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**Question Paper Code: 54405**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Fourth Semester

Electronics and Communication Engineering

15UEC405–DIGITAL COMMUNICATION

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. The conditions must be fulfilled in a good digital communication system is CO1- R
  - (a) High data rate
  - (b) High fidelity
  - (c) Low transmit power
  - (d) All of the mentioned
  
2. Entropy is the measure of CO2- R
  - (a) Randomness
  - (b) Information
  - (c) Randomness & Information
  - (d) None of the mentioned
  
3. In uniform quantization process CO3- R
  - (a) step size remains same
  - (b) Step size varies according to the values of the input signal
  - (c) Quantizer has linear characteristics
  - (d) Both a and c

4. The sequence of operations in which PCM is done is CO4- R
- (a) Sampling, quantizing, encoding (b) Quantizing, encoding, sampling
- (c) Quantizing, sampling, encoding (d) None of the above
5. In binary data transmission DPSK is preferred to PSK because CO5 R
- (a) a coherent carrier is not required to be generated at the receiver
- (b) For a given energy per bit, the probability of error is less
- (c) The  $180^\circ$  phase shifts of the carrier are unimportant
- (d) More protection is provided against impulse noise

PART – B (5 x 3= 15Marks)

6. Define channel redundancy. CO1- R
7. Summarize the properties of Cyclic codes. CO2- R
8. Show the diagram of Interpretation of eye pattern. CO3- R
9. Write the features of matched filter. CO4- R
10. List the application of spread spectrum modulation. CO5- R

PART – C (5 x 16= 80Marks)

11. (a) Classify and Explain the properties about the Mutual information. CO1- App (16)
- Or
- (b) Show and Construct binary optimal code for the following probability symbols using Huffman procedure and calculate code efficiency. CO1- App (16)
- {0.2,0.18,0.12,0.1,0.1,0.08,0.06,0.06,0.06,0.4.}
12. (a) Illustrate about the application of channel coding theorem. CO2- App (16)
- Or
- (b) The generator polynomial for (7, 4) cyclic Hamming code is given by,  $G(D) = 1 + D + D^3$  Compute all the systematic code words. CO2- Ana (16)
13. (a) Explain and draw the power spectra of NRZ, polar coded and bipolar coded waveform. CO3 Ana (16)

Or

(b) Analyze the Nyquist Criteria for distortion less transmission. CO3 Ana (16)

14. (a) Binary data are transmitted over a microwave link at a rate of 1Mbps and the PSD of the noise at the receiver input  $10^{-10}$  W/Hz. For each of the following pairs determine which one requires more power than the other, determine the extra average signal power required by the more power consuming scheme so that an average probability of error  $10^{-4}$  is always maintained.
- i) Coherent PSK and DPSK
  - ii) Coherent PSK and QPSK
  - iii) Coherent FSK and Non-Coherent FSK.

Or

(b) Discuss about Quadrature Amplitude Modulation. Explain the working of transmitter and receiver used for QAM with a block diagram. CO4- Ana (16)

15. (a) Discuss about Maximal length sequences. And state its properties. CO5- U (16)

Or

(b) Briefly explain the Direct sequence spread spectrum system and derive the processing gain with its power spectra. CO5- U (16)

