JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-3 EXAMINATION-MAY-2026

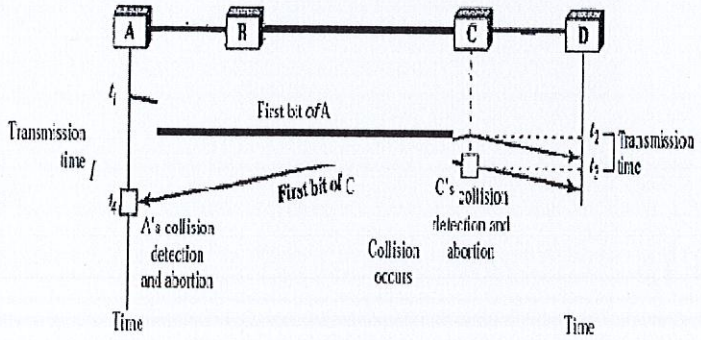
B.Tech- IVth Semester (ECE)

COURSE CODE (CREDITS): 25B11EC416 (3) MAX. MARKS: 35

COURSE NAME: Telecommunication Networks

COURSE INSTRUCTOR: Dr. Pardeep Garg MAX. TIME: 2 Hours

Note: (a) All questions are compulsory. (b) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems. (c) Calculator is allowed.

Q. No	Question	CO	Marks
Q1	In figure 1, the data rate is 20 Mbps, the distance between station A and C is 3000 m, and the propagation speed is 2.5 x 10^8 m/s. Station A starts sending a long frame at time t_1 =0; station C starts sending a long frame at time t_2 = 4 µsec. The size of the frame is long enough to guarantee the detection of collision by both stations. Find the following: a. The time when station C hears the collision *(t3).* b. The time when station A hears the collision *(t4).* c. The number of bits station A has sent before detecting the collision.  **Figure 1**	CO-3	1+1+1=**3**
Q2	Why the vulnerable time in ALOHA depends upon T_{fr}, but in CSMA/CA depends upon T_p?	CO-3	**2**
Q3	**a)** Show the original (unabbreviated) form of the following IP address: **0:FDB:234::3C** **b)** Write the following mask in slash notation (/n) and justify your answer: **255.255.240.0**	CO-4 CO-4	**1.5** **1.5**
Q4	Elucidate the concept of Network Address Translation (NAT) and critically analyze its role in mitigating the exhaustion of the IPv4	CO-4	**3**

	address space.		
Q5	**a)** An IPv4 datagram is carrying 1024 bytes of data. If there is no option information, what is the value of the header length field? What is the value of the total length field? **b)** An IPv4 datagram arrives with fragmentation offset of 0 and an Mbit of 0. Is the datagram fragmented? If fragmented, is this a first fragment, middle, or last fragment?	CO-4 CO-4	1+1=**2** **1**
Q6	Discuss the possible strategies for transition from IPv4 to IPv6.	CO-4	**3**
Q7	An organization is granted the block 130.56.0.0/16. The administrator wants to create 1024 subnets. a. Find the subnet mask. b. Find the number of addresses in each subnet. c. Find the first and last addresses in subnet 1. d. Find the first and last addresses in subnet 1024.	CO-4	1+1+1.5 +1.5 = **5**
Q8	Describe the operational principles of Distance Vector Routing (DVR) algorithm, and critically evaluate its inherent limitations, particularly in the context of routing instability.	CO-4	3+2=**5**
Q9	Write short note on the following: a) UDP and its comparison with TCP b) ISDN and B-ISDN	CO-4	 3+1=**4** 3+1=**4**