

N.B: (1) Question **No.1** is **compulsory**.

(2) Answer any **three** from remaining **five** questions.

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

(4) Assume the **data** if it is **necessary**.

1. Attempt **any four** of the following. [20]

- Draw and Explain the Block diagram of Basic communication system.
- Explain Shannon's Theorem on channel capacity.
- Draw ASK, FSK, PSK waveforms for data bit sequence 11011001.
- Explain need for modulation in communication system.
- Explain the role of AGC in AM reception.

2. (a) Consider a (7,3) code whose Parity check matrix is given below. [10]

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

(i) Construct syndrome table for signal bit error patterns.

(ii) Decode the received code vector $R_1=0011101$, $R_2=1101110$.

(b) Explain a method of generating DSB-SC AM signal with the help of waveforms. [10]

3.(a) Explain PCM transmitter and receiver with the help of neat block diagram. [10]

(b) In a fax transmission of a picture there are 2.25×10^6 picture elements in a frame. 12 brightness levels are required for faithful reception. Assuming all these levels are equiprobable, calculate channel bandwidth required to transmit 1 picture in every 3 minutes for a signal to noise ratio of 30dB. If signal to ratio is increased to 40 dB. Calculate new bandwidth. Comment on SNR-BW Trade off for the results obtained in above cases. [10]

4. (a) Derive FM wave equation, plot frequency spectrum of FM wave also explain carson's rule for FM Bandwidth. [10]

(b) Explain regarding BPSK (i) Transmission (ii) Reception (iii) waveform for data bit sequence $b(t) = 1011001$. Also plot frequency spectrum. [10]

5. (a) The Generator Polynomial of a (7,4) cyclic code is $g(x) = 1+x^2+x^3$. Draw feedback shift encoder. Use this encoder to find code word for the message (0011) in systematic form. [08]

(b) What is Direct and Indirect method of FM generation? Also Explain Armstrong method of FM generation. [12]

6. Write short notes on (**any two**) [20]

- Quantization in pcm system.
- Power Line Carrier Communication.
- Convolution codes.
- Superhetrodyne reciever
