B

BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination : Semester Final
Duration: 2 Hour 15 Minutes

Semester: Summer 2022
Full Marks: 100

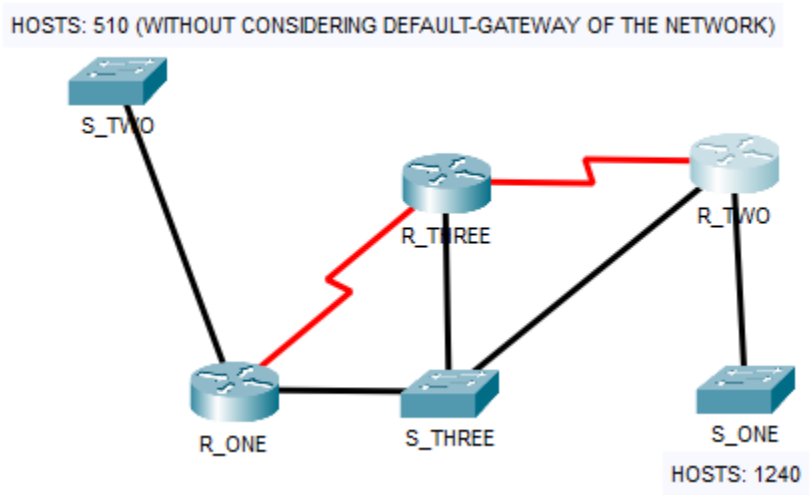
CSE421 / EEE465 : Computer Networks

Answer **ANY FIVE** out of the following **SIX** questions. (**Pages: 4**)

Figures in the right margin indicate marks.

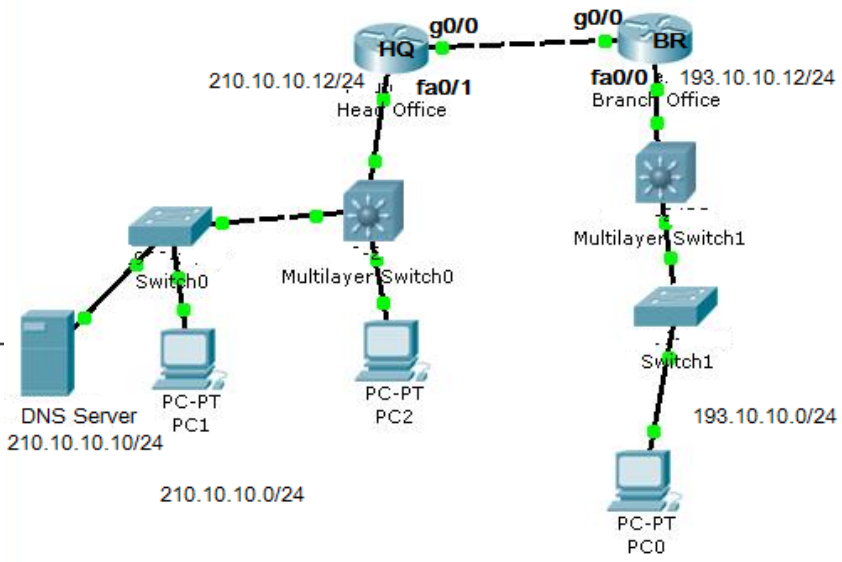
Name:	**ID:**	**Section:**

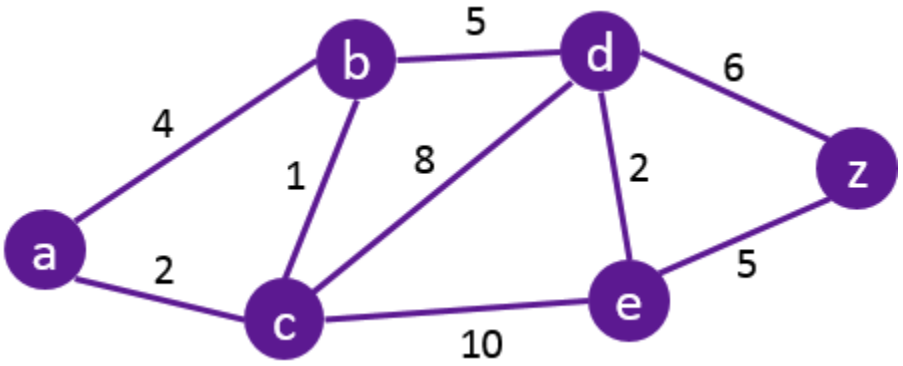
Q 1. a) CO3	The "ipconfig" command generates the following output.
	`Ethernet adapter Ethernet 2:`
	`  Connection-specific DNS Suffix  . :`
	`  Link-local IPv6 Address . . . . . : fe80::af89:abba:af0f:47cc/64`
	`  IPv4 Address. . . . . : 19.253.99.49`
	`  Subnet Mask . . . . . : 255.254.0.0`
	`  Default Gateway . . . . . : 19.253.99.50`
	From the above output, **determine** the following (show necessary calculations):
	I. The broadcast address.
	II. The prefix mask.
	III. The second usable IP address.
		3 + 1 + 2

