21718

3 Hours / 100 Marks   Seat No.

Instructions :
(1)   All Questions are *compulsory.*

(2)   Answer each next main Question on a new page.

(3)   Illustrate your answers with neat sketches wherever necessary.

(4)   Figures to the right indicate full marks.

(5)   Assume suitable data, if necessary.

(6)   Use of Non-programmable Electronic Pocket Calculator is permissible.

(7)   Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1.   (A)   Attempt any THREE of the following :   **12**

(a)   Describe the different types of error present in data communication.

(b)   State and explain Sampling Theorem with necessary waveforms.

(c)   Define multiplexing & describe the need of multiplexing.

(d)   State the applications of spread spectrum modulation.

(B)   Attempt any ONE of the following :   **6**

(a)   Draw the block diagram of the basic digital comm. system. State the function of each block in detail.

(b)   Generate CRC code for data word 1101101001 by using divisor as 1101. State the two advantages of CRC method.

2. **Attempt any TWO of the following :** 16

   (a) Draw the neat block diagram of PCM transmitter and receiver. Explain same with waveforms.

   (b) Describe QPSK modulator and demodulator and draw it's constellation diagram.

   (c) Describe Time Division Multiplexing with block diagram and state it's two advantages and disadvantages.

3. **Attempt any FOUR of the following :** 16

   (a) What are the limitations of DM ? Explain, how they overcome in Adaptive Delta Modulation.

   (b) Draw block schematic of DPCM transmitter and receiver.

   (c) Compare FDMA, TDMA & CDMA techniques based on (i) definition (ii) bandwidth available (iii) code word & (iv) synchronization.

   (d) Describe DPSK transmitter with block diagram.

   (e) What is meant by M-ary encoding ? Write the bandwidth requirement for ASK, BFSK and QPSK.

4. **(A) Attempt any THREE of the following :** 12

   (a) Differentiate the characteristics of communication channels with respect to bit rate, bandwidth, repeater distance and application. (any 4)

   (b) Explain quantization process with waveform.

   (c) Define PN sequence. Draw the pseudo random sequence generator.

   (d) For the binary data stream 1101001 draw unipolar RZ, Polar-NRZ, AMI and Manchester waveforms.

(B) Attempt any ONE of the following : 6

   (a) A discrete memory–less source has five message symbols S_0, S_1, S_2, S_3 & S_4 with corresponding probabilities

      {0.08, 0.2, 0.12, 0.4, 0.15}

      (i) Derive Huffman code for the above source & determine the average length of the code word.

      (ii) Determine the code efficiency of the designed Huffman code.

   (b) Describe DSSS transmitter and receiver with block diagram.

5. Attempt any TWO of the following : 16

   (a) Describe Wavelength Division Multiplexing with neat diagram. Compare FDM & TDM multiplexing (any 4 pts.).

   (b) With the help of block diagram explain the working of Transmitter and Receiver of QAM System.

   (c) Define slow and fast frequency hopping & describe BFSK/FHSS transmitter with block diagram.

6. Attempt any FOUR of the following : 16

   (a) State any two advantages and disadvantages of PCM system.

   (b) State the principle of orthogonality and describe OFDM technique.

   (c) Compare between BPSK and QPSK w.r.t. variable character of carrier, type of modulation, bit rate/baud rate and application.

   (d) Define the following : (i) Code word (ii) Code rate (iii) Hamming weight & (iv) Hamming distance.

   (e) Describe BPSK generator with block diagram and waveforms.

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