Reg. No. : | | | | | | | | | | |

Question Paper Code: 53806

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

Third Semester

Information Technology

15UIT306 - ANALOG AND DIGITAL COMMUNICATION

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. A carrier is simultaneously modulated by two sine waves with modulation indices of 0.3 and 0.4 ; The total modulation index

   (a) 0.4 (b) 0.5 (c) 0.6 (d) 0.7

2. If we correlate the received signal with any one of the two orthogonal function, the obtained inner product will be

   (a) In phase (b) Quadrature (c) Zero (d) Cannot be determined

3. Sampling rate is defined as

   (a) $f_s \geq 2f_m$ (b) $f_s \leq 2f_m$ (c) $f_s = f_m$ (d) none of these

4. Multiplexing combines signals from several sources to achieve

   (a) Data rate management (b) Interleaving
   (c) TDM efficiency (d) bandwidth efficiency

5. Binary Huffman coding is a

   (a) Prefix condition code (b) Suffix condition code

   (c) Both of the mentioned (d) None of the mentioned

PART - B (5 x 3 = 15 Marks)

6. Find the Carrier frquency and Modulation Index for the AM-DSB-FC signal $u(t) = [15+(4 \sin(44 \times 10^3 t))] (10 \sin(46.5 \times 10^6 t))$ volts.

7. Bring Out the difference between DPSK and BPSK.

8. What is an eye pattern?

9. Define Multiple Access and what are the major types of Multiple Accesses?

10. Define the Shannon-Fano coding.

PART - C (5 x 16 = 80 Marks)

11. (a) (i) Define modulation index and express its value in terms of maximum and minimum voltage value of signals. (8)

(ii) Explain the principle of operation of envelope detector with necessary diagram. (8)

Or

(b) (i) With the help of block diagram, explain the operation of super heterodyne radio receiver. (8)

(ii) Explain how FM can be generated from PM. (8)

12. (a) Explain the QPSK modulation scheme with suitable transmitter and receiver block diagram. Also derive the average probability of error in the presence of AWGN. (16)

Or

(b) Discuss quadrature amplitude modulation with the help of relevant diagram. (16)

13. (a) (i) Draw the block diagram of a PCM transmitter and explain the function of each block. (6)

(ii) What are the types of sampling? Explain the operation of the sample and hold circuit. (10)

Or

(b) Draw the block diagram and describe the operation of delta modulator. What are its advantages and disadvantages compared to a PCM system. (16)

14. (a) (i) Give the advantages associated with spreading a signal spectrum. (8)

(ii) Explain FH-CDMA acquisition and tracking with neat sketches. (8)

Or

(b) (i) Compare TDMA, FDMA & CDMA techniques. (8)

(ii) What is Pseudo noise sequence? What are the properties of Pseudo noise sequences? (8)

15. (a) (i) Discuss about the viterbi decoding algorithm. (8)

(ii) Discuss about the cyclic codes. (8)

Or

((b) Derive the Information Capacity of a continuous channel of Bandwidth B Hz. Also write the implication of Information Capacity theorem. (16)