b)	Using the network address found in 1 (a), efficiently **calculate** the required sub-network addresses of all the networks in the following topology *(Figure 01)*. Show necessary calculations and the hierarchical tree of network addresses.  **Figure 01 : VLSM Topology**	**14**
Q 2. a) CO3	A network has numerous routers interconnected. A network admin is called to troubleshoot a problematic router. **Identify** how the administrator can pinpoint the router?	**4**
b)	You want to create a problem for a server by sending numerous ping packets to the server. **Discuss** how it is possible to do so.	**4**

c)	You have a gaming server installed in your local network, having the private IP address of 192.168.10.10/24 and port number 28150. Now you want people to access it from outside, without you initiating the connection. **Judge** how can this be achieved?	**4**
d)	**Figure 02 : DHCPv4 Command and Network Topology** I. Refer to the topology and output shown in **Figure 02**. HQ router has been configured to act as the DHCP server for the 210.10.10.0/24 and 193.10.10.0/24 networks. **Identify** why: A. PC1 and PC2 are unable to go out of their network. B. HQ router displays error message of address conflicts. C. PC0 cannot get any IP address via DHCP.	**8**
Q 3. a) CO3	**Figure 03 : Dynamic Routing Algorithm** Link state routing protocol uses Dijkstra's algorithm. Now using Dijkstra's algorithm, **compute** the shortest path from Node **a** to all other remote networks shown in the above figure. Show both the shortest path and the cost.	**8**
b)	In the Link State Algorithm, nodes keep track of their neighbors. **Explain** how they do so.	**5**

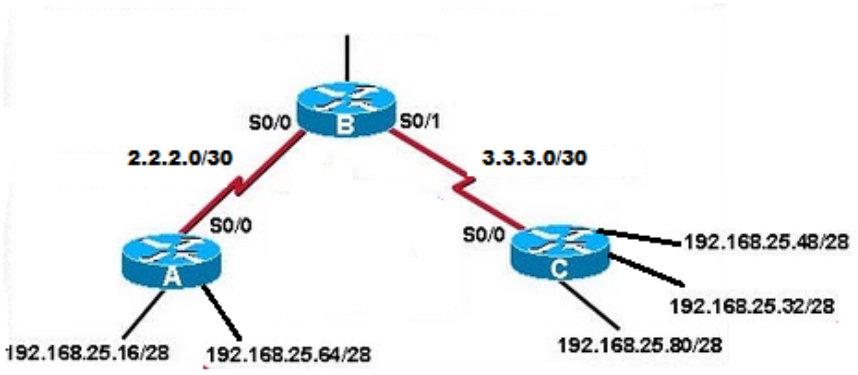
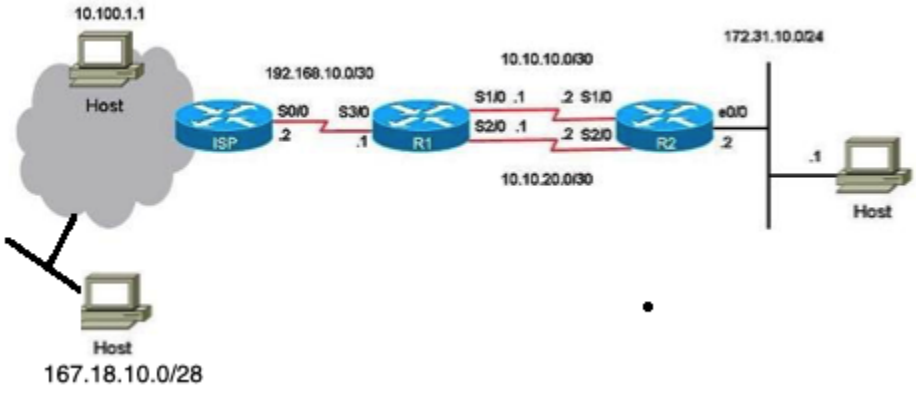
```
<output omitted>
ip dhcp excluded-address 210.10.10.12 210.10.10.12
ip dhcp excluded-address 193.10.10.12

ip dhcp pool HRPool
network 210.10.10.0 255.255.255.0
default-router 210.10.10.12
dns-server 210.10.10.10
!
interface FastEthernet 0/1
ip address 210.10.10.15 255.255.255.0
!
<output omitted>
```

