

MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal)

V SEMESTER B.TECH. (COMPUTER SCIENCE & ENGINEERING) END SEM EXAMINATIONS, NOVEMBER 2018

SUBJECT: DATA COMMUNICATIONS [CSE 4025]

REVISED CREDIT SYSTEM (26/11/2018)

Time: 3 Hours

MAX. MARKS: 50

2M

4M

Instructions to Candidates:

- ✤ Answer ALL the questions.
- Missing data may be suitably assumed.
- 1A. Distinguish between signal element and data element.
- What are the function of scrambling in the context of digital-to-digital encoding **1B**. scrambling techniques? What is the result of the sequence 1100000000110000010 using the following scrambling techniques? Assume that the last non-zero signal level has been positive. i. B8ZS 4Mii. HDB3 (odd number of 1's since last substitution)
- **1C.** Describe Bandwidth-Delay product with suitable examples.
- 2A. Medical digital radiology ultrasound studies consist of about 25 images extracted from a full-motion ultrasound examination. Each image consists of 512 by 512 pixels, each with 8 b of intensity information.

 How many bits are there in the 25 images?
 Ideally, however, doctors would like to use 512 *512 8-bit frames at 30 fps (frames per second). Ignoring possible compression and overhead factors, what is the minimum channel capacity required to sustain this full-motion ultrasound?
 Suppose each full-motion study consists of 25 s of frames. How many bytes of storage would be needed to store a single study in uncompressed form?
- **2B.** Find the bandwidth for a signal transmitting at 12 Mbps for QPSK. Assume the value of due to modulation and filtering (d) =0. **2M**
- 2C. How quantization error created in the quantization process of PCM encoder? Explain the recovery of original signal using PCM decoder.5 M

3A.	Two channels, one with a bit rate of 190kbps and another with a bit rate of 180kbps, are to be multiplexed using pulse stuffing TDM with no synchronization bits. Answer the following questions: i. What is the size of a frame in bits? ii. What is the frame rate?	
	iii. What is the duration of a frame?iv. What is the data rate?	4 M
3B.	Compare space-division and time-division switches.	2M
3C.	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
4A.	Explain the design of Stop and Wait protocol with neat diagram. Write the sender and receiver site algorithm for stop and wait protocol.	4 M
4B.	Describe the various phases of communication in a circuit switched network.	2M
4C.	Explain the authentication process of PAP with neat diagram.	4 M
5A.	Explain the strategies of data rate management in Time Division Multiplexing (TDM) with neat Diagrams.	4 M
5B.	What is Hidden Station Problem and Exposed station Problem in wireless LANs? Explain with Diagram.	3M
5C.	Describe CSMA/CA protocol with the help of neat Diagrams.	3M