Candidate Seat No.....

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

Sixth Semester of B. Tech. (CE) Examination

May 2022

CE358: COMPUTER NETWORKS

Date: 12/05/2022, Thursday **Time: 10:00 am To 01:00 pm** **Maximum Marks: 70**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make & specify suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q – 1 State True or false. **[05]**

a) A user requests a Web page that consists of some text and three images. For this page, the client will send one request message and receive four response messages.

b) Two distinct Web pages (for example, www.mit.edu/research.html and www.mit.edu/students.html) can be sent over the same persistent connection.

c) With non-persistent connections between browser and origin server, it is possible for a single TCP segment to carry two distinct HTTP request messages.

d) The Date: header in the HTTP response message indicates when the object in the response was last modified.

e) HTTP response messages never have an empty message body.

Q - 2 Do as Directed (Any Three). **[15]**

(a) Provide reasons for Internet growth in recent years.

(b) List and explain major five standardization organizations that create standards for data communications and computer networking.

(c) Difference between TCP and UDP.

(d) List the layers in the TCP/IP model, and give a brief explanation of any four layers.

(e) Describe the different parts of a URL, and what punctuation is used to separate the parts?

Q - 3 Do as Directed (Any Three). **[15]**

(a) What is the use of HTTP in Computer Network? Describe any four HTTP request methods, with the usage of each method.

(b) What are the characteristics of SMTP?

(c) Describe why an application developer might choose to run an application over UDP rather than TCP.

(d) List and explain the Services TCP Provides to Applications.

SECTION – II

Q – 4 Do as Directed **[05]**

(a) Suppose that host 222.222.222.220 wants to send a datagram that is IP addressed to another host or router on that subnet. The sending host needs to obtain the MAC address of the destination given the IP address. This task is easy if the sender's ARP table has an entry for the destination node. But what if the ARP table doesn't currently have an entry for the destination? (You can refer Figure 1 for the above scenario) [02]

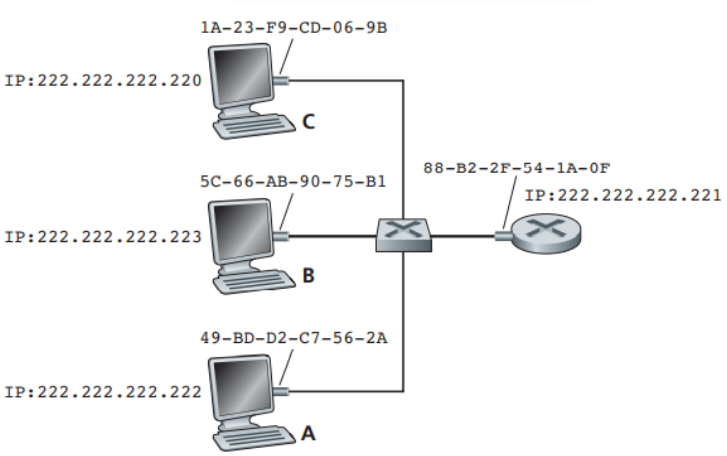

Figure 1: IP Scenario

(b) Make an important distinction between the forwarding and routing functions of the network layer with proper explanations. [03]

Q - 5 Do as Directed (Any Three). **[15]**

(a) In the sending host, when the transport layer passes a packet to the network layer, specific services that could be provided by the network layer. Explain such services in brief.

(b) List down and illustrate the services those could be provided to a flow of packets between a given source and destination.

(c) The network-layer connection and connectionless services have some parallels with transport-layer connection-oriented and connectionless services, there are crucial differences. Describe such differences.

(d) What are the main functions in the socket API?

(e) Design the simplest possible transport-layer protocol that will get application data to the desired process at the destination host. Assume the operating system in the destination host has assigned a 4-byte port number to each running application process.

.

Q - 6 Do as Directed (Any Three). **[15]**

(a) The basic service of any link layer is to move a datagram from one node to an adjacent node over a single communication link, the details of the provided service can vary from one link-layer protocol to the next. Explain such possible services that can be offered by a link-layer protocol.

(b) Draw the diagram for this Error-detection and correction scenario:

At the sending node, data, D, to be protected against bit errors is augmented with error-detection and correction bits (EDC). Typically, the data to be protected includes not only the datagram passed down from the network layer for transmission across the link, but also link-level addressing information, sequence numbers, and other fields in the link frame header. Both D and EDC are sent to the receiving node in a link-level frame. At the receiving node, a sequence of bits, D' and EDC' is received. Note that D' and EDC' may differ from the original D and EDC as a result of in-transit bit flips. The receiver's challenge is to determine whether or not D' is the same as the original D, given that it has only received D' and EDC'.

(c) What are the key fields in the IPv4 datagram? Explain any such four fields in details.

(d) For a newly arriving host, the DHCP protocol is a four-step process. Which are these four steps? Describe them in detail.

(e) What is the difference between end-to-end delay and packet jitter? What are the causes of packet jitter?

****