CHAPTER 5 : Analog Transmission

Solutions to Review Questions

Review Questions

1.

a. ASK changes the ***amplitude*** of the carrier.
b. FSK changes the ***frequency*** of the carrier.
c. PSK changes the ***phase*** of the carrier.
d. QAM changes both the ***amplitude*** and the ***phase*** of the carrier.

2. Normally, ***analog transmission*** refers to the transmission of analog signals using a band-pass channel. Baseband digital or analog signals are converted to a complex analog signal with a range of frequencies suitable for the channel.

3. We can say that the most susceptible technique is ***ASK*** because the amplitude is more affected by noise than the phase or frequency.

4. The process of changing one of the characteristics of an analog signal based on the information in digital data is called ***digital-to-analog conversion***. It is also called modulation of a digital signal. The baseband digital signal representing the digital data modulates the carrier to create a broadband analog signal.

5. The two components of a signal are called ***I*** and ***Q***. The I component, called inphase, is shown on the horizontal axis; the Q component, called quadrature, is shown on the vertical axis.

6. A ***constellation diagram*** can help us define the amplitude and phase of a signal element, particularly when we are using two carriers. The diagram is useful when we are dealing with multilevel ASK, PSK, or QAM. In a constellation diagram, a signal element type is represented as a dot. The bit or combination of bits it can carry is often written next to it.The diagram has two axes. The horizontal *X* axis is related to the in-phase carrier; the vertical *Y* axis is related to the quadrature carrier.

7. We can say that the most susceptible technique is ***AM*** because the amplitude is more affected by noise than the phase or frequency.

8. A ***carrier*** is a single-frequency signal that has one of its characteristics (amplitude, frequency, or phase) changed to represent the baseband signal.

9. The process of changing one of the characteristics of an analog signal to represent the instantaneous amplitude of a baseband signal is called ***analog-to-analog con2 version***. It is also called the *modulation* of an analog signal; the baseband analog signal modulates the carrier to create a broadband analog signal.

10.
    a. AM changes the ***amplitude*** of the carrier
    b. FM changes the ***frequency*** of the carrier
    c. PM changes the ***phase*** of the carrier

Exercises

11. We calculate the number of channels, not the number of coexisting stations.

    a. n = (1700 - 530) KHz / 10 KHz = **117**
    b. n = (108 - 88) MHz / 200 KHz = **100**