

Time: 3 Hours

Max. Marks: 80

- N.B.:** (1) Question No.1 is compulsory.
 (2) Write any three questions from Q. 2 to Q.6.
 (3) Draw a neat diagram wherever necessary.
 (4) Assume suitable data, if required and state it clearly.

- Q.1 Attempt any FOUR** [20]
 A Compare BASK, BFSK, BPSK, QPSK and MSK in terms of bandwidth.
 B To transmit a bit sequence 11100011, draw the waveforms using i) Unipolar RZ, ii) Unipolar NRZ, iii) Polar RZ, iv) AMI, v) Manchester.
 C Give comparison between FEC and ARQ.
 D Differentiate between linear block code and convolution code.
 E Distinguish between Matched filter and correlator.
- Q.2** A Explain properties of line codes and compare various line codes. [10]
 B Explain working of Minimum Shift Keying (MSK) transmitter and receiver. [10]
- Q.3** A A discrete memory less source has an alphabet of six symbols with probabilities as shown [10]
 S1 S2 S3 S4 S5 S6
 0.30 0.25 0.20 0.12 0.08 0.05
 Construct a Huffman code and calculate entropy, average code word length, code efficiency.
 B A cyclic code is described by a generator polynomial $g(x) = 1+x+x^3$. [10]
 i) Find the cod word using the polynomial division method for $m=1010$.
 ii) Design an encoder for systematic code generation.
 iii) Design a syndrome generator.
- Q.4** A The parity check matrix H of a linear block code (7,4) is given below: [10]
 $G = \begin{bmatrix} 1 & 1 & 1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 & 1 & 1 \\ 1 & 1 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}$
 1. Find H parity check matrix. 2. Compute the syndrome for the received vector 1101101.
 B Explain the M-ary PSK transmitter and receiver. [10]
- Q.5** A Draw and explain the block diagram of the QPSK transmitter and receiver. [10]
 B A bit stream 10011101 is transmitted using the CRC method, the divisor is 1001. Suppose the 3rd bit from the left is inverted during transmission. [10]
 Show that error is detected at the receive side.
- Q.6 Write a short note on the following:** [20]
 a Generation and detection of FSK signal
 b Impulse response of Matched Filter
 c Viterbi algorithm
 d Source coding and channel coding
