

Max. Marks: 70

## B.Tech III Year II Semester (R13) Regular & Supplementary Examinations May/June 2017 DIGITAL COMMUNICATION SYSTEMS

# (Electronics and Communication Engineering)

Time: 3 hours

1

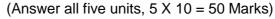
PART – A

(Compulsory Question)

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- Answer the following:  $(10 \times 02 = 20 \text{ Marks})$ 
  - (a) Compare amplifier and regenerative repeater.
  - (b) List the drawbacks of DM.
  - (c) Find matched filter for a rectangular pulse g(t) of amplitude A and duration T.
  - (d) Define Duo binary signaling. What are the disadvantages of it?
  - (e) What is Schwarz inequality?
  - (f) Draw the block diagram of correlation receiver.
  - (g) Define bandwidth efficiency.
  - (h) Draw signal space diagram of QPSK.
  - (i) Verify that the given code  $C = \{0 \ 0 \ 0, 1 \ 1 \ 1\}$  is linear code or not.
  - (j) Show that the code C=  $\{0 \ 0 \ 0, 1 \ 0 \ 0, 0 \ 1 \ 1, 1 \ 1 \ 1\}$  is not cyclic.





## UNIT – I

- 2 (a) State and prove sampling theorem.
  - (b) Compare PCM, DPCM & DM.

3 (a) Draw and explain the block diagram of TDM.(b) Explain operation of ADPCM system.

OR

- 4 (a) Explain inter symbol interference with required equations.
  - (b) What are the practical difficulties encountered with the ideal Nyquist channel and how to overcome them?

OR

- 5 (a) What are properties of matched filter?
  - (b) Explain how an eye pattern provides a great deal of useful information about the performance of a data transmission system.

## UNIT – III

- 6 (a) Explain Gram-Schmidt orthogonalization procedure.
  - (b) Explain correlation receiver with neat block diagram briefly.

## OR

7 Explain conversion of AWGN channel into vector channel.

## UNIT – IV

8 Explain coherent generation and detection of BPSK signals and derive the expression for probability of error.

## OR

- 9 (a) Explain non-coherent binary frequency shift keying.
  - (b) Explain generation and detection of DPSK signals.

Contd. in page 2

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## UNIT – V

(a) For a (6,3) systematic linear block code, the three parity check bits  $c_4$ ,  $c_5$  and  $c_6$  are formed from the 10 following equations:  $c_4 = d_1 \oplus d_3$ 

$$c_5 = d_1 \oplus d_2 \oplus d_3$$

 $c_6 = d_1 \oplus d_2$ 

(i) Write down the generator matrix G.

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(ii) Construct all possible code words.

(iii) Suppose that the received word is 010111. Decode this received word by finding the location of the error and the transmitted data bits.

- (b) Consider a (7, 4) cyclic code with  $g(x) = 1 + x + x^3$ .
  - (i) Let data word  $d = (1 \ 0 \ 1 \ 0)$ . Find the corresponding code word.
    - (ii) Let the code word  $c = (11 \ 0 \ 0 \ 1 \ 0 \ 1)$ . Find the corresponding data word.

#### OR

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#### 11 Write a short notes on:

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- (a) Error correction and detection codes.
- (b) Automatic Retransmission Query (ARQ) Systems.
- (c) Linear block codes.
- (d) Convolutional codes.

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