CSE 323: Computer Networks
United International University (UIU)
Mid Term Examination, Summer 2017
Total Marks: 30 **Time:** 1 Hour 45 Minutes
Answer any 6 (six) questions

Q1.

a) Discuss **four** types of **delays** associated with a packet switched network. [2]

b)

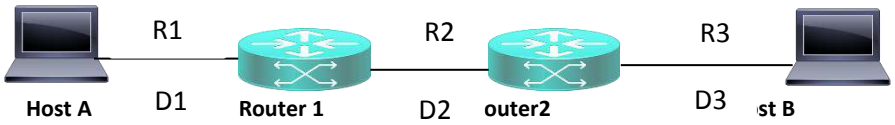

Figure 1: Simple Network with two routers

For the given network, assume the Transmission Rate of the three links are R1 = 2 Mbps, R2 = 1 Mbps and R3 = 500 kbps. The distance of the segments are D1 = 2km, D2 = 3km, D3 = 4km.

i) What is the end-to-end throughput? [1]

ii) If Host A wants to send a file containing three million bits to Host B, what will be the required time? Only consider transmission and propagation delay in the network. The propagation speed of the medium is $2x10^8$ ms^{-1}. There is no store and forward packet switching in routers. [2]

Q2.

a) Mention **two** benefits of **circuit switching** over packet switching. [1]
b) Mention **one difference** between virus and worm. [1]
c) What is **IP Spoofing**? Draw a figure and explain. [1]
d) For Figure 1, suppose **Host A** wants to send **3 (three)** packets, each containing L = 168 bits to **Host B**. In this case, the routers apply **store and forward** packet switching. For this example, assume R1 = R2 = R3 = R = 257 bps. What will be the **total time** required to send all 3 (three) packets to **Host B**. Ignore the Propagation Delay. [2]

Q3.

a) What is **RTT**? [1]

b) Explain the **Response Time** for a single file transfer using **non-persistent HTTP** protocol with a timing diagram. [2]

c) Mention **two differences** between **P2P** and **Client-Server** architecture [1]

d) Name **two method** types of **HTTP/1.1** protocol. What does **PUT** method do? [1]

Q4.

a) Explain how load distribution works in DNS resolution? [1]

b) What happens if the host at cse.uiu.ac.bd wants to get the IP address of PYRO.eee.umass.edu and the domain name is resolved using **recursive query** process? Draw the diagram and explain. [2]

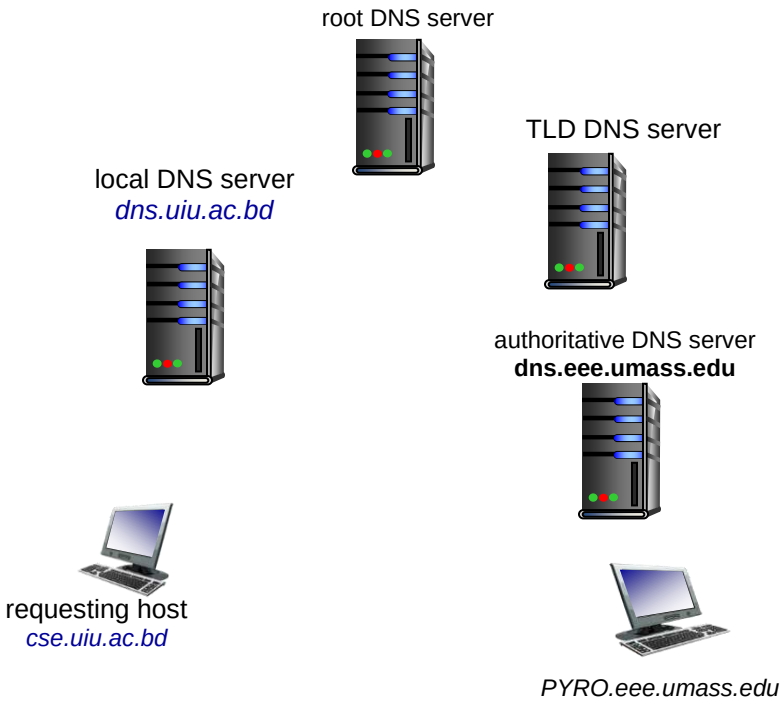

Figure 2: DNS Query Resolution

c) Write about four types of **DNS records** with necessary examples. [2]

Q5.

a) Write down **two usages** for cookies. [1]

b) Suppose Alice wants to send an email from alice@google.com to Bob at bob@yahoo.com. Draw a simple diagram depicting the **user agent, mailbox, SMTP protocol and mail message protocol** in the diagram. [2]

c) A simple website without any image content requires 2(two) RTTs to load in your browser. Suppose a website contains 20 images. Now using non-persistent HTTP connection, what is the total time required to download the entire content of that website? Given that, RTT = 20ms, ignore Transmission Delay. [2]

Q6.

a) Explain **MUX** and **DeMUX** process with simple diagrams. [2]

b) Mention the **four components** of an UDP header [2]

c) And UDP packet has the following data -

1110 1110 1010 1011
1110 1000 1101 1000

Calculate the **internet checksum** for the UDP packet [1]

Q7.

a) How many **bits** are needed to represent the **sequence number** of a packet in **RDT 2.1**? Why? [2]

b) What is the **fatal flaw of RDT 2.0**? What measures can we take to solve this problem? [2]

c) Use the following the **FSM** of **RDT 2.0** to mark the state changes that will occur when there is an error in packet. [1]

