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328554(28)

B. E. (Fifth Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(Et & T Branch)

DIGITAL COMMUNICATION

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) is compulsory from each question & carries 2 marks. Attempt any two parts of part (b), (c) and (d) of each question & carrying 7 marks.*

Unit-I

1. (a) What happen when an analog information signal is sampled at less than the Nyquist rate? 2

(b) What is the necessity of non-uniform quantization? Explain companding. 7

(c) Explain typical PWM system. How PWM signal converted to PPM signals? 7

(d) Describe the working of 24 channel digital multiplexers used in T-carrier system. Compute the bandwidth at each output stage of the system. 7

Unit-II

2. (a) List two unique features offered by delta modulation. 2

(b) Derive an expression for signal to noise ratio in PCM. 7

(c) A Delta modulation system is designed to operate at 5 times the Nyquist rate for a signal with 3 kHz bandwidth. Determine the maximum amplitude of a 2 kHz input signal (sinusoidal) for which the delta modulator does not have the slope overload condition. Quantization step size is 250 mV. Derive the formula that you use. 7

(d) Explain the working of CVSD modulator with the help of functional block diagram. 7

Unit-III

3. (a) The binary sequence 10101010101010 is transmitted over a baseband channel. Draw the waveform for the transmitted data using unipolar NRZ line encoding format. 2

(b) List out and explain the various properties of line code. 7

(c) Derive an expression for error probability of polar signal. 7

(d) What is ISI? Describe the Nyquist criterion for zero ISI. 7

Unit-IV

4. (a) Draw ASK waveform for digital data stream 101010. 2

(b) Explain the generation, detection, spectrum and geometrical representation of conventional BFSK system. 7

(c) Explain the generation and detection of QPSK. 7

(d) Compare FSK and PSK systems. 7

Unit-V

5. (a) How are matched filters different from conventional filters? 2

   (b) Derive an expression for probability of error of Matched filter. 7

   (c) Derive an expression for probability of error for BPSK system. 7

   (d) Find the expression of probability of error for BFSK. 7