JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2023

B.Tech-IV Semester (CSE/IT/ECE)

COURSE CODE(CREDITS): 18B11EC413 (3) MAX. MARKS: 35

COURSE NAME: Modern Analog and Digital Communication

COURSE INSTRUCTORS: Dr. Alok Kumar MAX. TIME: 2 Hours

Note: (a)*All questions are compulsory.*

(b)Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

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Q.1 Explain the working of PCM transmitter and receiver block diagram in detail. Design a digital communication system using PCM, having signal to quantization noise ratio $\geq$ 40dB for a signal $m(t) = 3\cos(2\pi * 500t)$. Also Find the Bandwidth of PCM signal. **[CO3] [2+2+1=5]**

Q.2 How Delta modulator can be used to convert analog signal to digital signal? What are the different errors may occur in this process. How we can overcome these errors? **[CO3] [2+2+1=5]**

Q.3 What is anti-aliasing filter? How we can reconstruct the signal from its samples? Explain the sampling procedure in detail with the help of suitable diagram. Find the Nyquist rate and Nyquist interval for the given signal x(t).

$x(t) = 0.5 * \mathrm{Sin}(3000\pi t) + 2 * \mathrm{Cos}(2000\pi t) + 4 * \mathrm{Cos}(500\pi t)$

[CO2,CO3] [1+1+2+1=5]

Q.4 Explain the working of Frequency Shift Keying (FSK) modulator and demodulator with the help of suitable diagrams and waveforms. **[CO3] [2+2=4]**

Q.5 What is the use of each block in digital communication system? What are the merits and demerits of digital communication over analogue communication? **[CO2, CO3] [4]**

Q.6 Consider a binary data sequence 0100101. Draw the waveform for the following signaling line codes formats. (a) AMI (B) Bipolar RZ (c) Split-phase Manchester (d) Unipolar NRZ **[CO3] [4]**

Q.7 How asynchronous demodulation is different from synchronous demodulation? Explain the synchronous demodulation technique for the SSB-SC demodulation.

[CO1, CO2] [4]

Q.8 Write Short notes on **[CO4, CO5] [4]**

a. Matched Filter
b. ISI