

BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination : Semester Final
 Duration: **2 Hours 5 Minutes**

Semester: **Spring 2024**
 Full Marks: 70

CSE421 / EEE465 : Computer Networks

Answer **Sections A, B and C** as per instructions given. (**Pages: 3**)

Figures in the right margin indicate marks.

Name:

ID:

Section:

SECTION A [All questions of this section are **MANDATORY**] - **40 MARKS**

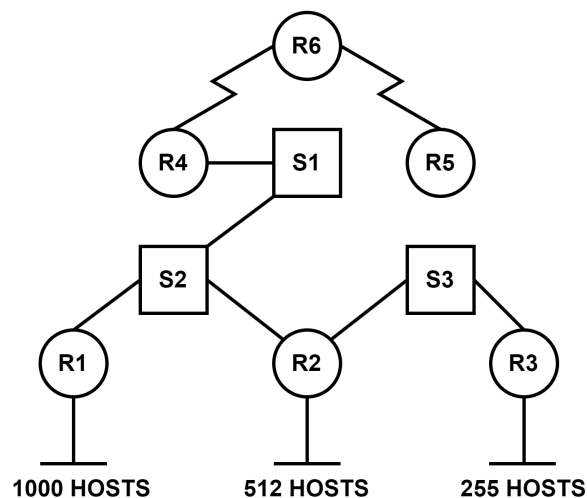
Q1 Mahalabia Inc. wants to subnet the existing network (3.255.192.0/19) into smaller sub-networks, as given in the figure below.

**3
+**

[CO3] I. Determine the maximum number of subnets you can create from the above-mentioned root network.

12

[CO3] II. Efficiently calculate the network address for all the sub-networks and draw the hierarchical tree



Q2 Consider the following figure (next page), where R1-R3 and ISP are routers and the corresponding interfaces are mentioned beside them. The notation S0 [.1] denotes that S0 is the name of the interface and [.1] denotes the IP address. Answer the questions below:

**6
+**

[CO3] I. Calculate the summarized network of all R2 LANs and then configure a summary static route in the router R1 for the calculated network

[CO3] II. A default route has been configured in R3 towards ISP via its S1 interface. Now **write** a command to configure a floating default route in R3 towards ISP.

<p>Q3</p> <p>[CO3] I. Calculate the number of fragments that have been created from the original packet.</p> <p>[CO3] II. Calculate the fragment offset of the 4th fragment.</p> <p>[CO3] III. State the MF bit of the 4th fragment.</p>	<p>A router receives a packet containing data of 4080 bytes. After looking at the IP header and consulting its routing table, the router knows that it needs to send the packet through its serial link, which has an MTU of 540 bytes and a header of size 20 bytes.</p>	<p>2 + 2 + 1</p>
<p>Q4</p> <p>[CO2]</p>	<p>You are trying to access the WiFi network of a coffee shop. The WiFi router of the coffee shop sends your mobile a DHCP Offer message. State the source and destination MAC address and the content of this DHCP Offer. Also, state how your mobile will reply after receiving this offer.</p>	<p>6</p>
<p>Q5</p> <p>[CO2]</p>	<p>Dipu was trying to communicate to a web server, where the connection is set up as shown in the figure below. The network the web server belongs to is a private network and R2 is configured to use NAT. Interpret how it will be possible for Dipu to communicate with the web server when it does not have a fixed public IP address assigned to it.</p>	<p>4</p>

END OF SECTION A

[CO3] SECTION B [Answer ANY TWO out of THREE in this section] - 12 MARKS

<p>Q6</p>	<p>Refer to the figure in Q2. All routers are running the Link State Routing protocol. How does router R3 know that it needs to send the LSP packets to only its interfaces of S1 and S0? Explain briefly.</p>	<p>6</p>
<p>Q7</p>	<p>Given, your device has an IPv6 address of 2000::B0B:80:A8FF:FE03:4566 which was generated using the EUI-64 protocol.</p> <p>I. Identify the MAC address of your device.</p> <p>II. Identify the subnet ID of the IPv6 address.</p>	<p>4 + 2</p>

Q8	<p>Suppose, the initial MAC Address tables of all switches are empty. PC2 sends two frames, one to PC4 and the other to PC6. How does switch S1 forward these two frames? Consider that PC4 does not reply, but PC6 does. Now, illustrate the current state of the MAC Address tables of switches S3 and S4. [Mention the device name and the interface]</p>	4 + 2
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END OF SECTION B

[CO2] SECTION C [Answer ANY THREE out of FIVE in this section] - 18 MARKS

Q9	The AD (Administrative Distance) of Link State Protocol is 90, while that of RIP (Distance Vector) is 120. Justify the reason behind LSP having a lower AD.	6
Q10	Why does any entry of an ARP table have a TTL? ARP requests are never forwarded by routers - Explain why.	4 + 2
Q11	There is no 'Option' field in IPv6. So, how does IPv6 handle adding the extra information by any hop? Since the IPv6 header is fixed in size (40 bytes), when extra information, for example 20 bytes is included, the header size does not change. Then state what changes.	4 + 2
Q12	Given your MAC address is AF:CC:FE:12:23:40 . I. Identify if the address is locally administered or globally unique II. Discuss why the MAC address is considered to be a portable address	2 + 4
Q13	Mention what kind of information you get to see when you do a traceroute from your home PC to a YAHOO server. How does traceroute help us to troubleshoot?	3 + 3

END OF SECTION C

===== **THE END** =====

An IPv6 packet walks into a IPv4 fair. Nobody talks to him.