases towards zero gradually That is there is no abrupt transition.

15. Define the term ISI?

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