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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Electronics and Communication Engineering
Semester End Examination; May / June - 2019
Digital Communication

Time: 3 hrs *Max. Marks: 100*

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

1 a.	With the help of a neat block diagram, explain digital communication system.	6
b.	Classify electromagnetic spectrum based on their frequency ranges and list the applications of each frequency range.	8
c.	Explain the process of communication channel modelling by analyzing the electrical behavior of the channel.	6
2 a.	With necessary diagrams and equation, explain "Quadrature sampling of bandpass signals".	8
b.	Explain the concepts of ideal sampling. Derive the interpolation formula, $g(t) = \sum\limits_{-\infty}^{\infty} g(\frac{n}{2w}) \sin c(2wt - n).$	12

UNIT - II

3 a.	Using sinusoidal signal as the input, derive an expression for the signal to quantization noise ratio of the uniform quantizer.	6
b.	With the help of a neat block diagram, explain the operation of Pulse Code Modulation.	10
c.	List the disadvantages of PCM system and explain how it can be overcome using DPCM?	4
4 a.	A compact disc records audio signal digitally by using PCM. Assume the audio signal bandwidth to be 15 kHz; i) Calculate the Nyquist rate ii) If the Nyquist samples are quantized to L = 65,536 levels and then binary coded, determine the number of binary digits required to encode a sample iii) Determine the number of binary digits per second required to encode the audio signal	6
b.	With the help of a neat block diagram, explain the operation of TDM system.	6
c.	Define the types of noise encountered in delta modulation and explain how it can be overcome by using Adaptive Delta Modulation?	8

UNIT - III

5 a.	For the binary bit stream 1001011100. Draw the waveforms for; i) Polar NRZ ii) Polor RZ iii) Manchester iv) Bipolar NRZ	8
b.	Define ISI. Explain how ISI can be controlled?	6
c.	Explain Adaptive Equalization for data transmission.	6

6 a. Sketch and derive power spectra of a NRZ bi-polar format. 8

  b. Construct duo binary coder output and corresponding receiver output in the absence of noise. The binary data stream 0010110 is applied to the input of a duo binary system. Assume that there is precoder at the input. 12

UNIT - IV

7 a. Derive an expression for the average probability of symbol error of coherent binary FSK system. 10

  b. With the help of a block diagrams, explain the operation of QPSK transmitter and receiver. 10

8 a. With a neat block diagram, explain MSK transmitter and receiver. 10

  b. Derive an expression for the average probability of symbol error of coherent binary ASK system. 10

UNIT - V

9 a. With a block diagram, explain non-coherent orthogonal modulation scheme. 10

  b. With the help of a block diagrams, explain the operation of DPSK transmitter and receiver. 10

10 a. Explain GRAM-SCHMIDT orthoganalization procedure. 6

  b. With a neat block diagram, explain correlation receiver. 8

  c. List any three important properties of matched filters. 6

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