Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

V SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

MAKEUP EXAMINATIONS, DECEMBER 2019

SUBJECT: COMMUNICATION SYSTEMS [ELE 3103]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 24 December 2019** **Max. Marks: 50**

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. What are the basic components of communication system? Draw and explain the block diagram of typical communication system. ***(05)***

1B. Describe superhetrodyne receiver in detail with the help of neat block diagram. Write the advantages and disadvantages. ***(05)***

2A. Write short note on power spectral density and autocorrelation function of white noise. ***(03)***

2B. The wideband frequency modulator using indirect method is used to transmit audio signal with frequency 100Hz. The narrowband phase modulator is supplied with a carrier of frequency fc= 0.1MHz by a crystal controlled oscillator. A second crystal reference oscillator supplies a sinusoidal wave of frequency 9.5MHz to the mixer (consider local oscillator frequency is greater than frequency of first multiplier output). The system specifications are as follows:

Carrier frequency at the transmitter output, ft = 100MHz

Frequency deviation at the transmitter = 75KHz

Modulation index at the Narrow band modulator = 0.2 rad

a) Calculate the frequency multiplication ratios n1 and n2, which will satisfy these specifications
b) Specify the values of the frequencies and frequency deviation at various points of the modulator ***(04)***

2C. A signal x(t) shown in figure Q3B is applied at the input of an integrator and dump circuit. Plot the output as a function of time. ***(03)***

3A. In digital communication system, the bit rate of NRZ data stream is 1 Mbps and carrier frequency is 100 MHz .Find the symbol rate of transmission and bandwidth requirement of the channel if the following techniques are used.

a. BPSK system
b. QPSK system
c. BFSK system ***(03)***

3B. Explain DPSK transmitter and receiver. Find the differentially encoded sequence and decoded sequence for the message sequence 10010011 by considering 0 as the first arbitrary bit of the encoded sequence

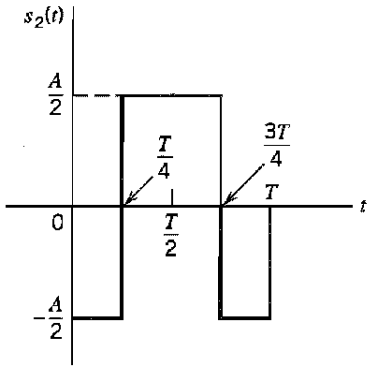

Figure Q3B ***(07)***

4A. Explain, how the effects of noise are minimized in PCM, with diagram. ***(03)***

4B. A binary sequence 1011 is transmitted using the shift keying technique that occupies maximum channel bandwidth.

(i) Sketch the waveform at the transmitter output.

(ii) With neat block diagram and necessary expressions explain the detection of symbol '0' at the receiver. ***(04)***

4C. For a convolutional encoder with impulse responses as (1 0 1) and (1 0 1)

a. Draw the convolutional encoder

b. Find the output for an input sequence (1 0 1 1 0 1 1)

c. Obtain the state transition table and state diagram. ***(03)***

5A. Explain the steps of Viterbi's maximum likelihood algorithm for a received sequence of 01 00 01 00 00 ,where the state table is as given below. (States: a=00, b=10, c=01,d=11)

Present state	Next state (i/p=0)	Next state (i/p=1)	Output (i/p= 0)	Output (i/p=1)
a	a	b	00	11
b	c	d	10	01
c	a	b	11	00
d	c	d	01	10

(07)

5B. Describe the satellite system link model with block diagram ***(03)***