B

BRAC UNIVERSITY
Department of Computer Science and Engineering

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

Semester: **Summer 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 **[CO3]**	As a network administrator, you are asked to design a subnetted network structure using VLSM. However, the organization is unable to provide you with a network address. Being an expert, you go to a computer and get its IP configuration:
	`IPv4 Address. . . . . : 137.168.210.108`
	`Subnet Mask . . . . . : 255.255.240.0`
	`Default Gateway . . . . . : 137.168.211.10`
	I. **Calculate** how many hosts this organization can support.
	II. **Identify** the network address of the organization.
	III. Using the network address found for the main network, efficiently **apply** VLSM to find the network address of the subnets as per the following host requirement: LAN A - **2000 hosts**, LAN B - **480 hosts**, LAN C - **350 hosts**, and **two WAN Links**.
		2 + **4** + **10**

Q2 **[CO2]**	Devices A and B, with IP addresses **192.168.20.10/24** and **192.168.20.11/24** respectively, both send packets using the same source port (**40540**) to a game web server on the Internet. The packets pass through an ISP router, which performs PAT using a single IP address (**139.200.200.100/24**) before forwarding them to the game web server. **I.** When a reply from the game web server is received by the ISP router, how does the ISP router determine which device to send the reply, device A or B? **Explain** briefly. **II.** **State** the type of address that device A and B uses, and how is it different from the single IP address used.	**6** + **6**
Q3 **[CO3]** **[CO3]** **[CO3]** **[CO2]**	A packet with data of **8240 bytes** arrived at a router. The router can send **830 bytes** (including **30 bytes** of header) at a time through the link, so it needs to fragment accordingly. **I.** **Calculate** the number of fragments that will be created. **II.** **Calculate** the data size of the last fragment. **III.** **Calculate** the fragment offset of the 7th fragment. **IV.** **Explain** what the router will do if the Don't Fragment (DF) bit is turned on.	**2** + **3** + **4** + **3**

END OF SECTION A

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

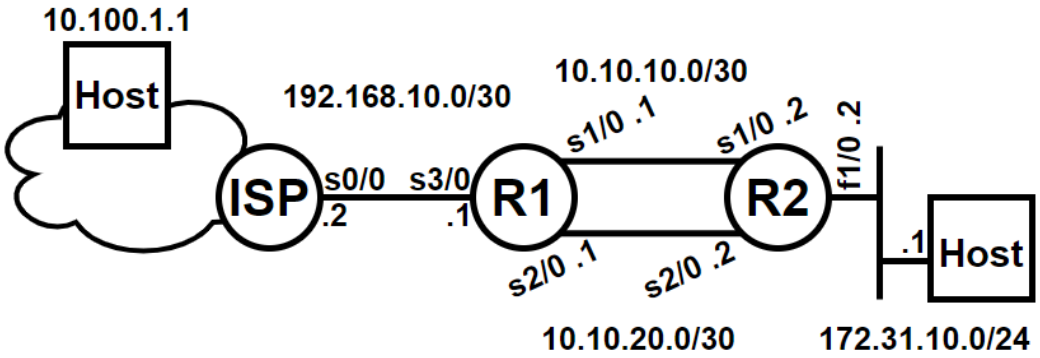
Q4 **Write** the following IPv6 addresses in fully extended string notation: **2 + 2 + 2**

I. 2001:db8::0001:0:100:0

II. 0:1::

III. 2002:C6::DB80:0:0

Q5 **3 + 3**



Refer to the topology above. Since this is a stub network, static routes are preferable. The following static route command was given in the ISP router

```
ip route 172.31.10.0 255.255.255.0 192.168.10.1
```

