United International **University** (**UIU**)

Dept. of Computer Science and Engineering (CSE)

MidTerm Assessment Year: **2021** Semester: **Fall**

Course: **CSE 323** Title: **Computer Networks (Section – A/B/D/E)**

Marks: **30** Time: **1 Hour 45 minutes**

[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.

Q1. a) What are the **two technologies** used in the **Network Core**? Describe each one with proper **example, advantages** and **disadvantages**. **[3]**

b) **How long** does it take a packet of length **1,000 bytes** to **propagate** over a link of distance **2,500 km**, propagation speed **2.5 x 10^8 m/s**, and transmission rate **2 Mbps**? Does this delay depend on **packet length**? Does this delay depend on **transmission rate**? **[1+0.5+0.5 = 2]**

c) How **layering architecture** simplifies network operations? Specify **3 distinct advantages**. **[3]**

d) Suppose a process wants to send a **message** of **3000 bytes** to its peer process, using an existing TCP connection. Each **TCP segment** can carry **maximum 500 bytes** of application data. The **TCP segment** consists of the message plus **20 bytes of header**. The segment is encapsulated into an **IP packet** that has an additional **20 bytes of header**. The IP packet in turn goes inside a **Data Link frame** that has **30 bytes of header** and **trailer combined**.

i. What **percentage of the transmitted bits** in the physical layer corresponds to the **overhead**? **[2]**

ii. If we increase maximum data size in a single segment from **500 bytes** to **1000 bytes**, is it an **advantage** or **disadvantage**? **Justify** in terms of **delay**. **[2]**

Q.2 a) Suppose your browser (client) downloads a webpage. The **base html (master index file)** object is **500 Kbytes** in length and additionally contains **9 embedded images**, each **200 Kbytes** in length. All links have capacity of **5 Mbps**. Given the following information:

- ✓ The **base html** is stored in the **original server** and the **CDN servers 1, 2 & 3** stores **3 images** each.
- ✓ **R1** (RTT between Client and original server) = **500 ms**, **R2** (RTT between Client and CDN server 1) = **200 ms**, **R3** (RTT between Client and CDN server 2) = **100 ms**, and **R4** (RTT between Client and CDN server 3) = **50 ms.**

Calculate the **response time** to download the entire web page for (i) **Sequential & Parallel** non-persistent HTTP**, and** (ii) **Sequential & Parallel** persistent HTTP. **[5]**

b) A browser contains a file "**abcd.html**" in its cache memory and sends a "**conditional get**" request to the server. Suppose, the file is **not updated** after the "**last-modified:**" date stored in the browser. Should the server explicitly return the contents of the file? **How** can you tell? **[2]**

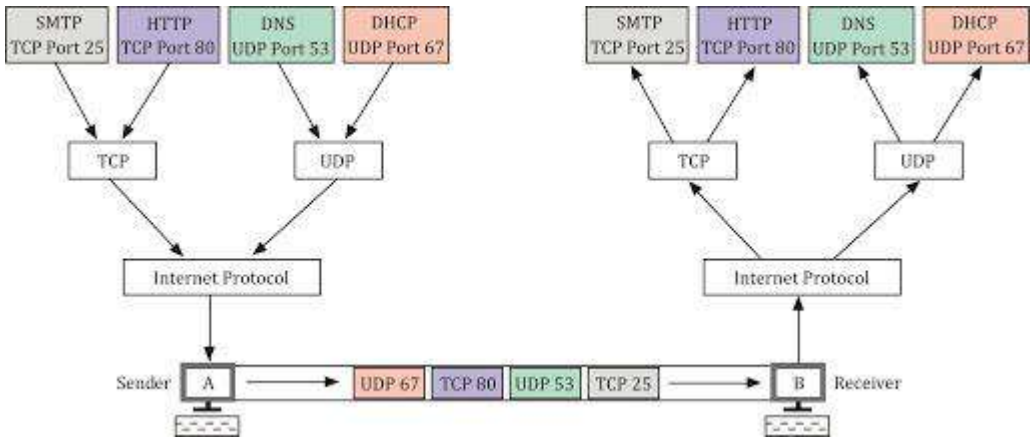
c) In the following DNS database, **Aroot**, **Acom**, and **Agoogle.com** denote the **name servers** in the name zone x. **Ax** is a variable and **NOT** a hostname.

Name Server Variable	Resource Record
Aroot	{com, a.gtld-servers.net, NS, IN}
Aroot	{ a.gtld-servers.net, 192.5.6.30, A, IN}
Acom	{google.com, ns1.google.com, NS, IN}
Acom	{ ns1.google.com, 216.239.32.10, A, IN}
Agoogle.com	{www.google.com, 66.102.7.104, A, IN}
Agoogle.com	{mail.google.com, 66.102.7.83, A, IN}

i. Using the resource records given, provide the **hostnames** and **IP addresses** for **Acom**, **Agoogle.com** and **google's mail server.** **[3]**

ii. Suppose, a new startup company "newsBD" wants to set up company network with an authoritative DNS server: "**dns1.newsBD.com**" with IP as "**129.198.1.48**" under the **.com TLD** DNS server. What **resource records (RRs)** do you need to provide to the upper-level "**.com**" Registrar? **[2]**

Q3. a) **What information** is used by a process running on one host to **identify a process** running on another host? **Identify** and **Explain** how **multiplexing** and **de-multiplexing** have been applied in the following scenario: **[1 + 2 = 3]**



b) Suppose, **Host A** sends packets to **host B** using **Go-back-N** protocol, where **window size**, **N = 4**. Now, in the middle of transmission **PKT3**, **PKT6** and **PKT7** 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]**

←End of Paper – Thank You→