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**18CS46**

# Fourth Semester B.E. Degree Examination, Jan./Feb. 2023
## Data Communication

Time: 3 hrs.                                                                              Max. Marks: 100

**Note:** *Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

1   a. Define Data Communication. Explain the five component of data communication. **(06 Marks)**
    b. Explain the functionalities of Data link layer, Network layer and transport layer. **(09 Marks)**
    c. Distinguish between TCP/IP protocols suites of OSI Model. **(05 Marks)**

**OR**

2   a. What is transmission impairment? Explain three causes of transmission impairment. **(07 Marks)**
    b. Determine the appropriate bit rate and signal level for a channel with a 1MHz bandwidth. The signal to noise ratio for this channel is 63. **(06 Marks)**
    c. Explain briefly how encapsulation and Decapsulation takes place in internet. **(07 Marks)**

### Module-2

3   a. What is line coding? Represent the sequence 010011 using NRZ – I, NRZ – L, Manchester and differential Manchester schemes. **(08 Marks)**
    b. Explain the three step procedure of Pulse Code Modulation (PCM) for analog to digital conversion with example. **(08 Marks)**
    c. Explain any four characteristics of line coding techniques. **(04 Marks)**

**OR**

4   a. With neat diagram, explain Amplitude Shift Keying (ASK) and Frequency Shift Keying (FSK) conversion techniques. **(08 Marks)**
    b. Describe briefly about different transmission modes. **(06 Marks)**
    c. An analog signal has a bit rate of 8000bps and a baud rate of 1000 baud. How many data elements are carried by each signal element? How many signal elements are we need? **(06 Marks)**

### Module-3

5   a. Why is signal multiplexing required. Explain synchronous TDM with data rate management strategies. **(07 Marks)**
    b. What is the significance of spread spectrum? Discuss FHSS. **(07 Marks)**
    c. Compare and contrast circuit switching with packet switching. **(06 Marks)**

**OR**

6   a. What is Hamming distance? Discuss about minimum hamming distance for error detection. **(06 Marks)**
    b. Define cyclic codes. Find the codeword C(X) using CRC for the information 1001 with generator 1011. **(06 Marks)**
    c. Explain direct sequence spread spectrum with an example. **(08 Marks)**

## Module-4

**7**  a.  What is the need of Bit stuffing and Byte stuffing at Data link layer? Explain with example for each.                                                          **(08 Marks)**
   b.  Illustrate the working of CDMA with suitable example.                          **(08 Marks)**
   c.  Explain three persistent methods of CDMA.                                      **(04 Marks)**

### OR

**8**  a.  Explain the three strategies used in CSMA/CA to avoid collision.              **(08 Marks)**
   b.  Discuss three controlled access methods.                                       **(06 Marks)**
   c.  Draw three structures of HDLC frames. Briefly explain control field for S frame.  **(06 Marks)**

## Module-5

**9**  a.  With a neat diagram of Ethernet frame, explain the seven fields.              **(08 Marks)**
   b.  List the goal of Fast Ethernet. Briefly explain the challenges in fast Ethernet about access method.                                                            **(08 Marks)**
   c.  Explain the three reasons why CSMA/CD algorithm does not work in wireless LANS.  **(04 Marks)**

### OR

**10**  a.  Explain the architecture of Bluetooth technology.                            **(06 Marks)**
    b.  Discuss briefly the operations of the cellular telephony.                      **(08 Marks)**
    c.  Explain the two kinds of services defined by IEEE 802.11 project.              **(06 Marks)**

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