

(4) Figures to the **right** indicate **full** marks.

1. (a) Compare BPSK and DPSK. 4
- (b) Enlist the major sources of signal loss and noise in communication link. 4
- (c) Compare channel encoding and encryption. 4
- (d) Derive the condition of maximum entropy of a source. How entropy varies with probability? 4
- (e) Draw the PSD of NRZ bipolar format. 4

2. (a) In a radio Receiver an RF amplifier and a mixer are connected in Cascade. The amplifier has a noise figure of 10dB and power gain is 15 dB. The noise figure of mixer stage is 20 dB. Calculate the overall noise factor. Derive the relation used. 12
- (b) What is line coding? Draw the waveforms for different line coding. Assume the binary sequence 10110101. 8

3. (a) What is matched filter? Enumerate its properties and derive expression for probability of error in matched filter. 10
- (b) Explain the block diagram of BFSK transmitter and receiver. Explain the bandwidth requirement. 10

4. (a) The parity check matrix of a particular (7, 4) linear block code is given by. 10

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

- (i) Find Generator Matrix
- (ii) List all code words
- (iii) How many errors can be detected and corrected?

- (b) Explain the process of Delta Modulation, with neat diagram and waveform. 10

5. (a) What is Gaussian probability density function? Derive its cumulative distribution in terms of complimentary error function. 10

- (b) A source emits seven messages with probabilities  $\frac{1}{3}, \frac{1}{3}, \frac{1}{9}, \frac{1}{9}, \frac{1}{27}, \frac{1}{27},$  &  $\frac{1}{27}$  respectively. Find the entropy of the source and compact binary code, the average length of code word. Determine the efficiency and redundancy of this code. 10

6. (a) Explain signature authentication process using public key cryptosystem. 10
- (b) Explain the systematic cyclic code generator circuit by shift register and decoding process of cyclic codes. 10

7. Write short notes on any **four** :— 20

- (a) Quantization
- (b) Eye Pattern
- (c) JPEG
- (d) A-law and  $\mu$ -law
- (e) Data Encryption standard algorithm.