B

BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination : Semester Final
Duration: **2 Hour 15 Minutes**

Semester: **Summer 2023**
Full Marks: **75**

CSE421 / EEE465 : Computer Networks

Answer **Sections A & B** as per instructions given. (**Pages: 3**)

Figures in the right margin indicate marks.

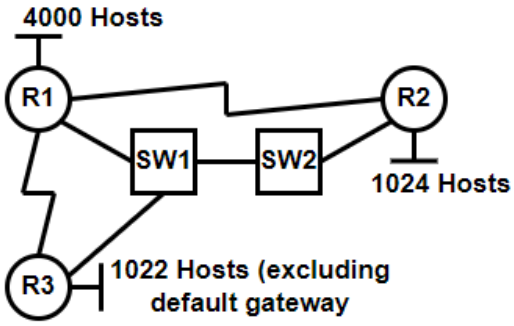
Name:	**ID:**	**Section:**

SECTION A [All questions of this section are MANDATORY]

Q 1. a) CO3 Given an IP address of 109.36.99.178 with the subnet mask of 255.255.128.0. **2**

1. **Identify** the network address. **+**
2. **Identify** the number of hosts possible in this IP block. **3**

b) CO3 Using the network address of (a), use VLSM to **determine** the subnetwork addresses of the networks in the following topology. **10**



Q 2. a) CO3 Given a packet of size **X bytes**, including a header of size **44 bytes**, needs to be sent through a link having an MTU of **1884 bytes**. All the fragmented packets are of the same size. The original packet was fragmented into 15 packets. Assume the start byte number is 0. **1 + 3**

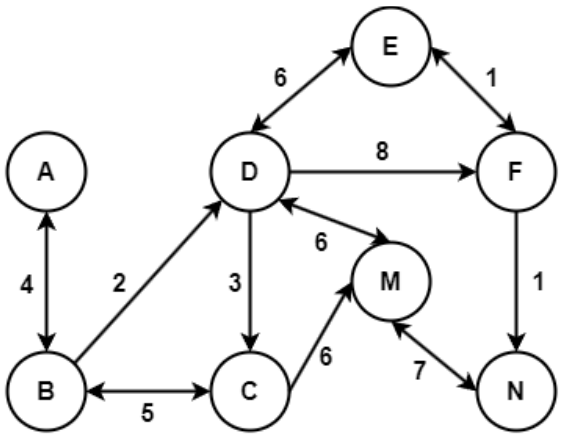
I. **Calculate** the data size of each fragment. **+**
II. **Identify** the value of X. **4**
III. **Calculate** the offset value of the 9th packet.

b) CO2 **State** in which scenarios will Traceroute help the most. **3**

c) CO2 You can access and use the coffee shop's Internet when you sit at a coffee shop. No one gave you the coffee shop's network's IP address to have access. **Explain** how it was possible. **4**

Q 3. a) CO3 Consider the topology below (next page), where the circles denote nodes/routers, and the numbers on the edges denote the respective cost of that edge. The arrows denote the direction of updates being sent to each node. For example, the bidirectional arrow between **nodes C** and **D** indicates that routing table updates were exchanged between both nodes. The unidirectional arrow between **D** and **F** indicates that updates were only sent from **D** to **F**.

	A	B	C	D	E	F	M	N
A	0	4	inf	inf	inf	inf	inf	inf
B	4	0	5	2	inf	inf	inf	inf
C	inf	5	0	3	inf	inf	6	inf
D	inf	2	3	0	6	8	6	inf
E	inf	inf	inf	6	0	1	inf	inf
F	inf	inf	inf	8	6	0	inf	1
M	inf	inf	6	6	inf	inf	0	7
N	inf	inf	inf	inf	inf	1	7	0



