Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

V SEMESTER B.TECH. (COMPUTER SCIENCE & ENGINEERING)

END SEMESTER EXAMINATIONS, NOVEMBER 2017

SUBJECT: DATA COMMUNICATIONS [CSE 4205]

REVISED CREDIT SYSTEM
(22/11/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. How Performance of a network can be measured? List and explain the two metrics by which network performance is evaluated. **2M**

1B. Distinguish between Manchester and differential Manchester encoding techniques. What are their merits and demerits? Encode 01001100011 in these encoding techniques. **4M**

1C. Explain the function of scrambling in the context of digital-to-digital encoding techniques? What is the result of scrambling the sequence 1100000000110000010 using the following scrambling techniques? Assume that the last non-zero signal level has been positive.
i. B8ZS
ii. HDB3 (odd number of 1's since last substitution) **4M**

2A. Define Shannon Capacity formula for a noisy channel.
Suppose that a digitized TV picture is to be transmitted from a source that uses a matrix of 480 *500 pixels, where each pixel can take on one of 32 intensity values. Assume that 30 pictures are sent per second. Find the source rate. Assume that the TV picture is to be transmitted over a channel with 4.5-MHz bandwidth and a 35-dB signal-to-noise ratio. Find the capacity of the channel. **3M**

2B. Explain the implementation of Binary Phase Shift Keying & Quadrature Phase shift keying with neat diagrams. Give the bandwidth expression for BPSK. **4M**

2C. Explain Delta Modulation and demodulation with the help of diagrams. What is the advantage of using Adaptive Delta Modulation? **3M**

3A. Define Constellation diagram. Explain its concept and role in analog transmission. Draw and explain the constellation diagram for ASK, BPSK and QPSK. **2M**

3B. We need to use synchronous TDM and combine 20 digital sources, each of 100 Kbps. Each output slot carries 1 bit from each digital source, but one extra bit is added to each frame for synchronization.
i. What is the size of an output frame in bits?
ii. What is the output frame rate?
iii. What is the duration of an output frame?
iv. What is the output data rate? **4M**

3C. What is serial transmission? Explain different types of Serial transmission with neat diagrams. **4M**

4A. What are the propagation modes in the fiber optic cable technology? Explain with neat diagrams. **4M**

4B. Describe the various phases of communication in a circuit switched network. **2M**

4C. A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is $x^3+ 1$. Show the actual bit string transmitted. Suppose the third bit from the left is inverted during transmission. Show that this error is detected at the receivers end. **4M**

5A. Explain the Transition phases in Point to Point Protocol connection with neat diagram. How the Challenge Handshake Authentication Protocol provides more security than Password Authentication Protocol? **3M**

5B. What are the strategies used by CSMA/CA to avoid collision? Explain the strategies with neat diagram. **4M**

5C. What is Hidden Station Problem and Exposed Station Problem in wireless LANs? Explain with Diagram. **3M**