B

BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination : Semester Final
Duration: 2 Hour 30 Minutes

Semester: Fall 2022
Full Marks: 100

CSE421 / EEE465 : Computer Networks

Answer **ANY FIVE** of the following **SIX** questions. (**Pages: 3**)

Figures in the right margin indicate marks.

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

Q 1. a) CO1 A network engineer uses the "ipconfig" command to visualize the current IP network configuration. From the displayed output, he notes down the following information: **3 + 3**

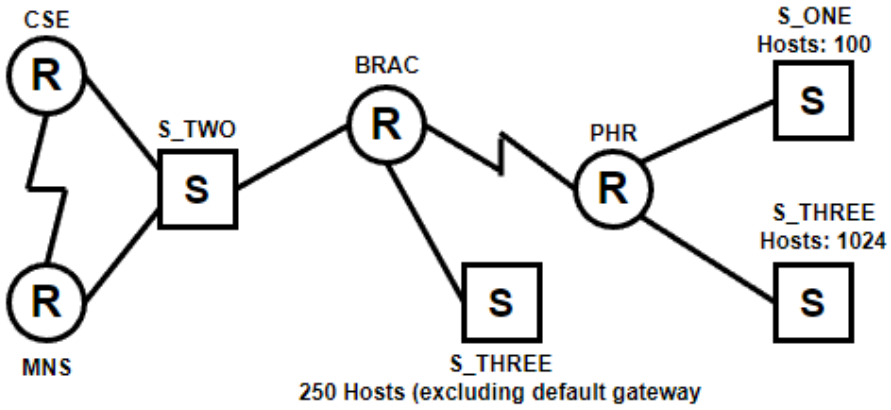
```
IPv4 Address : 200.100.50.25
Prefix Mask : 12
```

He also identifies that the default-gateway of the network is the second last usable host IP address of the network.

From the above scenario, **determine** the following (show necessary calculations):

I. The network address
II. IP address of the default-gateway

b) Using the network address found in **1(a)**, efficiently **calculate** the sub-network addresses of all the networks in the following topology. Show necessary calculations. **14**



Q 2. a) CO2 Suppose the packet size of the last fragment (7th fragment) is **268 bytes**, including **20 bytes** of header. Also, this packet has an offset value of **186**. [First byte number starts from 8]. All fragments have the same packet size. **4 + 4 + 2**

I. **Identify** the original intact packet size
II. **Identify** the MTU of the network and the 5th fragment's fragment offset.
III. **What's** the MF value of the 7th fragment?

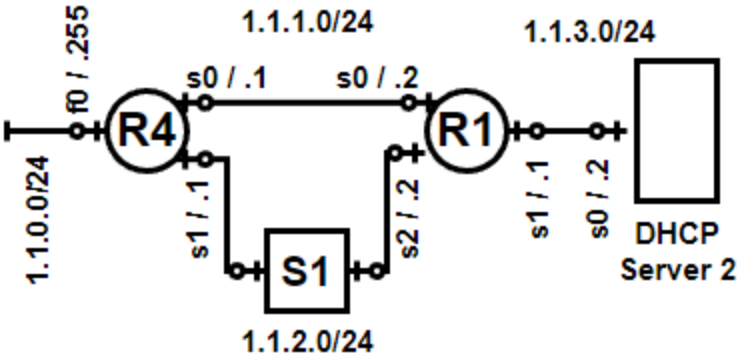
b) Refer to the following figure and configuration of R4 (start of next page) **6**

I. **Identify** the issues in the above configuration. **+ 4**
II. A network admin now wishes to use **DHCP Server 2** and sets the server up likewise. However, no computer in the **R4_LAN** is getting any IPs. How can you solve this problem?

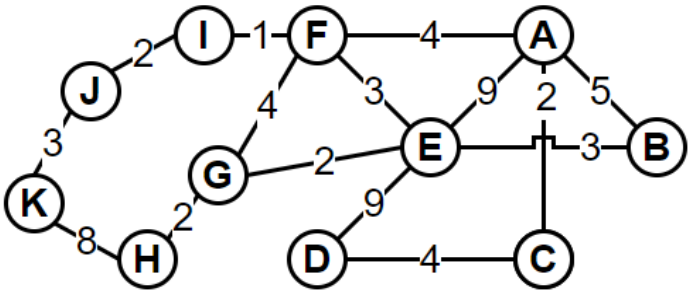
```
ip dhcp excluded-address 1.1.1.1 1.1.1.10

ip dhcp pool NETWORK_R4
network 1.1.0.0 255.255.254.0
default router 1.1.0.255

interface f0
ip add 1.1.0.254 255.255.255.0
<R4 output omitted>
```



Q 3. a) **CO3** **2 + 8**



Given, the above network topology finds the shortest path by a centralized routing algorithm.

