

Instructions:

- 1) Question number 1 is compulsory.
- 2) Answer any three questions from remaining question
- 3) Assume Suitable data if required but justify the same.

Q1. Answer any four questions

- 1) With neat block diagram explain Digital Communication System.
- 2) Differentiate between MSK and Offset QPSK.
- 3) State and Explain Shannon's theorem for channel capacity.
- 4) Explain the terms code redundancy, code rate, code efficiency and Hamming Bound.
- 5) Differentiate between Frequency hopped spread spectrum(FHSS) and Direct sequence spread spectrum.

Q2. 1) Explain with neat diagram, transmitter. Receiver, waveforms, the BPSK modulation System.

- 2) A discrete memoryless channel has an alphabets of five symbols, with the probabilities as
As given below

S1	S2	S3	S4	S5
0.55	0.15	0.15	0.1	0.05

Construct the Huffman code and find entropy and average code word length of the code.

Also calculate code redundancy and efficiency of the code.

Q3. 1) A (7,4) linear block code has following generator matrix

$$G = \begin{bmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 1 \end{bmatrix}$$

- i) Write parity check matrix
- ii) Generate all the code word
- iii) Generate the decoding table for the single error pattern.

2) Explain DPSK system with respect to transmitter. Receiver

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- Q4. 1) Explain with neat diagram the working of Integrate and Dump receiver. Derive the expression for probability of error.
- 2) Explain with neat diagram frequency hopping spread spectrum, FH-MFSK and explain slow hopping and fast hopping.
- Q5. 1) What is Eye pattern. Explain the parameters observed from it with an illustration.
- 2) Draw signal space diagram for 16 QAM system and compare probability of occurrence of error in it with QPSK system.
- Q6. Write short notes on followings(any two)
- 1) Nyquist criteria for distortion less baseband transmission
 - 2) Convolution codes
 - 3) Direct sequence code division multiple array(DS-CDMA)
 - 4) Probability Models
