CBCS SCHEME

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18CS46

Fourth Semester B.E. Degree Examination, June/July 2025
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 a neat diagram, explain data flow techniques of data communication. **(06 Marks)**

b. Explain the functionalities of each layer in the TCP/IP protocol suite with logical connections between them. **(08 Marks)**

c. What is Noisy Channel? Assume we have a channel with 1 MHz bandwidth. The SNR for this channel is 63. What are the appropriate bit rate and signal level? **(06 Marks)**

OR

2 a. Design a Mesh topology for 5-nodes. Derive the number of links required for 7-nodes mesh network and mention its disadvantage. **(06 Marks)**

b. Explain different causes for transmission impairment during signal transmission through media. **(06 Marks)**

c. Distinguish between baseband transmission and broad band transmission. Illustrate the modulation of a digital signal for transmission on a bandpass channel. **(08 Marks)**

Module-2

3 a. Draw line coding scheme for NRZ-I RZ, Manchester and differential Manchester of scheme 11010010. Mention its advantages and disadvantages. **(07 Marks)**

b. What are the steps involved in P.C.M? Describe Quantization and encoding process with an example. **(08 Marks)**

c. An analog signal has a bit rate of 8000 bps and a bound rate of 1000 baud. How many data elements are carried by each signal element? How many signal element it need? **(05 Marks)**

OR

4 a. What is parallel and serial data transmission? Explain different types of serial transmission. **(07 Marks)**

b. Define digital to analog conversion. Explain Amplitude Shift Keying (ASK) and Phase Shift Keying (PSK). **(08 Marks)**

c. A channel has a bandwidth of 100 KHz which spans from 200 to 300 KHz. What are the carrier frequency and the bit rate if it is modulated by using ASK with d = 1? **(05 Marks)**

Module-3

5 a. What is the necessity of spread spectrum? Explain FHSS with neat diagram. **(07 Marks)**

b. Why signal multiplexing required? Which are the analog and digital multiplexing? Discuss FDM technique. **(07 Marks)**

c. What are different types of errors in data transmission? Discuss the process of error detection technique in block coding. **(06 Marks)**

OR

6 a. Define synchronous TDM with various data rate manufacturing strategies. **(06 Marks)**

b. Define switching. Explain virtual circuit network by demonstrating data transfer from source – to – destination. **(07 Marks)**

c. What is the special property of cyclic code? Design CRC encoder and decoder for the 1001 and divisor 1011. **(07 Marks)**

Module-4

7 a. Illustrate the working of CDMA with suitable example. **(07 Marks)**

b. What is framing? Explain character–oriented framing and bit oriented framing with example for each. **(07 Marks)**

c. Explain the functionalities of the following protocol.
i) NAT ii) DHCP iii) ARP. **(06 Marks)**

OR

8 a. Explain PPP protocol frame format. Also mention the different transition phases of PPP. **(07 Marks)**

b. A pure ALOHA network transmits 200 bits frames on a shared channel of 200 kbps. What is the through put if the system (all stations together) produces? **(06 Marks)**

c. Explain the address space in classful addressing with neat diagram. **(07 Marks)**

Module-5

9 a. Explain Ethernet frame format with neat diagram. **(06 Marks)**

b. Define Unicast, Multicast and broad cast address and show how the address – 47 : 20 : 1B : 2E : 08 : EE is sent out online. **(07 Marks)**

c. Define Bluetooth and explain the architecture of Bluetooth. **(07 Marks)**

OR

10 a. Discuss the operation of the cellular telephony. What is hard hand off and soft handoff? **(06 Marks)**

b. Define wireless Ethernet. With neat sketch explain Basic Service Set (BSS) and Extended Service Set (ESS). **(07 Marks)**

c. Explain frame format and frame type of the MAC layers in IEEE 802.11 standard. **(07 Marks)**

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