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Fourth Semester B.E. Degree Examination, July/August 2022  
**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. What is Data Communication? With neat diagram, explain the components of data communication. (08 Marks)
- b. With neat diagram, explain four basic topologies. Assume that 10 devices are connected in mesh topology. How many duplex links are needed? How many ports are needed for each device? (08 Marks)
- c. Explain Half Duplex and Full Duplex with respect to data communication. (04 Marks)

OR

- 2 a. With neat diagram, explain TCP/IP protocol suite of computer networks. (08 Marks)
- b. Define transmission impairments. Explain different, causes of transmission impairment during signal transmission. (08 Marks)
- c. Explain briefly about Shannon capacity and Nyquist bit rate for communication channel. (04 Marks)

**Module-2**

- 3 a. With neat diagram, explain the most common technique to change analog signal to digital signal. (12 Marks)
- b. With a neat diagram, explain ASK, FSK and PSK. (06 Marks)
- c. In a digital transmission the receiver clock is 0.3 percent faster than the sender clock. How many extra bits per second does the receiver receive if the data rate is 1 Mbps? (02 Marks)

OR

- 4 a. Define line coding. List out its characteristics. Represent the sequence "01001110" using NRZ-L, NRZ-I and Manchester scheme. (10 Marks)
- b. Explain parallel and serial transmission modes. (06 Marks)
- c. An analog signal has a bit rate of 8000 bps and baud rate of 1000 baud. How many data elements are carried by each signal element? How many signal elements do we need? (04 Marks)

**Module-3**

- 5 a. What is circuit switching? Enumerate the characteristics of circuit switching. Analyze the three stages of circuit switching. (10 Marks)
- b. What is multiplexing? Explain wavelength division multiplexing. (05 Marks)
- c. Given data word 101001111 and divisor 10111. Show the generation of CRC codeword at the sender site. (05 Marks)

OR

- 6 a. What is spread spectrum? Explain FHSS and DHSS. (10 Marks)
- b. Analyze how message can be transferred from one system to another using datagram network and calculate the delay in the network. (05 Marks)

- c. Assume a packet is made any of four 16 bits words  $(466F)_{16}$ ,  $(726F)_{16}$ ,  $(757A)_{16}$  and  $(616E)_{16}$ . Find the sender site checksum using traditional checksum algorithm. (05 Marks)

**Module-4**

- 7 a. With neat diagram, explain point-to-point protocol frame format. (06 Marks)  
b. Explain pure ALOHA and slotted ALOHA protocols. (08 Marks)  
c. Explain the working of stop-and-wait protocol for Noiseless channels. (06 Marks)

OR

- 8 a. Analyze channelization. Explain Code Division Multiple Access (CDMA). (08 Marks)  
b. Mention different controlled access methods. Explain token passing method. (06 Marks)  
c. Explain class full addressing of IPV4. (06 Marks)

**Module-5**

- 9 a. Explain the operation of Cellular Telephony. (08 Marks)  
b. Explain Bluetooth Architecture. (05 Marks)  
c. Explain the different types of addressing mechanisms in IEEE-802.11. (07 Marks)

OR

- 10 a. With neat diagram, explain Ethernet frame format. (10 Marks)  
b. Explain access control of wireless LAN. (05 Marks)  
c. Explain Fourth Generation (4G) of Cellular Telephone. (05 Marks)

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