

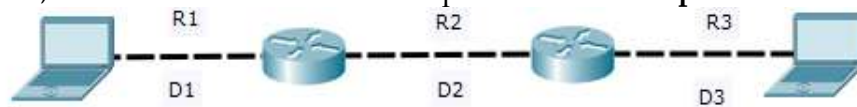


[Any examinee found adopting unfair means will be expelled from the trimester/program as per UIU disciplinary rules.]

There are **3 (Three)** questions. Answer **all 3 (Three)** questions. All questions are of values indicated on the right-hand margin.

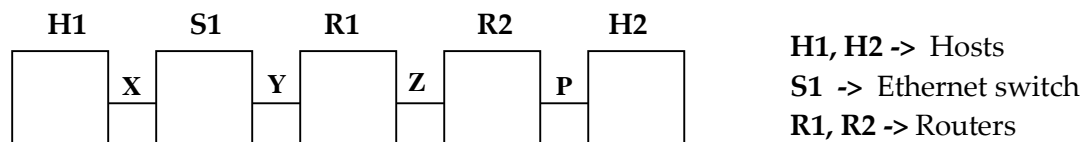
Q.1 a) What are the **two technologies** used in the **Network Core**? List with **1 example**, **1 advantage** and **1 disadvantage** of each one. [2]

b) Consider a packet of **length L = 2000 bytes** begins at end **system A** and travels over **three links** to a destination end system. Both the routers apply **store and forward** packet switching, i.e., receives entire packet before forwarding. For this example, assume **R1 = 500 bps**, **R2 = 2 Mbps** and **R3 = 256 Kbps**, **D1 = 200 m**, **D2 = 2 Km** and **D3 = 500 m**. Propagation speed of medium = **2.1 x 10⁸ ms⁻¹**. If packet processing time in each router is **10 ms**, what will be the **total time** required to send the packets to **Host B**. [2]



c) Assign the term **“Frames”**, **“Packets”**, **“Segments”** and **“Signals”** to the layers of the **OSI reference models**. [1]

d) Consider the following diagram, where **X**, **Y**, **Z** and **P** are data packets: [2]



- i. Which packets (X/Y/Z/P) contains **R2.ip**?
- ii. Which packets (X/Y/Z/P) contains **H2.ip**?
- iii. Which packets (X/Y/Z/P) contains **R1.mac**?
- iv. Which packets (X/Y/Z/P) contains **H2.mac**?

Q.2 a) Suppose your browser (client) downloads a webpage. The **base html (master index file)** object is **100 Kbytes** in length and additionally contains **10 embedded images**, each **20 Kbytes** in length. All links have capacity of **5 Mbps**. Assume as shown in the following diagram:

- ✓ The **base html** is stored in the **original server** and the **10 images** are all stored on the **CDN server**.
- ✓ **R1** (RTT between Client and original server) = **500 ms** and **R2** (RTT between Client and CDN server) = **100 ms**.

Calculate the **response time** to download the entire web page for (i) **Sequential** non-persistent HTTP, (ii) **Parallel** non-persistent HTTP, (iii) **Sequential** persistent HTTP, and (iv) **Parallel** persistent HTTP. [4]

b) Suppose a **client** process (Browser) in a **host** named **“UIU-lab-Pc9”** wants to communicate with the HTTP **server** process running on **“cisco.uiu.ac.bd”**.

- i. Show the necessary **diagram** and the **steps** at intermediate servers to show how the hostname **“cisco.uiu.ac.bd”** will be resolved using **iterative query** process. Assume that caches at all the intermediate servers are **empty**. [3]
- ii. **List the entries** (name to IP mappings) cached in the local DNS server after the process. [1]

Q.3 a) What are the **reasons** for UDP been faster than TCP? Is it possible for an application to enjoy **reliable data transfer** even when the application runs over **UDP**? If so, **how**? [2]

b) Suppose, **Host A** sends packets to **host B** using **Go-back-N** protocol, where **window size**, **N = 3**. Now, in the middle of transmission **PKT2**, **PKT4** and **PKT6** got lost. Show the **sequence diagram** for the entire scenario of sender and receiver until the **8th packet** is received successfully by the receiver. [3]