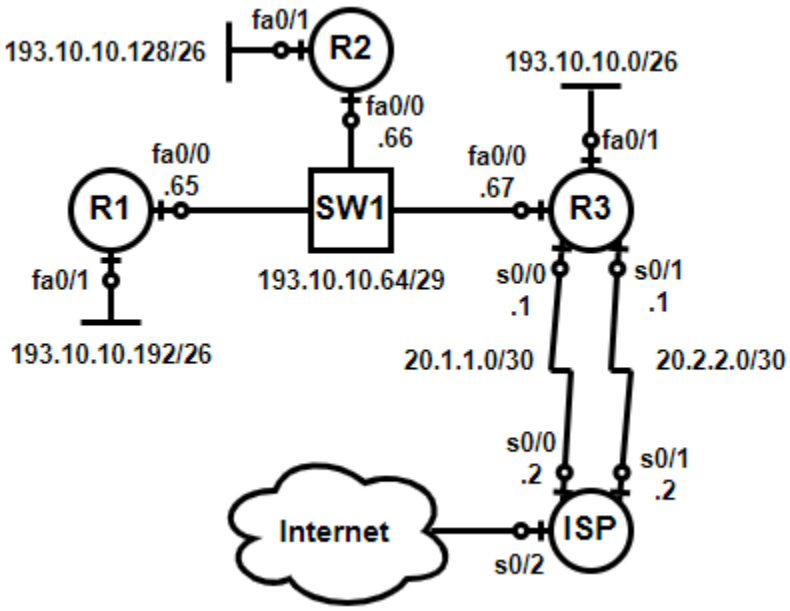
The entire topology uses a routing algorithm that sends updates at regular intervals. **Update** the cost table of **node D** once for all the remaining nodes using the above routing algorithm. **10**

b) CO2 Link State Routing first creates an image of the entire network. After that, it starts running the algorithm. How does each router in the network create this image? Mention the steps and **explain** them briefly. **5**

END OF SECTION A

SECTION B [Answer <u>ANY TWO out of THREE</u> in this section]

Q 4. a) CO3



2 + 3 + 1

Refer to the diagram above.

I. **Write** the command required in **R1** for a static route for the network **193.10.10.0/26**.

II. **Write** a summarized recursive static route command in the **ISP** router for all the networks attached to routers **R1**, **R2**, and **R3**.

III. **Write** a floating static route for the summarized static route in **4(a)(II)**.

b) CO2 Packets originating from the BRACU network and destined for all remote networks on the Internet should go via the ISP Router. These remote networks are not in the routing table. **Identify** what should be done to forward the packets. **5**

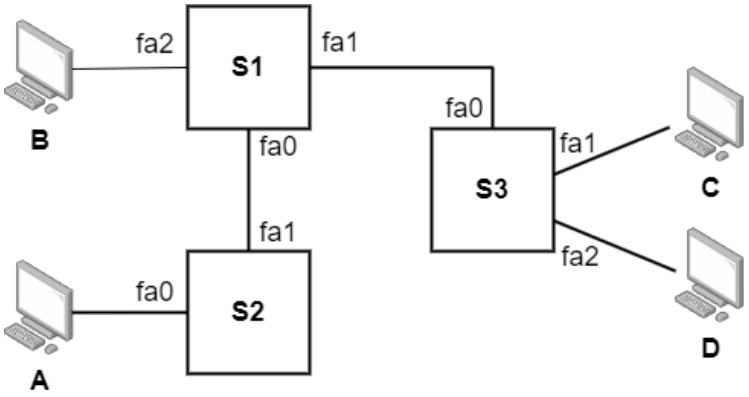
c) CO2 **Deduce** why static routes have no cost metric. **4**

Q 5. a) CO3 You want to convert your home network to IPv6. For this reason, your host PC needs a global unicast address. You know that your network interface card has the MAC address **AB-42-01-E3-01-10**. Your ISP has allocated you a subnet with ID **5,** and your ISP has a global routing prefix of **5::2**. **Represent** the shortened IPv6 address if you use EUI-64. **6**

b) CO2 **Explain** the difference between Multicast address and Anycast address in IPv6. Give an example where Anycast address can be of use. **5**

c) CO2 In IPv6, we can manually configure the IP using the EUI-64 method. **Determine** how the protocol ensures that there is no duplicate address. **4**

Q 6. a) CO3



Consider the following topology, where **S1**, **S2** and **S3** are three switches and **A**, **B**, **C**, and **D** are host devices. All the switches were just turned on. Then **Host C** sends a frame to **Host B**. **State** the current condition of all switches' MAC Address tables? *Drawing the tables is enough.* **6**

b) CO2 Referring to the diagram in **6(a)**, when **Host A** sends an ARP Request for **Host D**, **state** the source and destination MAC addresses in the ARP Request packet. **Select** which devices will receive the ARP Request and drop it. **3 + 2**

c) CO2 **Retell** the purpose of the OUI part of the MAC address and who assigns it. **4**

END OF SECTION B

========== THE END ==========

I'd tell you a joke about UDP, but you might not get it