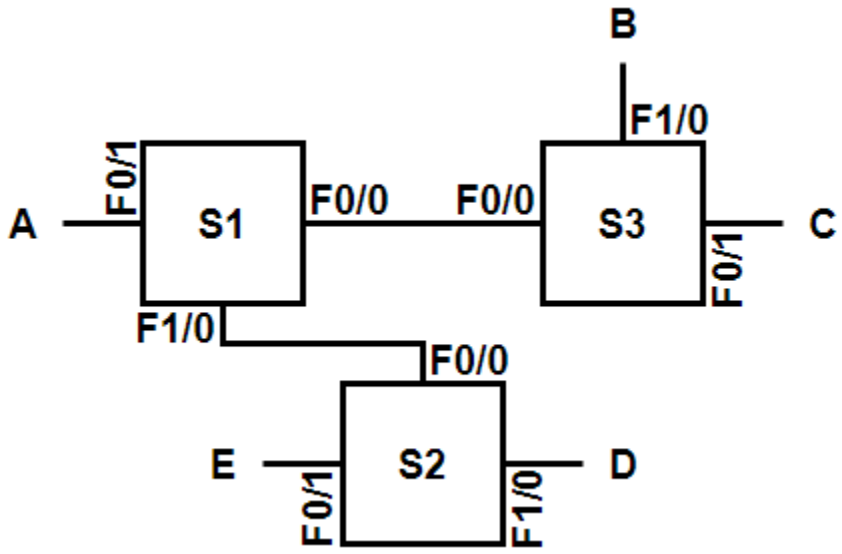




c)	I. In the Distance Vector algorithm, the nodes send their updates periodically. **State** if this is good or bad for the process. II. **State** two dis-advantages of using Distance Vector over Link State algorithm.	**4 + 3**

Q 4. a) CO3	`Router(config)#ip route 0.0.0.0 0.0.0.0 s0/0/0`
	`Router(config)#ip route 0.0.0.0 0.0.0.0 s0/0/1 30`
	Refer to the commands given above
	I. **Identify** the significance of giving the first command. Why is 0.0.0.0/0 set as the destination network?
	II. **Establish** why the second command is given for the same destination network?
		3 + 3

b)	 **Figure 04 : Network Topology (1)** Refer to the figure no. above. You are asked to configure a summary static route in router B for all the networks attached to Router A and C. You configure the static summary route in router B. After few hours, many users are complaining that they are not receiving data. Explain what is the problem.	**5**
c)	 **Figure 05 : Network Topology (2)** I. Refer to the topology in figure above**.** You need to configure a static route for the network 167.18.10.0/28 in router R1 and R2. Using the command below, **create** the static routes needed. `ip route` _____ _____ _____	**4 + 5**

	II. To create a floating static route of the same network, **identify** what are the modifications to be done to the above command and in which router/s will you be able to implement it?	
Q 5. a) CO3	You are setting up a brand-new lab in your university. You have about 30 computers, of which some are running on IPv4 and the rest are running on IPv6. These PCs need to communicate with each other. **Analyze if** there will be any problem here? If yes, what is the solution?	**5**
b)	**Shorten** the following IPv6 addresses: FF10:00FF:0000:0000:AC19:0000:0000:E000	**4**
c)	**State** the fully expanded Link Local Unicast address for the PC with MAC is F0-B2-F0-EA-DF-35 with subnet ID of (1010)h using EUI64.	**5**
d)	I. In Stateful DHCPv6, having a DHCPv6 server only to assign IPs dynamically is enough in an IPv6 network setup". Is the statement true or false? **Justify**. II. **Explain** what is the purpose of DAD in DHCPv6 ?	**3 + 3**
Q 6. a) CO4	I. **Explain** briefly how ARP works when the destination device is in a different network. II. Host A on Network A pings Host B in Network B. **Identify** the source and destination MAC addresses of the ARP frame and the ping frame leaving Host A? Assume a successful ARP Request was performed by Host A.	**4 + 4**
	 **Figure 06 : Switch Topology**	
b)	Given, all the switches were just turned on in the above figure (Figure xy): I. **State** how would the switches handle the frames sent by Host A to Host E ? Answer in terms of whether the switch will broadcast or selectively forward the frame. II. Few minutes later, Host A sends a frame to Host C. **Write** the contents of the MAC table of S3 at this state.	**3 + 4**
c)	Given a MAC address E0:A9:B8:C7:D6:E5. I. **Identify** if the above MAC address is a unicast or multicast address? II. MAC address is portable, **examin** on what does it mean?	**2 + 3**