12 NOV 2025 TE SEM-V C SCHEME EXTC DC QP CODE: 10096380

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. Show that error is detected at the receive side. **[10]**

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

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