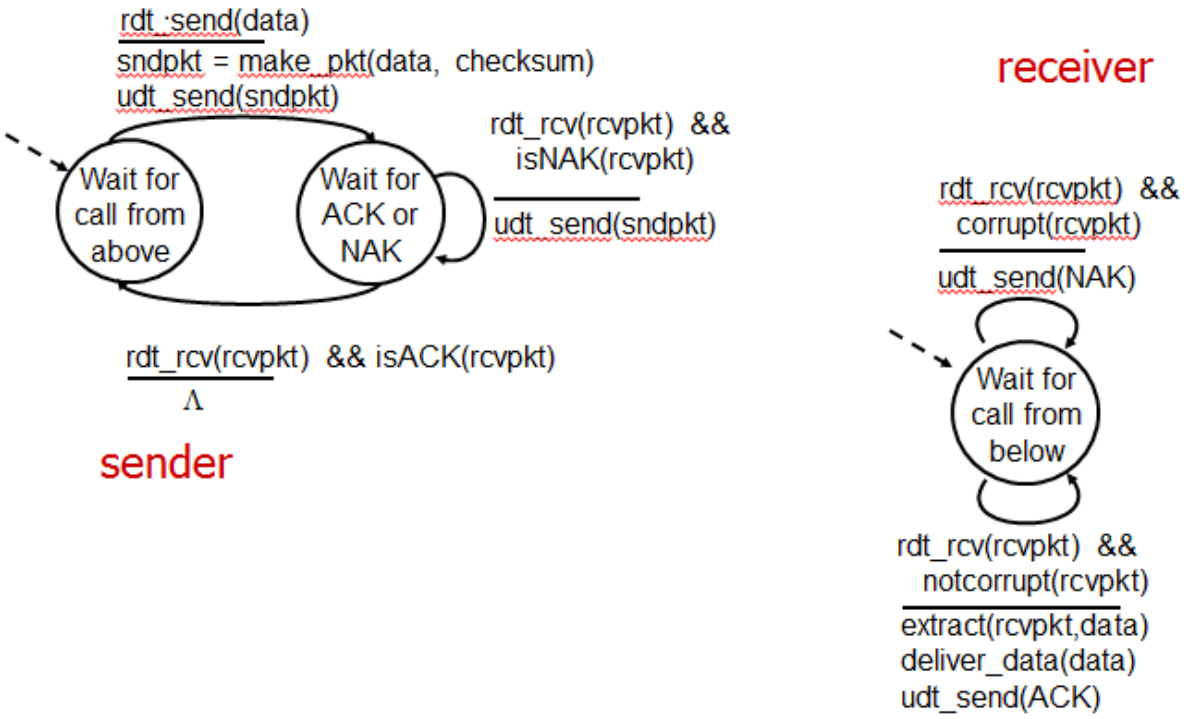

Figure 3: Finite State Machine representation for RDT 2.0

Q8.

a) Mention 2 (two) benefits of using **UDP protocol** over using **TCP protocol** [1]

b) In case of **RDT 3.0**, suppose there is a scenario where the **acknowledgment** packet from the **receiver** was delayed and arrived at the sender after the packet was retransmitted. Explain with a **timing diagram** how sender and receiver react to recover from this premature timeout situation. [2]

c) Using the following figure, explain how pipelining can increase the **utilization** of a channel from **stop-and-wait** protocols. Show necessary calculations assuming, pipeline size n = 5, RTT = 10s, Packet Size = 100 kb and Transmission Rate = 1000kbps, [2]

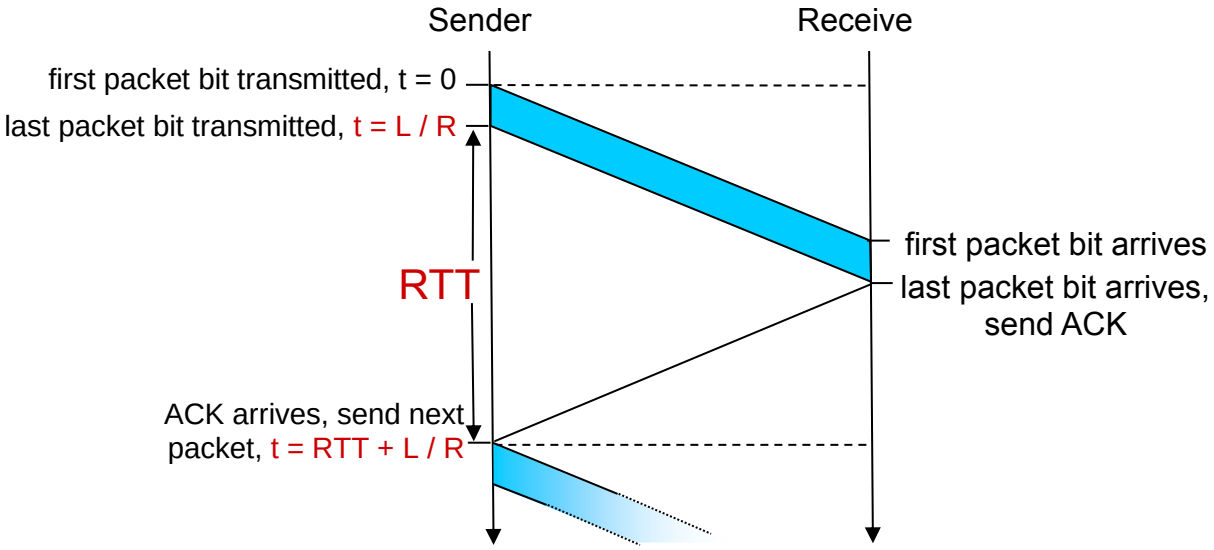

Figure 4: Timing diagram for non-pipelined protocols