Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent Institution of MAHE, Manipal)

V SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

MAKEUP EXAMINATIONS, DECEMBER 2017

SUBJECT: COMMUNICATION SYSTEMS [ELE 3103]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 23 December 2017** **Max. Marks: 50**

Instructions to Candidates:

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

1A. Explain with neat diagram, the phase discrimination method used in SSB modulation. ***(03)***

1B. Explain superhetrodyne receiver with a neat block diagram ***(03)***

1C A sinusoidal modulated ordinary AM wave has maximum and minimum amplitude as 10V and 5V respectively. Find the modulation index. Calculate the efficiency and determine the amplitude of the carrier which must be added to attain a modulation index of 0.1. ***(04)***

2A. Define frequency modulation and derive the expression of FM in terms of β. ***(03)***

2B. Explain the pre-emphasis and de- emphasis network and their need. ***(03)***

2C. Derive the sampling theorem and prove the Interpolation formula ***(04)***

3A. Explain with neat diagrams the different types of encoding schemes used in digital communication ***(05)***

3B. Derive the average probability of symbol error of BPSK system when symbols '1' and '0' are transmitted ***(05)***

4A. For the given input sequence '01101000' sketch the waveforms of the even and odd components of bipolar representation, carrier waves, modulated even and odd waves and the final modulated wave obtained by using the QPSK system. ***(03)***

4B. With neat block diagram and expressions, explain the transmission and reception of symbols using Amplitude shift keying technique. Also draw the signal constellation diagram. ***(04)***

4C. For a (7, 4) systematic cyclic code with $g(X) = 1 + X + X^2$. Determine the code word if the message sequence is [1011] ***(03)***

5A. Consider the rate $r = \frac{1}{2}$, constraint length $K = 2$ convolutional encoder of Fig (Q5A). The code is systematic. Construct the code tree up to 5 levels and trace the path through the tree that corresponds to the message sequence '**1 0 1 1 1**'. ***(03)***

5B. For a convolutional encoder with n=2,k=1,K=3 and the generator polynomial coefficients (1 0 1) and (0 1 1), draw the complete trellis diagram up to 5 levels and then find the coded output for an input sequence (1 0 1 1 0) using the same. ***(04)***

5C. Explain in brief the transmission and reception of digital signals using CDMA technology with neat sketches. ***(03)***

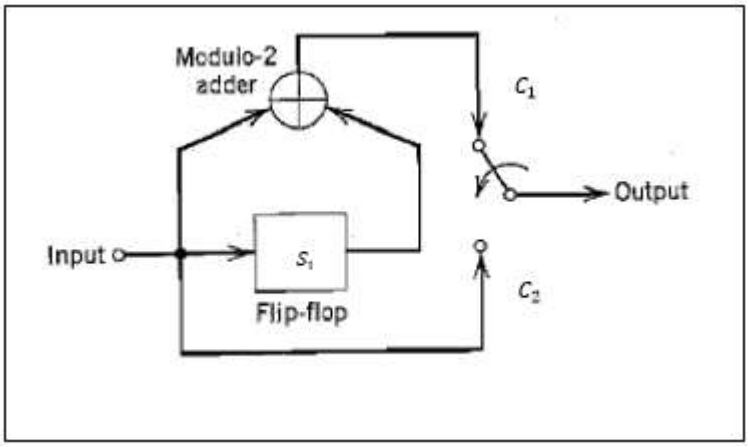

Figure: Q5A