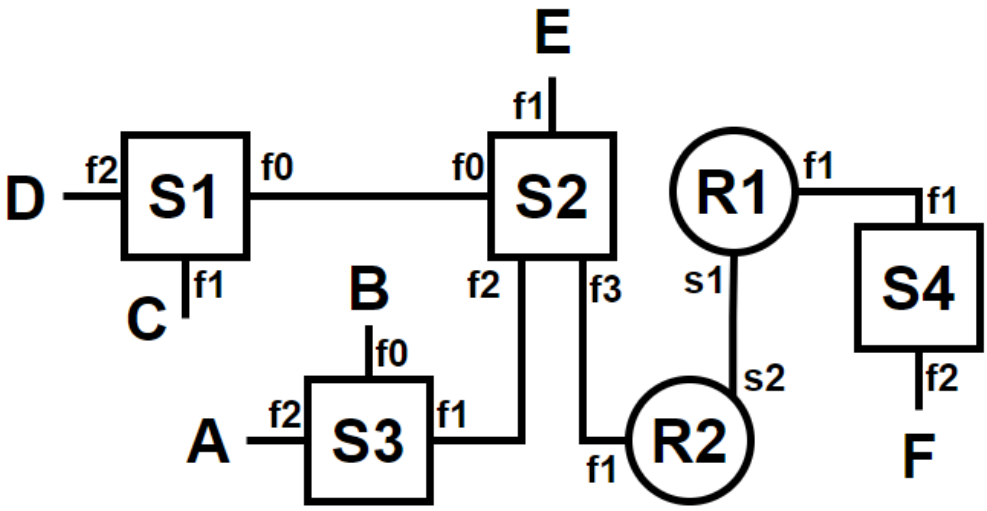
I. **State** the problem of this command and how to improve it.

II. If the network administrator wishes to configure default static routes, in which routers should s/he configure them? **Justify** your answer.

Q6 Refer to the figure given below **4 + 2**

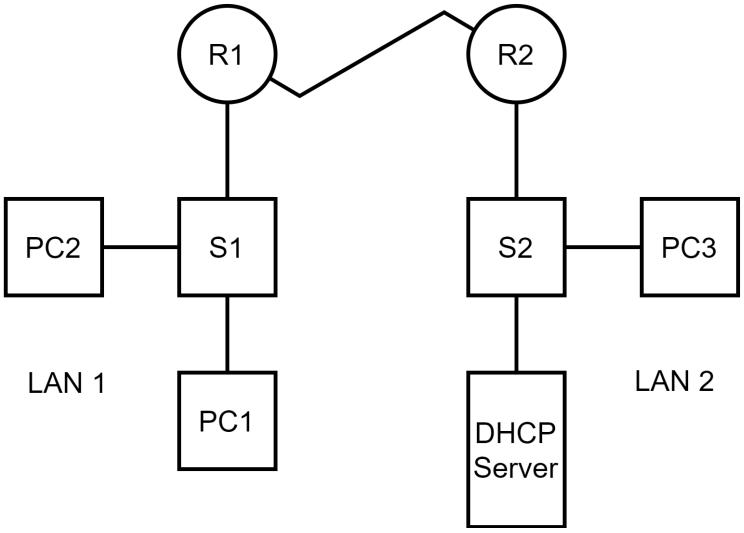
I. Device **D** sends an ARP request for the MAC address of device **A**. **State** which intermediary devices will receive the ARP request frame and forward it to other ports. Also **state** which intermediary devices will drop the frame.

II. **Show** the entries of the MAC address tables of S1 and S3 after receiving the reply to the ARP request.



END OF SECTION B

[CO2] **SECTION C [Answer <u>ANY THREE out of FIVE</u> in this section] - 18 MARKS**

Q7	**State** the purpose of Hop Limit in an IPv6 header. **Name** the field that does the same function in the IPv4 header.	**6**
Q8	**State** why we call Link State routing protocol a global routing protocol and why it is more efficient than Distance Vector routing protocol.	**6**
Q9	 **I.** No DHCP requests from any PCs of LAN 1 are reaching the DHCP server. **Identify** the issue and **state** the solution. **II.** **State** the messages that are exchanged between any PC and a DHCP server for renewal of a leased IP address.	**4 + 2**
Q10	Given your MAC address is 98:CC:12:23:40:BB **I.** **Identify** if the given address is a unicast or a multicast address **II.** **Discuss** why the MAC address of a packet changes every hop, but its IP address does not.	**3 + 3**
Q11	A device in a network wishes to send a packet to another device in a different network. It needs to know the MAC address of that device. At the initial stage, the sending device will send an ARP request for which device? **Where** does it get the IP address of the device that it needs to ARP for?	**6**

END OF SECTION C

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

Why did the server go to therapy?
It couldn't handle the load anymore..