

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

T3 EXAMINATION – MAY 2019

B.Tech [CSE], V Semester {One to One}

COURSE CODE: 10B11EC514

MAX. MARKS: 35

COURSE NAME: COMMUNICATION SYSTEMS

COURSE CREDITS: 04

MAX. TIME: 2.0 Hour

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

- Q1.** (a) Draw the basic block diagram of analog communication system. [1]
(b) Define modulation and explain the need of modulation. [2]
(c) What is the use of multiplexing? Explain the difference between TDM & FDM. [2]
- Q2.** (a) Define Sampling theorem. [1]
(b) Derive the expression of flat-top sampled signal in frequency domain. [3]
(c) Discuss the effect of under sampling. [1]
- Q3.** A binary data **10110010** has to be transmitted over the communication channel. Draw the resulting waveform for the following line coding: [5]
(i) BNRZ (ii) URZ (iii) BRZ (iv) UNRZ (v) Manchester
- Q4.** (a) Discuss the working of transmitter of binary frequency shift keying (BFSK). [2]
(b) In a frequency modulated system, a 7kHz modulating signal modulates 107.6MHz carrier wave so that the frequency deviation is 50kHz . Find [3]
(i) carrier swing in the FM signal and modulation index
(ii) the highest and lowest frequencies attained by the FM signal.
- Q5.** (a) Compute the channel capacity for a telephone line of bandwidth 3kHz at 30dB SNR. [2]
(b) Explain the working of Differential Pulse Code Modulation (DPCM) transmitter and receiver with the help of appropriate block diagrams. [3]
- Q6.** A compact disc (CD) records audio signals digitally by using PCM. Assume the audio signal bandwidth to be 15kHz . [5]
(i) If the Nyquist samples are quantized into $L = 65,536$ levels and then binary encoded, determine the number of binary digits required to encode a sample.
(ii) Determine the number of digits per sec. (bits/sec) required to encode the audio signal.
(iii) For practical reasons, the signals are sampled at a rate well above the Nyquist rate at $44,100$ samples/sec. If $L = 65,536$ then determine number of bits/sec required to encode the signal.
- Q7.** With the help of block diagram explain the working of Delta modulation. What are the drawbacks of Delta modulation. How Adaptive Delta modulator improves the performance of Delta modulator. [5]