JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B.Tech-VI Semester (CSE/IT/BT/ECE/CE)

COURSE CODE (CREDITS): 18B11CI611 (3) MAX. MARKS: 15

COURSE NAME: Computer Networks

COURSE INSTRUCTOR: HRI/NTS/GVN/SRJ MAX. TIME: 1 Hour

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculators is allowed

Q.No	Question	CO	Marks
Q1	(a) For *n* devices in a network, what is the number of cable links required for a mesh, ring, bus, and star topology? (b) Protocol layering can be found in many aspects of our lives such as air travelling. Imagine you make a round-trip to spend some time on vacation at a resort. You need to go through some processes at your city airport before flying. You also need to go through some processes when you arrive at the resort airport. Show the protocol layering for the round trip using some layers such as baggage checking/claiming, boarding/unboarding, takeoff/landing.	CO1	2+2
Q2	(a) In a digital communication system, the signal-to-noise ratio (SNR) of a channel is 42 dB. If the available channel bandwidth is 5 MHz, determine the theoretical maximum data rate supported by the channel using Shannon's capacity theorem. (b) A data communication link has a bandwidth of 20 Mbps and a one-way propagation delay of 25 ms. If the frame size is 1,000 bytes, determine the minimum window size (number of frames) required to fully utilize the link.	CO1	1.5+1.5
Q3	(a) In modern communication networks, efficient data transmission is achieved by breaking large messages into smaller units before sending them across the network. These smaller units may travel independently through different routes and are later combined at the receiver's end to reconstruct the original message. Identify and briefly explain the data switching technique used in this communication process.	CO1	2+2

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	(b) For the data 01001110, show the following line coding, assuming previous signal before starting of data set was positive. (i) NRZ-L Polar (ii) NRZ-I Polar (iii) Manchester (iv) Differential Manchester		
Q4	(a) Briefly describe the jobs and responsibilities of data link layer. (b) A sender wants to transmit the data word **1101011011** using **CRC** for error detection. The generator polynomial is **10011.** Find (i) The CRC code. (ii) Determine the transmitted frame	CO2	2+2