INDIAN INSTITUTE OF INFORMATION TECHNOLOGY, NAGPUR

Department of Computer Science and Engineering
Sessional-I Examination
CSL302: Computer Networks

Date: 28/08/2024 (Wednesday)
Time: 03:00 PM to 4:00 PM

Duration: 1 Hours.   **Max. Marks**: 15

Important Instructions:
- All the questions are compulsory.
- Maximum marks that can be obtained for a particular question are indicated in the brackets [] on the right-hand side of the question

1.	Consider two hosts X and Y connected by a single direct link of rate 10^6 bits/sec. The distance between the two hosts is 10,000 km and the propagation speed along the link is 2×10^8 m/sec. Host X sends a file of 50,000 bytes as one large message to host Y continuously. Let the transmission and propagation delays be p milliseconds and q milliseconds respectively, then find the value of p & q?	[4]	CO1, CO4

2.	Assume the following scenario: Data: 1101011011 ; Generator Polynomial: 10011. An error occurs in the transmission at positions 3, 7, and 10 (counting from the left, starting from 1). Then find the following:
	
	  A. The CRC codeword.
	  B. The received codeword after errors are introduced.
	  C. Whether the error is detectable using the given generator polynomial.
	
	Give justification for your answer.
		[4]	CO1, CO4

3.	You are a network administrator tasked with diagnosing a network issue. During your analysis, you come across the following situations involving various network components and tasks. Your task is to identify the OSI layer primarily responsible for each scenario and briefly explain why. **Situation 1**: A user reports that they are unable to access a website using its domain name, but they can access it using the IP address directly. **Situation 2**: A network switch is managing the flow of data between devices on the same local network but is failing to direct the traffic correctly. **Situation 3**: A large file transfer between two servers on different networks fails halfway through. You suspect an issue with how the data is being segmented and reassembled.	[4]	CO1

4.	A digital communication system transmits the following bit sequence at a data rate of 1 Mbps: **1101010110010011**. Given the following encoding techniques, calculate the bandwidth required for each and draw the waveform: (Assume bandwidth for Unipolar NRZ and Polar RZ encoding is directly proportional to the bit rate and differential Manchester encoding requires twice the bandwidth of the bit rate).
	
	  a. Unipolar NRZ (Non-Return-to-Zero)
	  b. Polar RZ (Return-to-Zero)
	  c. Differential Manchester Encoding
		[3]	CO1, CO4