Printed Pages: 02 **Sub Code: REC602**

Paper Id: **131300** **Roll No.** | | | | | | | | | | |

B. TECH.
(SEM VI) THEORY EXAMINATION 2018-19
DIGITAL COMMUNICATION

Time: 3Hours ***Total Marks: 70***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION-A

1. Attempt all questions in brief. **7 x 2= 14**

a. In PSK and FSK modulation techniques which one is better and why?
b. Define signal level and data level.
c. What is mean and variance of random variable?
d. Calculate error probability of 16QAM.
e. What are the types of error control method?
f. Give any four application of DS-SS system.
g. What is signal space?

SECTION-B

2. Attempt any three of the following. **3 x 7 = 21**

a. Explain the block diagram of digital communication system. What are noise and bandwidth limitation of any communication system.
b. Explain QPSK modulation and Demodulation Techniques with block diagram. Sketch QPSK Waveform for the sequence 0110100.
c. Explain random process and give its classification.
d. Explain Near-Far problem in CDMA system. Explain MUD and how it is useful to control Near-Far problem.
e. A spread spectrum communication system is characterized by the following parameters. Duration of each information bit is 4.095 ms, chip duration of pn sequence in 1 ms. Calculate the processing gain and jamming margin in dB if $(E_B/N_o) = 10$ and probability of error $P_e = 0.5 \times 10^{-3}$.

SECTION-C

3. Attempt any one part of the following. **1 x 7 = 7**

a. Write down the steps to solve Huffman coding. Determine the Huffman code and efficiency of code for the following message with their probabilities given

a	b	c	d	e	f	g
0.05	0.15	0.2	0.05	0.15	0.3	0.1

b. Two dice are rolled, find the probability that the sum is

1) Equal to 1
2) Equal to 4
3) Less than 13

4. Attempt any one part of the following. **1 x 7 = 7**

a. Find out the expression for PSD of polar NRZ format. Give the properties of line coding. Draw polar NRZ for the bit stream 110011.

b. Differentiate between DSSS and FHSS on the basis of various parameters.

5. Attempt any one part of the following. **1 x 7 = 7**

a. A random variable X has the uniform distribution given by,

$f_x = 1/2\pi$ for $0 \leq x \leq 2\pi$

$= 0$ otherwise

Determine E[x], E[x^2], and σ_x.

a. A message 101101 is to be transmitted in the cyclic code with generator polynomial $g(x)= 1 + x^3 + x^4$. Obtain the transmitted code word. How many check bits does the encoded message contain? Draw the encoding arrangement for the same.

6. Attempt any one part of the following. **1 x 7 = 7**

a. Describe scrambler and unscrambler with the help of suitable diagram.

b. Explain Central limit theorem by using Gaussian distribution.

7. Attempt any one part of the following. **1 x 7 = 7**

a. What do you understand by statistical averages? Explain all its properties.

b. Describe in brief OFDM communication system.