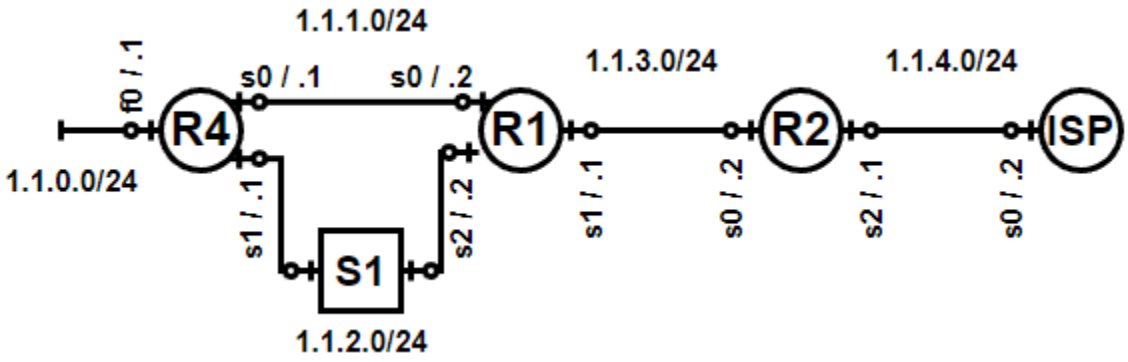
I. **Determine** the name of the algorithm the above topology is using

II. Find the shortest path and the associated costs from Node A to the first 4 nodes visited (excluding itself). Show your work.

b) **Determine** which algorithm is better in terms of judging the shortest path. Distance Vector or Link State? **Justify** briefly. **5**

c) **Determine** which characteristic of the Distance Vector algorithm results in a slow convergence of networks. **5**

Q 4. a) **CO3** **4 + 4**



Command: ip route _____

I. **Construct** a recursive static default route towards ISP on Router R4.

II. **Construct** up a backup route for the above route.

*Note: **s0 / .1** where **s0** is the interface number and **.1** is the host part of the IP address.*

b) You are asked to summarize the following addresses attached to R2 in the ISP router: **5 + 2**

```
1.1.0.224/29
1.1.0.232/29
1.1.0.240/29
1.1.0.248/29
```

I. **Summarize** the above routes and complete the summarized static route command in the ISP router.

```
ip route _____________________________________________
```

II. **What** is the effect of creating the summarized route in R2 router?

c) Given the following entry in the routing table of a router: **1 + 4**

```
S* 0.0.0.0 0.0.0.0 [50/0] via 17.69.66.2
```

Name the above route and explain why the value of AD is 50 instead of 1.

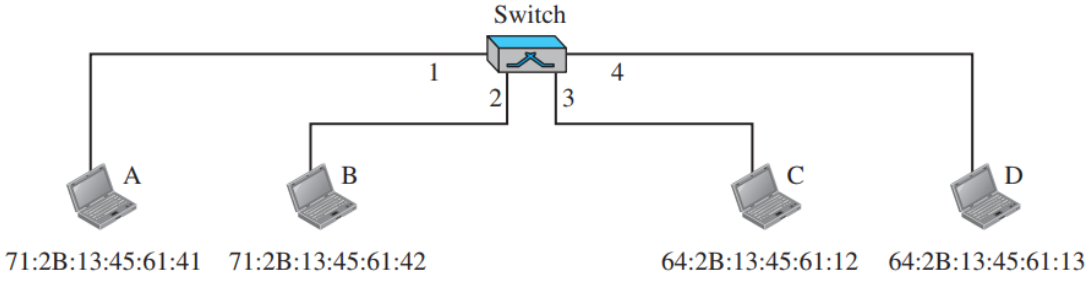
Q 5. CO3 **a)** **State** how to identify an IPv6 multicast address. IPv6 has no specific broadcast address. **Explain** how a multicast address is converted into a broadcast address. **3 + 4**

b) We know that the IPv6 header size is fixed. In the case of IPv4, we could use the Options field to add extra information. **Explain** how we add extra information in an IPv6 header. If 20 bytes of extra information are added, **state** what happens to the header size. **4 + 2**

c) In Stateful DHCPv6, **state** why DAD is not required here. **List** the steps required between the end device and the DHCPv6 server. **3 + 4**

Q 6. CO4 **a)** **Consider** a physical address such as A2-FE-22-32-3D-4F. Explain how we will detect if this is a globally unique address or if it has been locally administered. How is this address portable? **3 + 4**

b) **4 + 3**



Figure

Host A sends an ARP request for Host D. The switch's MAC address table has information about hosts B, C and D. When the switch receives this ARP request, **state** what it will do with the ARP request frame. **Identify** if there will be any change in the MAC address table of the Switch.

c) The "Preamble" of Ethernet header and CRC of Ethernet trailer help in **which** processes for two devices sending data? **3 + 3**

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