12223

3 Hours / 70 Marks   Seat No. ☐☐☐☐☐☐☐☐

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

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

  (3) Figures to the right indicate full marks.

  (4) Assume suitable data, if necessary.

Marks

1. Attempt any FIVE of the following : $5 \times 2 = 10$

  (a) State Shannon Hartley theorem.

  (b) State disadvantages of digital communication.

  (c) State sampling theorem.

  (d) State advantages of Amplitude Shift Keying.

  (e) State the need of multiplexing.

  (f) Define Pseudo Noise (PN) sequence.

  (g) Define Code Division Multiplexing.

2. Attempt any THREE of the following : $3 \times 4 = 12$

  (a) Write the values of following parameters for coaxial cable and fibre optic cable :

    (i) Bit rate (ii) Repeater distance

  (b) State the drawbacks of Delta Modulation. List the methods to overcome them.

  (c) Explain quantization process with neat sketch.

  (d) Explain the generation of PSK signal with the help of block diagram.

3. **Attempt any THREE of the following :** **3 × 4 = 12**

 (a) Explain checksum method of error detection with example.

 (b) Explain ADM receiver with suitable block diagram.

 (c) Draw the block diagram of TDMA system and explain its working.

 (d) Compare TDM and FDM.

4. **Attempt any THREE of the following :** **3 × 4 = 12**

 (a) Explain hamming code for one bit error detection with example for data 1101.

 (b) Draw the block diagram of Delta Modulation and explain its working.

 (c) Draw the neat diagram of CCITT digital multiplexing hierarchy and explain in brief.

 (d) Explain with the help of block diagram the working of FHSS transmitter.

 (e) Encode binary sequence 11010100 using URZ, NRZ-L, AMI and differential Manchester line coding techniques.

5. **Attempt any TWO of the following :** **2 × 6 = 12**

 (a) The probabilities of five source messages are m1 = 0.2, m2 = 0.3, m3 = 0.2, m4 = 0.15 and m5 = 0.15

   (i) generate Huffman codes for the given source

   (ii) find the coding efficiency for Huffman coding.

 (b) Explain the need of M-ary FSK encoding scheme & explain M-ary PSK transmitter with diagram.

 (c) Describe DPCM system with block diagram.

6. **Attempt any TWO of the following :** **12**

 (a) Interpret the steps to convert digital signal into analog signal using QPSK modulation with suitable block diagram.

 (b) Draw the block diagram of QPSK system and explain its working.

 (c) Draw the circuit diagram of PN sequence generator for generating PN sequences of length 15. Assuming initial content of shift register to be all ones explain its working, generate the output sequence.

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