328554(28)

B. E. (Fifth Semester) Examination, Nov.-Dec. 2019

(New Scheme)

(Et.&T Engg. Branch)

DIGITAL COMMUNICATION

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) of each question is compulsory. Attempt any two parts from parts (b), (c) and (d).*

Unit-I

1. (a) What do you mean by Nyquist rate? 2

(b) Compare the Ideal, Natural and Flat top sampling techniques. 7

(c) State and prove sampling theorem. 7

(d) Prove that quantization error (in terms of power) in PCM is $\frac{s^2}{12}$. Where s is step size. 7

Unit-II

2. (a) What is slope overload duration in DM? 2

(b) Explain delta modulation in detail with suitable diagram. 7

(c) Explain Adaptive delta modulation with block diagram of transmitter part and receiver part of ADM. 7

(d) Determine the output SNR in a DM system for 1 kHz sinusoid, sampled at 32 kHz without slope overload and followed by a 4 kHz post construction filter. 7

Unit-III

3. (a) Define the term line codes. 2

(b) Draw the eye diagram and explain it. 7

(c) What is ISI? Describe nequist criterian for zero ISI. 7

(d) Draw the following data format for the bit stream 1100110. 7

(i) Polar NRZ

(ii) Unipolar RZ

(iii) AMI

(iv) Manchester

Unit-IV

4. (a) Represent ASK mathematically. 2

(b) Explain generation and demodulation of BPSK using block diagram. 7

(c) Compare BASK, BPSK and BFSK. 7

(d) Explain generation and detection of QPSK using block diagram. 7

Unit-V

5. (a) Define probability of error (P_e). 2

(b) Show that the probability of error (P_e) for method filter is

$$P_e = \frac{1}{2} erfc \sqrt{\frac{E}{N_0}}$$ 7

(c) What is the concept of optimum receiver? Explain the fundamental of optimum receiver. 7

(d) Obtain the error probability for a BPSK system having a bit rate of 1 Mbcts/s. The receiver receives the waveforms $S_1(t) = A \cos w_c t$ and $S_2(t) = -A \cos w_c t$. The received signals are coherently detected using a matched filter. If $A = 10$ mV and signal sided noise power spectral density is $N_0 = 10^{-11}$ w/Hz. Assume that the signal power and energy perfect are normalized

$[\, erfc[\, 2 \cdot 24 \,] = 0 \cdot 00041 \,]$. 7