

Model Question Paper-1 with effect from 2019-20 (CBCS Scheme)

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Fourth Semester B.E. Degree Examination

Data Communication

Time: 03 Hrs

Max. Marks:100

Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**

Module – 1

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| 1. | a) What is Data Communication? With a neat diagram, explain the three basic topologies. | 6 |
| | b) List out the functionalities of physical layer, data link layer, network layer and Application layer. Explain in brief. | 8 |
| | c) Explain the different characteristics of periodic analog signal. | 6 |
| 2. | a) Define Nyquist bit rate and Shannon capacity. What are the propagation time and the transmission time for a 2.5-kbyte message (an e-mail) if the bandwidth of the network is 1 Gbps? Assume that the distance between the sender and the receiver is 12,000 km and that light travels at 2.4×10^8 m/s | 6 |
| | b) What is noiseless channel?. Find out the maximum bit rate in noiseless channel with a bandwidth of 3000 Hz transmitting a signal with two signal levels. | 4 |
| | c) Explain the different causes for transmission impairment during signal transmission through media | 10 |

Module – 2

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|----|--|----|
| 3. | a) Explain PCM and Quantization process with steps and examples. | 10 |
| | b) With the help of a neat diagram, explain the ASK, FSK and PSK. Discuss the bandwidth requirement in each case. | 10 |
| 4. | a) Explain Digital signal Transmission methods. | 6 |
| | b) Distinguish between low pass channel and band pass channel | 6 |
| | c) What is line coding? Represent the sequence "01001110" using NRZ-I, Manchester, differential Manchester and RZ coding schemes | 8 |

Module – 3

5. a) What is Multiplexing? Define Synchronous TDM with data rate management strategies. 8
b) Four 1-kbps connections are multiplexed together. A unit is 1 bit. Find (a) the duration of 1 bit before multiplexing, (b) the transmission rate of the link, (c) the duration of a time slot (d) the duration of a frame. 4
c) What is spread spectrum? Explain direct sequence spread spectrum with an example. 8

OR

6. a) Define cyclic code. Find the codeword $c(x)$, using CRC for the information 1101 with generator 1100. 6
b) With an example explain the computation of internet checksum. List the steps undertaken by the sender and receiver for error detection. 8
c) Define switching? Compare and contrast circuit switched network and packet switched network. 6

Module – 4

7. a) Describe the need for bit stuffing with an example. 4
b) Illustrate the working of CDMA with suitable example. 8
c) Explain the three persistence methods of CSMA. A network using CSMA/CD has a bandwidth of 10 Mbps. If the maximum propagation time (including the delays in the devices and ignoring the time needed to send a jamming signal) is $25.6 \mu s$, calculate the minimum size of the frame? 8

OR

8. a) Find the class of the following classful IP addresses: 4
a. 130.34.54.12 b. 200.34.2.1 c. 245.34.2.8 d. 110.11.5.88
b) Combine the following three blocks of addresses into a single block: 6
a. 16.27.24.0/26 b. 16.27.24.64/26 c. 16.27.24.128/25
c) Explain the functionalities of below protocols: 10
a. PPP b. ARP c. NAT d. DHCP e. ALOHA

Module – 5

9. a) Describe the frame format of standard Ethernet. 6
b) Define Bluetooth and explain the architecture of Bluetooth 6
c) Describe the MAC layers in IEEE 802.11 standard. 8

OR

10. a) Explain the operation of cellular telephony. 6
b) Explain Hidden and Exposed Station problems in IEEE 802.11 8
c) With a neat sketch, explain BSS and ESS 6