JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS-2022

B.Tech-VI Semester (CS&IT)

COURSE CODE (CREDITS): 18B11CI611 (3)   MAX. MARKS: 35

COURSE NAME: COMPUTER NETWORKS

COURSE INSTRUCTORS: Jagpreet, Arvind Kumar, Vipul Sharma, Praveen Modi, Pankaj
Dhiman   MAX. TIME: 2 Hours

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

Q. No. 1   (a) In electronic mail, what are the tasks of a user agent, MIME, POP3 and   [2, 3]
            IMAP4?   [CO-6,2]

            (b) Consider a source computer (S) transmitting a file of size 10^6 bits to a destination
            computer (D) over a network of two routers (R 1 and R 2) and three links (L 1, L
            2, and L 3). L 1 connects S to R 1; L 2 connects R 1 to R 2; and L 3 connects R 2
            to D. Let each link be of length 100 km. Assume signals travel over each link at
            a speed of 10^8 meters per second. Assume that the link bandwidth on each link is
            1Mbps. Let the file be broken down into 1000 packets each of size 1000 bits.
            Find the total sum of transmission and propagation delays in transmitting the file
            from S to D?

Q. No. 2   (a) In an IPv4 datagram, the M bit is 0, the value of HLEN is 5, the value of   [2, 3]
            total length is 200, and the offset value is 200. What is the number of the   [CO-4,5]
            first byte and number of the last byte in this datagram? Is this the last
            fragment, the first fragment, or a middle fragment?

            (b) What can you say about the TCP segment in which the value of the control
            field/flag is one of the following?
            a. 000000
            b. 000001
            c. 010001

Q. No. 3   (a) Find the topology of the network if Table is the routing table for router   [2,3]
            R1.   [CO-4]

Mask	Network Address	Next-Hop Address	Interface
/27	202.14.17.224	-	m1
/18	145.23.192.0	-	m0
Default	Default	130.56.12.4	m2

(b) Contrast and compare Distance Vector Routing with Link State Routing with a suitable illustration.

Q. No. 4   (a) Compare the TCP header and the UDP header with suitable illustrations. List the fields in the TCP header that are missing from UDP header. Give the reason for their absence.   [3, 2] [CO-5]

(b) Show the entries for the header of a TCP segment that carries a message from an FTP client to an FTP server. Fill the checksum field with 0's. Choose an appropriate ephemeral port number and the correct well-known port number. The length of the data is 40 bytes.

Q. No. 5   (a) An organization is granted the block 130.56.0.0/16. The administrator wants to create 1024 subnets.   [5] [CO-4]
   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.

Q. No. 6   A sender uses the Stop-and-Wait ARQ protocol for reliable transmission of frames. Frames are of size 1000 bytes and the transmission rate at the sender is 80 Kbps (1Kbps = 1000 bits/second). Size of an acknowledgement is 100 bytes and the transmission rate at the receiver is 8 Kbps. The one-way propagation delay is 100 milliseconds. Assuming no frame is lost, find the sender throughput in bytes/second?   [5] [CO-3]

Q. No. 7   (a) In symmetric-key and asymmetric-key cryptography, if every person in a group of 10 people needs to communicate with every other person in another group of 10 people, how many secret keys are needed?   [3, 2] [CO-7]
   (b) In symmetric-key and asymmetric-key cryptography, if every person in a group of 10 people needs to communicate, with every other person in the group, how many secret keys are needed?