Reg. No._____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, JANUARY 2017

Course Code: IT203

Course Name: DATA COMMUNICATION (IT)

Max. Marks: 100 Duration: 3 Hours

PART A

(Answer any 2 Questions)

1. a) What does the Shannon capacity have to do with communications? (4)

   b) Consider a channel with a 1-MHz bandwidth. The SNR for this channel is 63. What are the appropriate bit rate and signal level? (4)

   c) Explain the requirement of isochronous data transmission. (3)

   d) What is on-off keying? (4)

2. a) What is the difference between half and full duplex transmission modes? (4)

   b) Given the frequencies listed below, calculate the corresponding periods.

   i) 24Hz ii) 8 MHz iii) 140 KHz (3)

   c) What is polar NRZ line encoding? What are its variations? (8)

3. a) The frequency domain is more compact and useful. Why? (3)

   b) What are the different modes of transmission in optical fiber? (4)

   c) Calculate the baud rate for the given bit rate and type of modulation.

   i) 2000 bps, BFSK ii) 4000 bps, BASK

   iii) 6000 bps, QPSK (6)

   d) What are the restrictions on sampling rate? (2)

PART B

(Answer any 2 Questions)

4. a) What is Quantization? Elaborate the steps in Quantization. (7)

   b) What are the steps in Huffman code? Consider a discrete memoryless service with seven possible symbols x_i, i=1,2,...,7 and the corresponding probabilities $P(x_1)=0.37$, $P(x_2)=0.33$, $P(x_3)=0.16$, $P(x_4)=0.07$, $P(x_5)=0.04$, $P(x_6)=0.02$, $P(x_7)=0.01$. Generate Huffman code and find out its efficiency. (8)

5. a) Differentiate between Amplitude Modulation and Frequency Modulation. (8)

   b) What are the advantages of Arithmetic codes over Huffman code? (2)

   c) Let the alphabet consist of only three symbols A, B and C with probabilities of occurrence P(A) = 0.5, P(B) = 0.25 and P(C) = 0.25. Generate Arithmetic code for an input stream "BACA". (5)

6. a) Five channels, each with a 100-kHz bandwidth, are to be multiplexed together. What is the minimum bandwidth of the link, if there is a need for a guard band of 10 kHz between the channels to prevent interference? (2)

   b) There are four sources, each creating 250 characters per second. If the interleaved unit is a character and 1 synchronizing bit is added to each frame, find

   (i) Data rate of each source (ii) Duration of each character in each source

   (iii) Frame rate (iv) Duration of each frame

   (v) Number of bits in each frame (vi) Data rate of the link. (6)

   c) What are block codes? Discuss about Simple Parity-Check Code. (7)

PART C

(Answer any 2 Questions)

7. a) What are the properties of linear codes? How can we say that a codeword C is cyclic? (10)

   b) We need a data word of at least 7 bits. Calculate values of k and n that satisfy this requirement in Hamming code. (5)

   c) The data word 0111 becomes the Hamming codeword 0111001. However receiver got a Hamming codeword 0011001. How can we find syndrome? (5)

8. a) Explain the significance of parity check matrix. (5)

   b) What is burst error? Explain cyclic burst. (5)

   c) Elaborate the significance of GSM in mobile communication. (10)

9. a) Elaborate CRC encoder and decoder with an example. (10)

   b) How is the data transferred between two stations by circuit switched network? (6)

   c) The efficiency of datagram network is better. Why? (4)