National University of Computer and Emerging Sciences, Lahore
Campus **Quiz ……1 [BCS: Section 5A] Fall 2024**

Computer Networks (Code: CS3001)   **Quiz Date: September 03, 2024**

Total Marks: 15   **Duration: 20 -Minutes**

Name --- Roll #---

Instructions: Attempt all questions on this sheet. You can make use of rough sheet (do not attach to this sheet).

Q1: Identify and encircle the correct option(s).   **(3 Marks)**   **[CLO 1]**

I. For over a hundred years, _____ has been used by telephone networks.
(a) Twisted pair copper wire   (b) Coaxial cable
(c) Fiber optic cable   (d) None of the given options

2-The two main types of switching networks are:
(a) Routers and Switches   **(b) Circuit-switched and Packet-switched**
(c) Wi-Fi and Ethernet   (d) None of these

3- Server is part of the
(a) Edge Network   (b) Core Network   (c) Both Edge & Core Network (d) None of these

Q2: The first column of the table shows the function of a layer in the Internet protocol stack. You are required to write the correct name of the layer in second column that matches with the function provided in the first column.   **(5 Marks)**   **[CLO 1]**

Function of a layer	Layer Name
Protocols that are part of a distributed network application.	Application
Transfer of data between one process and another process (typically on different hosts).	Transport
Delivery of datagrams from a source host to a destination host.	Network
Transfer of data between neighboring network devices.	Link
Transfer of a bit into and out of a transmission media.	Physical

Q3: Consider a packet of length 3000 bytes, which starts at source end system and travels over four links to destination end system. Three packet switches connect these four links. Suppose that propagation speed on all four links is 2×10^8 m/s. The transmission rate of all four links is 2 Mbps and each packet switch incurs a processing delay of 5 msec. Moreover, suppose that the distance from source end system to packet switch 1 is 5,000 km, the distance from packet switch 1 to packet switch 2 is 4,000 km, the distance from packet switch 2 to packet switch 3 is 3,000 km, and the distance from packet switch 3 to destination end system is 1,000 km. What is the end-to-end delay for these values assuming no queuing delay exist?   **(7 Marks)**   **[CLO 1]**

Write your Answer for Q3 on backside of this sheet.

Solution:

Length of packet = L = 3000 x 8 = 24000 bits
Transmission rate of links: $R_1=R_2=R_3=R_4$ = 2 Mbps = 2×10^6 bps
Transmission delay of each link (L/R): $d_{trans1} = d_{trans2} = d_{trans3} = d_{trans4} = 24000/ 2 \times 10^6$ = 12 msec

Propagation speed of links: $s_1 = s_2 = s_3 = s_4 = 2 \times 10^8$ m/s
Distance between links: d_1 = 5000 km, d_2 = 4000 km, d_3 = 3000 km, and d_4 = 1000 km
$d_{prop1} = d_1/s_1 = 5000 \times 10^3 / 2 \times 10^8$ = 25 msec
$d_{prop2} = d_2/s_2 = 4000 \times 10^3 / 2 \times 10^8$ = 20 msec
$d_{prop3} = d_3/s_3 = 3000 \times 10^3 / 2 \times 10^8$ = 15 msec
$d_{prop4} = d_4/s_4 = 1000 \times 10^3 / 2 \times 10^8$ = 5 msec
$d_{prop} = d_{prop1} + d_{prop2} + d_{prop3} + d_{prop4}$ = 25 + 20 + 15 + 5 = 65 msec

Processing delay of each packet switch: $d_{proc1} = d_{proc2} = d_{proc3}$ = 5 msec

$d_{end-end} = 4 * d_{trans} + d_{prop} + 3 * d_{proc}$ = 4 x 12 + 65 + 3 x 5 = 48 + 65 + 15 = 128 msec