

- 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. a) Write the expression for an AM wave. Draw the waveforms of an Amplitude modulated Wave for modulation indexes a)  $m > 1$  b)  $m < 1$  c)  $m = 1$  [20]  
(b) Differentiate between Analog communication and Digital communication.  
(c) Draw and explain the block diagram of a Power Line Carrier Communication system.  
(d) Explain the sample and hold circuit used in PCM transmission system.
2. (a) Consider a (7,4) code whose Generator matrix is given below. [10]
- $$G = \begin{bmatrix} 1 & 1 & 1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 1 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$
- (i) Determine Parity Check Matrix (H)  
(ii) Decode the received code vector 1101101.
- (b) What is DSBSC? Explain any one method of generation of DSBSC with a neat circuit diagram and waveforms. [10]
3. (a) Explain Delta modulation transmitter and receiver with the help of neat block diagram. Also explain Slope overload distortion and Granular noise. [10]
- (b) A channel has a BW of 5 KHz and signal to noise power ratio of 63. Determine the BW needed if the signal to noise power ratio is reduced to 31. What will be the signal power required if the channel bandwidth is reduced to 3 KHz [5]  
c) Calculate the percentage power saving achieved in SSB. [5]
4. (a) Draw and Explain the Diode detection circuit. Also explain the Distortions in it. [10]  
(b) What is BPSK? Explain the BPSK transmitter circuit with a neat block diagram And waveforms. [10]
5. (a) The Generator Polynomial of a (7,4) cyclic code is  $g(x) = 1+x+x^2+x^3$ . Find code word for the message (10101) in systematic form. [10]  
(b) What are the different types of source coding algorithms? Briefly explain any one algorithm. [10]

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6. Write short notes on (any three)

- (a) Pre-emphasis and De-emphasis
- (b) Satellite Communication.
- (c) Convolution codes.
- (d) Properties of Fourier Transform

[20]

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