

B.Tech III Year I Semester (R15) Regular Examinations November/December 2017

DIGITAL COMMUNICATION SYSTEMS

(Electronics and Communication Engineering)

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Max. Marks: 70

Time: 3 hours

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PART – A (Compulsory Question) ****

- Answer the following: $(10 \times 02 = 20 \text{ Marks})$
- List the advantages of digital communication systems. (a)
- Discuss the advantages of DM over PCM. (b)
- What are the properties of matched filter? (c)
- Write the applications for eve pattern. (d)
- Explain Signal Space Representation. (e)
- Define the probability of error. (f)
- (g) Distinguish between Coherent and Non coherent detection.
- Compare power bandwidth requirements of BPSK, BFSK, QPSK and DPSK. (h)
- What are the conditions to satisfy the hamming code? (i)
- Discuss the difference between convolutional codes and block code. (i)

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- Discuss delta modulation block diagram and explain the working with waveforms. (a)
- A band limited signal has bandwidth equal to 4 kHz. What sampling rate should be used to guarantee a (b) guard band of 1200 Hz?

OR

- 3 Explain the principle of TDM with a neat block diagram. (a) (b)
 - Compare the features of PCM and DPCM.

UNIT – II

- Justify how a matched filter works as an ideal receiver. 4 (a)
 - What is inter symbol interference? How this can be minimized? (b)

OR

- Discuss in detail about baseband transmission in M-ary data 5 (a)
 - Explain how eye diagrams are useful in describing the performance of digital data transmission system. (b)

UNIT – III

- Explain Gram-Schmidt orthogonalization procedure. 6 (a)
- (b) Describe the conversion of the continuous AWGN channel into a vector channel.

OR

- 7 Explain the correlation receiver with neat diagram. (a)
 - Explain probability of error using matched filter. (b)

[UNIT – IV]

- Derive an expression for error probability of BPSK. 8 (a)
 - Assume that 3600 bits/sec data is sent over a pass band channel by FSK signaling scheme. Estimate the (b) transmission bandwidth.

OR

- Explain generation and detection of DPSK. 9 (a)
 - Derive an expression for error probability of BFSK. (b)

UNIT – V

- Demonstrate the Viterbi algorithm for maximum-likelihood decoding of convolutional codes. 10 (a)
 - Draw the state diagram, tree diagram, and trellis diagram for k = 3, rate 1/3 code generated by: (b) $g_1(x) = 1 + x^2$, $g_2(x) = 1 + x$ and $g_3(x) = 1 + x + x^2$.

OR

- 11 Compare linear block codes, cyclic codes and the convolutional codes. (a)
 - The generator polynomial of a (15, 11) Hamming code is defined by $q(x) = 1 + x + x^4$. Develop the (b) encoder and syndrome calculator for this code.