JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- APRIL-2023

COURSE CODE (CREDITS): 18B11CI611 (3) MAX. MARKS: 25

COURSE NAME: COMPUTER NETWORKS

COURSE INSTRUCTORS: Vipul, Amit, Arvind, Pankaj, Jagpreet

MAX. TIME: 1 Hour 30 Minutes

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q. No. 1

a) Consider a CSMA/CD network that transmits data at a rate of 100 Mbps over a 1 km cable with no repeaters. If the minimum frame size required for this network is 1250 bytes, what is the signal speed in the cable? **[3, 2] [CO-4]**

b) 1000 airline reservation stations are competing for the use of a single slotted ALOHA channel. The average station makes 36 requests per hour. A slot is 100 μsec. What is the approximate total channel load?

Q. No. 2

a) Given an 8 bit data string: 00111001. Compute the parity bits for the given data string. Now let us assume that the third bit is corrupted. Use Hamming code to detect and correct the corrupted bit. **[3, 2] [CO-2]**

b)

i. A bit-stuffing based framing protocol uses an 8-bit delimiter pattern of 01111110. If the output bit-string after stuffing is 01111100101, then find out the input bit-string.

ii. In a data link protocol, the frame delimiter flag is given by 0111. Assuming that bit stuffing is employed, find out the output bit sequence if data sequence is 01110110.

Q. No. 3

a) Assume Bandwidth= 3 mbps and Propagation Delay=2 msec. Find the value of Size of Data packet (L) for which the efficiency (η) should be at-least 50%. **[3,2] [CO-3]**

b) If every 6th packet that is being transmitted is lost in GoBack-4 protocol. If we have to send 10 packets, then find out how many retransmissions are required.

Q. No. 4 a) Find the class of the following IP addresses. [2, 3] [CO-4]

i. 11110111 11110011 10000111 11011101
ii. 10101111 11000000 11110000 00011101
iii. 11011111 10110000 00011111 01011101
iv. 11101111 11110111 11000111 00011101

b) An ISP is granted a block of addresses starting with 120.60.4.0/22. The ISP wants to distribute these blocks to 100 organizations with each organization receiving just eight addresses. Design the subblocks and give the slash notation for each subblock. Find out how many addresses are still available after these allocations.

Q. No. 5 a) In a CSMA/CD network with a data rate of 10 Mbps, the maximum distance between any station pair is found to be 2500 m for the correct operation of the collision detection process. What should be the maximum distance if we increase the data rate to 100 Mbps? To 1 Gbps? To 10 Gbps? [2,1,3] [CO-4,3]

b) A sender sends a series of packets to the same destination using 5-bit sequence numbers. If the sequence number starts with 0, what is the sequence number after sending 100 packets?

c) Using 5-bit sequence numbers, what is the maximum size of the send and receive windows for each of the following protocols?

i. Go-Back-N ARQ
ii. Selective-Repeat ARQ