



**Fourth Semester B.E. Degree Examination, Dec.2024/Jan.2025**  
**Data Communication**

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 fundamental components of data communication. (05 Marks)
- b. With neat diagram explain the functionalities of each layer of OSI reference model. (10 Marks)
- c. What are ISPs? List and discuss different types of ISPs. (05 Marks)

**OR**

- 2 a. State the following terms : analog, digital, periodic, and non-periodic signals. Also sketch these signals. (06 Marks)
- b. What do you mean by transmission impairment? Explain the three causes of transmission impairment. (08 Marks)
- c. Write a note on the characteristics influencing the performance of the networks. (06 Marks)

**Module-2**

- 3 a. List any three line coding techniques, and represent the sequence 10110011 using techniques. (05 Marks)
- b. Explain the PCM techniques of changing analog signal to digital signal with neat diagram of PCM encoder and decoder. (10 Marks)
- c. What do you mean by sampling? Explain the three sampling methods with neat diagram. (05 Marks)

**OR**

- 4 a. Discuss the following transmission modes :  
 i) Parallel  
 ii) Serial  
 iii) Synchronous  
 iv) Asynchronous transmissions. (06 Marks)
- b. Define digital-to-analog conversion. List and define different types of digital-to-analog conversion. (06 Marks)
- c. Define frequency shift keying. Explain binary frequency shift keying and its implementation. (08 Marks)

**Module-3**

- 5 a. Highlight the concepts of multiplexing and list the categories of multiplexing. (04 Marks)
- b. Explain in detail synchronous time division multiplexing. (08 Marks)
- c. What is frequency hopping spread spectrum? Explain how it achieves bandwidth multiplexing. (08 Marks)

**OR**

- 6 a. Analyze in detail circuit switched network with neat diagram. (06 Marks)
- b. Describe virtual-circuit network. Discuss the five characteristics of virtual-circuit network. (08 Marks)
- c. Recall cyclic redundancy check with block diagram. Also explain CRC with an example. (06 Marks)

**Module-4**

- 7 a. What is the need for bit and byte stuffing at data link layer? Explain them with examples. (08 Marks)
- b. Discuss the three types of HDLC frames with neat diagrams. (08 Marks)
- c. Explain the transition phases of point-to-point protocol with relevant diagram. (04 Marks)

**OR**

- 8 a. What is channelization? List and explain the channelization protocols. (10 Marks)
- b. Discuss IPv4 addressing scheme and Dynamic Host Configuration Protocol (DHCP). (06 Marks)
- c. Write short notes on Networks Address Translation. (04 Marks)

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**Module-5**

- 9 a. With a neat diagram, explain the structure of 802.3 frame format. (08 Marks)
- b. How Bridge Networks Improves DLL performance? What are the goals of Fast Ethernet? (08 Marks)
- c. Explain 10 Gigabit Ethernet implementation. (04 Marks)

**OR**

- 10 a. Describe the MAC layer in IEEE 802.11 standard. (06 Marks)
- b. Highlight the architecture of Bluetooth and explain its frame. (04 Marks)
- c. Explain the operation of cellular telephony with neat diagram. (10 Marks)

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