

(3 Hours)

[ Total Marks : 100

- N. B. :**
- (1) Question No. 1 is **compulsory**.
  - (2) Attempt any **four** questions out of remaining **six** questions.
  - (3) **Make** suitable assumptions if **required** and **justify** the same.
1. (a) Write difference between BPSK and DPSK. 5  
 (b) Design a feedback shift encoder for an (8,5) cyclic code with a generator  $g(x) = 1+x+x^2+x^3$ . Use this encoder to find code word for the message (10101) in systematic form. 5  
 (c) Derive expression for entropy. 5  
 (d) Write difference between low level and high level AM Transmitter. 5
  2. (a) Draw the spectrum of an AM waveform if the modulating signal is  $m(t) = (\cos 2000 \Pi t + 0.5 \cos 4000 \Pi t)$  and carrier is  $c(t) = 1.5 \cos (1000 \Pi t)$ . Also calculate the total power, sideband power and bandwidth. 10  
 (b) Draw and explain delta modulation transmitted and receiver. 10
  3. (a) Draw and explain TRF receiver and give disadvantages of TRF. 10  
 (b) For a systematic linear block code, the three parity digits  $c_4, c_5$  and  $c_6$  are given 10  
 by  

$$c_4 = d_1 \oplus d_2 \oplus d_3$$

$$c_5 = d_1 \oplus d_2$$

$$c_6 = d_1 \oplus d_3$$
 (i) Construct generator matrix.  
 (ii) Construct code generated by this matrix.  
 (iii) Determine error correcting capability.  
 (iv) Prepare a suitable decoding table.  
 (v) Decode the received words 101100 and 000110.
  4. (a) Explain phase Discriminatr. 10  
 (b) A message 101101 is to be transmitted in cyclic code with a generator polynomial  $G(D) = D^4 + D^3 + 1$ . Obtain the transmitted code word. How many check bits does the encoded message contain? Draw the encoding arrangement for the same. 10
  5. (a) Explain regarding DPSK – (i) Generation; (ii) Operation; (iii) bandwidth, for given data bit sequence 1011001. 10  
 (b) Explain balanced slope detector. 10

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6. (a) Write short note on Telmetry. 10  
(b) The convolutional encoder has the following two generator sequences each of length 3. 10  
 $(g_0^1 g_1^1 g_2^1) = (1, 1, 1)$  and  $(g_0^2 g_1^2 g_2^2) = (1, 0, 1)$   
Draw code tree, code trellis and state diagram for message = 10011. 20
7. Write short notes on (any two):-
- (a) Image frequency and its rejection.
  - (b) ISB receiver.
  - (c) Quantization process.
  - (d) Fourier transform and its properties.

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