

Class test - I

Course Title: Data Communication
Time: 35 minutes

Course Code: ICT-3101
Full Marks: 20

- 1 Define *Data Communication*. Write down the main five (5) components of data communication. 4
- 2 Briefly explain about simplex, half-duplex, and full duplex communication. Mention at least two real life applications of each type of communication scheme. 4
- 3 Write down the IEEE standard names of 802.3, 802.15, 802.16 2
- 4 Draw the ISO-OSI 7(seven) layer with their communication unit and briefly explain about physical, and transport layer. 4
- 5 TCP/IP reference model is more organized than ISO-OSI reference model- do you agree? Explain your answer. 3
- 6 Write short notes on physical, logical, and port addressing. 3



Class test - II

Course Title: Data Communication

Course Code: ICT-3101

Time: 35 minutes

Full Marks: 20

- 1 Define *Data and signals*. Write down the main distinctions between analog and digital signal. 4
- 2 A nonperiodic composite signal has a bandwidth of 220 kHz, with a middle frequency of 140 kHz and peak amplitude of 20 V. The two extreme frequencies have an amplitude of 5v. Draw the frequency domain of the signal. 4
- 3 A telephone line normally has a bandwidth of 3000. The signal-to-noise ratio is usually 3162. Now, calculate the theoretical highest bit rate of a regular telephone line. 3
- 4 What is *multiplexing*? Describe the *FDM Multiplexing* and *Demultiplexing* operation with appropriate diagram. 5
- 5 Four 1 MBPS synchronous TDM with a data stream for each input and one data stream for the output. The unit of data is 1 bit. Find (a) the input bit duration, (b) the output bit duration, (c) the output bit rate, and (d) the output frame rate. 4

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Class Test - III

Course Title: Data Communication

Time: 35 minutes

Course Code: ICT-3101

Full Marks: 20

- 1 Define core and cladding in terms of fiber optic communication. Write down the key distinctions among 50/125 μm 62.5/125 μm 100/125 μm fiber optic types. 4
- 2 Write down the key Comparisons among ground, sky, and Line of sight signal propagation 4
- 3 Compare circuit switching and packet switching in the context of voice and data communication. Which switching technique is more suitable for each type of communication, and why? Provide a justified explanation based on their characteristics. 3
- 4 Five equal-size datagrams belonging to the same message leave for the destination one after another. However, they travel through different paths as shown in table below. 5

| Datagram | Path Length | Visited Switches |
|----------|-------------|------------------|
| 1 | 3200 km | 1, 3, 5 |
| 2 | 11,700 km | 1, 2, 5 |
| 3 | 12,200 km | 1, 2, 3, 5 |
| 4 | 10,200 km | 1, 4, 5 |
| 5 | 10,700 km | 1, 4, 3, 5 |

We assume that the delay for each switch (including waiting and processing) is 3, 10, 20, 7, and 20 ms respectively. Assuming that the propagation speed is 2×10^8 m/s, find the **order the datagrams arrive at the destination and the delay for each**. Ignore any other delays in transmission.

Briefly explain a multistage switch with appropriate diagram

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Class test - IV

Course Title: **Data Communication**

Course Code: **ICT-3101**

Time: **35 minutes**

Full Marks: 20

- 1 Define line coding. Briefly describe the DC component and synchronization problem for signal transmission. 3
- 2 Draw the Digital signal graph of the NRZ-L, Manchester, and 2B1Q scheme using each of the following data streams 6
 - I. 01010101
 - II. 00110011
- 3 Describe the Pulse Code Modulation (PCM) operation with appropriate diagram 5
- 4 In MFSK, We need to send data 3 bits at a time at a bit rate of 3 Mbps. The carrier frequency is 10 MHz. Calculate the number of levels (different frequencies), the baud rate, and the bandwidth. Draw the representation of the solution. 3
- 5 Briefly explain the Quadrature PSK (QPSK) operation with appropriate diagram.