Tutorial 4

Question 1

A digital transmission system has a bit rate of 5 Gbps. What kind of communication channel can support digital transmission at such rate? How many digitized telephone voice calls can be carried by the system?

Question 2

A system generates pulses periodically at an interval of 50 μsec. The pulse signal is sampled at the Nyquist rate and quantized to 16 levels. What is the bit rate of the system?

Question 3

Suppose that a low-pass communication system has the bandwidth of 1.5 MHz with 16-level signaling.

(a) Can the pulse signal be transmitted reliably through the channel with the SNR of 20 dB? Why?
(b) Can the pulse signal be transmitted reliably through the channel with the SNR of 30 dB? Why?

Question 4

Consider a baseband transmission channel with a bandwidth of 10 MHz.

(a) What bit rate can be supported by the bipolar line code?
(b) What bit rate can be supported by the Manchester line code?