

(3 Hours)

[Total Marks: 80]

- N.B: (1) Questions No.1 is **compulsory**.
 (2) Attempt **any three questions** out of remaining five questions.
 (3) Assume suitable data if required.
 (4) Figures to the right indicate full marks

Que.1 Answer the following (Any Four)

20

- Define the following terms and give their significance (i) Mean (ii) Central moment (iii) Variance (iv) Standard deviation.
- What is Entropy of an information source? When is entropy maximum?
- Compare intersymbol interference and interchannel interference
- Differentiate between QPSK and OQPSK
- Compare optical fibre with coaxial cable and twisted pair cable

Q2.

- Explain with neat diagram transmitter, receiver and waveforms the BPSK modulation System. Sketch signal space diagram and PSD of BPSK.
- A discrete memory less channel has an alphabet of six symbols, with the probabilities as given below

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S1	S2	S3	S4	S5	S6
0.30	0.25	0.2	0.12	0.08	0.05

Construct the Huffman code and find entropy and average code word length of code
 Also calculate the code efficiency and redundancy of the code

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Q3.

- Linear block code having following parity check equations –
 $c_4 = d_1 \oplus d_2 \oplus d_3$,
 $c_5 = d_1 \oplus d_2$,
 $c_6 = d_1 \oplus d_3$.

Calculate

- G & H matrix
- error detection, Correction capacity of the code;
- decode the received codeword-----101100

10

- b) Discuss the problem of inter symbol interference (ISI). Explain the measures to be taken to reduce ISI. How to study ISI using eye pattern? 10

Q4.

- a) Explain the working of Minimum Shift Keying, modulator and demodulator, with the help of block diagram and waveforms. 10
- b) Derive the expression for the probability of error of the matched filter. 10

Q5)

- a) Over a long transmission line draw the following data format for the binary sequence 10110100101. i) Unipolar NRZ ii) Polar RZ iii) Manchester Select the best and justify the answer. 10
- b) A (7, 4) cyclic code is generated using the generator polynomial $g(x) = 1 + x + x^3$
- i) Generate the systematic cyclic code for the data 1100 and 1001(MSB) by long division method
- ii) Draw the encoder and show how code words are generated for the data 1100, by tracing the path through the encoder and verify the result. 10

Q6) Write a short note on 20

- a) Duo-binary encoding
- b) QAM
- c) Satellite communication system
- d) Convolution code
