National Institute of Technology, Hamirpur (H.P.)

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B. Tech. (8th Sem.) Electrical Engineering

End Sem Theory Examination (May 2023)

4/5/2023

EE-422

Subject: Communication Systems

Time: 3hrs

Maximum Marks 50

Q.1 Define communication system? Draw the block diagram of a typical communication system. Explain the role of each block. Also describe the sources of information.

(10)

Q.2 (a) Design commercial FM transmitter using Armstrong method for the given specifications: Carrier frequency = 91.2 MHz, frequency deviation Δf = 75 kHz, audio signal bandwidth W = 15kHz Draw the block diagram for the designed transmitter using indirect method for generation of Wide Band Frequency Modulated signal.

(b) Draw the block diagram of Tuned Radio-Frequency (TRF) and Superhetrodyne receiver. Also explain the main requirements from a good receiver, role of image frequencies, and justify why named superheterodyne.

(5+5=10)

Q.3 (a) (i) It is known that sampling theorem is applicable for strictly band limited signals. In practice, however an information bearing signal is not strictly band limited and has effect of aliasing when sampled. What are the corrective measures to reduce such effects.

(ii) A 1.0 KHz signal is flat top sampled at the rate of 1800 samples/sec and the samples are applied to an ideal rectangular LPF with cut-off frequency of 1100 Hz. Find which components of frequency will appear in the output of the filter.

(iii) The peak to peak input to an 8 bit PCM coder is 2 volts. Compute the signal to quantization noise power ratio (SQNR) (in dB) for an input of $0.5\cos\omega_m t$.

(b) What are the advantages of Pulse Position Modulation (PPM) over Pulse With Modulation (PWM). Explain PPM scheme. Also with diagram the method of generation of PPM signal

(6+5=11)

Q.4 (a) What are the basic elements of a Pulse-Code Modulation (PCM) system. Explain with block diagram. Briefly discuss regenerative repeater process

(b) Draw any *four* Base-band signaling scheme for transmitting PCM **11001101** binary information. Also draw the Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK) and Phase Shift Keying (PSK) of signaling **11001101** binary information.

(5+5=10)

Q.5 Write short notes on **any *three*** of the following:-

(a) Satellite communication

(b) Mobile communication

(c) Computer communication

(d) What do you mean by multiplexing? Draw the block diagram for both TDM and FDM in communication system.

(e) Explain the basic principle of Delta Modulation (DM). Draw block diagram of its transmitter and receiver. Also explain the quantization errors in DM scheme.

(3×3=9)

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