

Seat No.	
-------------	--

T. E. (Electronics and Telecommunication Engg.) (Part - II)
(Semester - VI) Examination, December - 2015

DIGITAL COMMUNICATION (Pre - Revised)

Sub. Code : 45693

Day and Date : Wednesday, 02 - 12 - 2015

Total Marks : 100

Time : 02.30 p.m. to 05.30 p.m.

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary.

SECTION - I

Q1) Solve any two.

- a) Define Random Process. Also explain classification of Random Processes. [8]
- b) Define Probability. Explain Properties of Probability. Derive expression for conditional probability. [8]
- c) Suppose 10,000 digits are transmitted over a noisy transmission channel having error probability per digit equal to 5×10^{-5} . Estimate the probability of getting two digits in errors. Use the poisson's distribution. [8]

Q2) Solve any two.

- a) Prove relationship between conditional and joint entropy. [8]
- b) Explain types of channels and their models. [8]
- c) Consider the five source symbols (messages) of a discrete memoryless source and their probabilities are shown below. [8]

Message	:	M_1	M_2	M_3	M_4	M_5
Probability	:	0.4	0.2	0.2	0.1	0.1

Follow the Huffman's algorithm to find the code words for each message. Also find the average codeword length and the average information per message.

Assume $M = 2$.

P.T.O.

Q3) Solve any two.

- a) Explain companding in PCM. [9]
- b) Explain with block diagram DPCM transmitter and receiver. [9]
- c) In a PCM system using N-bit encoder, show that signal to quantization noise ratio is given as $[1.8 + 6N]$ dB for sine wave input. [9]

SECTION - II

Q4) Solve any two.

- a) Explain with block diagram BASK transmitter and receiver. [8]
- b) Compare ASK, FSK and PSK. [8]
- c) Explain coding format of [8]
 - i) Bipolar RZ
 - ii) Bipolar NRZ
 - iii) Unipolar NRZ
 - iv) Unipolar RZ

Q5) Solve any two.

- a) Explain with block diagram Early-late bit synchronizer. [8]
- b) Explain Eye diagram. Also explain ISI. [8]
- c) What is equalization? Draw and explain Adaptive equalizer for data transmission. [8]

Q6) Solve any two.

- a) Explain linearity and cyclic property of cyclic code. [9]
- b) Consider a (7, 4) linear block code whose generator matrix is given by [9]

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

- Find i) All the codewords.
 ii) Parity check matrix.

- c) For the convolutional encoder shown below, Find the encoder output for the bit sequence 11011011 using code Tree. [9]

