Quiz: 05		**Total Marks: 10**
Summer 2025		**Time: 20 minutes**
Name:	**ID:**	**Sec:**

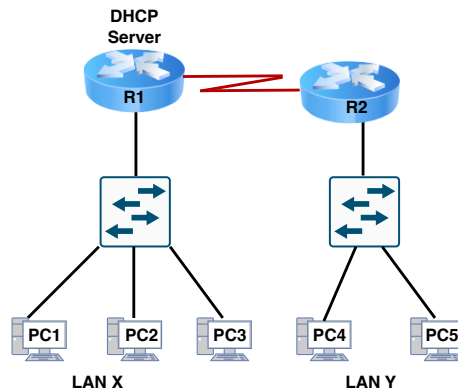Q1. Consider the following topology and answer the following questions:

a) From the routing table, mention how you can identify the directly connected networks. [1]

Ans: Directly connected networks are identified by a code at the beginning of the entry in the routing table:

'C' → Directly connected networks

b) **Write** a command to add a static route **on R3** towards **LAN4 of R2** using **Recursive** lookup option.
[2]

Ans: R3(config) # `ip route 200.4.0.0 255.255.252.0` 2.2.3.2

c) A network administrator finds out that the router **R2** is dropping all packets which are destined to unknown networks from the router itself. **Show the configuration** that the network administrator needs to issue on the router to solve the problem using **directly attached method**. [2]

Ans:
R2 (config) # `ip route 0.0.0.0 0.0.0.0 S0`

Q2. In the following figure, no DHCP requests from any PCs of LAN Y are reaching Router R1, which has been configured as a DHCP server. **Identify** the issue and **state** the solution. [1+1]

Ans:

Issue:

The DHCP server is located on a different network. We also know that the DHCP discover/request message is a broadcast message and will not be forwarded to outer networks by a router. Therefore, R2 will drop the DHCP discover/requests.

Solution:

The solution is **DHCP Relay**. R2 must be configured to relay DHCP messages to the DHCP server. By configuring a **helper address** feature on R2 the device will forward DHCP broadcasts to the appropriate server.

Q3. Cryptic Consultancy Limited is using 172.16.0.0/16 as its network address, and it has 2000 hosts. Cryptic uses BRACNet as its ISP. Now BRACNet gave Cryptic only 2 public IP addresses. Explain how all 2000 users of Cryptic Consultancy Limited can access the Internet. [3]
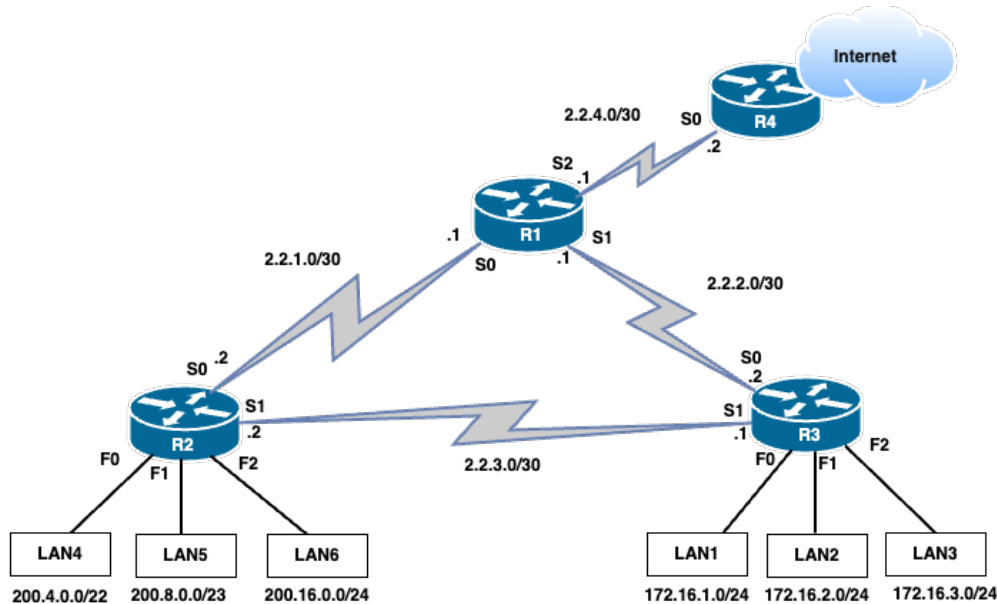
Ans: PAT.

BRAC UNIVERSITY
Department of Computer Science and Engineering
CSE421: Computer Networking (Sec: 11) Set B

Quiz: 05   **Total Marks: 10**
Summer 2025   **Time: 20 minutes**

Name:	ID:	Sec:

Q1. Consider the following topology and answer the following questions:

a) From a routing table, how can you identify static routes?   [1]
   Ans: Static routes are identified by a code at the beginning of the entry in the routing table:
         'S' → Static route

b) **Write** a command to add a static route **on R1** towards **LAN1 of R3** using **Recursive** lookup option.
                                                                                              [2]
      Ans: R1(config) # `ip route 172.16.1.0      255.255.255.0     2.2.2.2`

c) A network administrator finds out that the router **R3** is dropping all packets which are destined to unknown networks from the router itself. **Show the configuration** that the network administrator needs to issue on the router to solve the problem using **directly attached method**.   [2]

      R3 (config) # `ip route 0.0.0.0     0.0.0.0          S0`

Q2. A home network has three devices with private IP addresses 192.168.0.2, 192.168.0.3, and 192.168.0.4. The router has a single public IP 203.0.113.8. All three devices are streaming videos from 203.0.113.9 on port 8080. Illustrate an example of how the source port numbers may be translated to avoid conflicts. [3]

Answer:

PAT maps the private IP addresses to the single public IP 203.0.113.8 while using different source port numbers to distinguish between connections.

Example of source port mapping:

192.168.0.2:5000 → 203.0.113.8:6000

192.168.0.3:5001 → 203.0.113.8:6001

192.168.0.4:5002 → 203.0.113.8:6002

The router maintains a mapping table to ensure responses are routed to the correct device.

Q3. A company has two office branches connected via a router:

- Branch 1 (10.10.1.0/24): 50 client PCs, no local DHCP server.
- Branch 2 (10.10.2.0/24): Hosts a DHCP server at 10.10.2.5.

Clients in Branch 2 get IP addresses successfully, but clients in Branch 1 fail to obtain any IP when set to automatic configuration.

a) Why do clients in Branch 1 fail to obtain an IP address even though a DHCP server exists in Branch 2? [1]

Ans: The DHCP discover broadcast messages from Clients in Branch 1 will be discarded by the router as the router do not forward broadcast messages.

b) How can you solve this issue? [1]

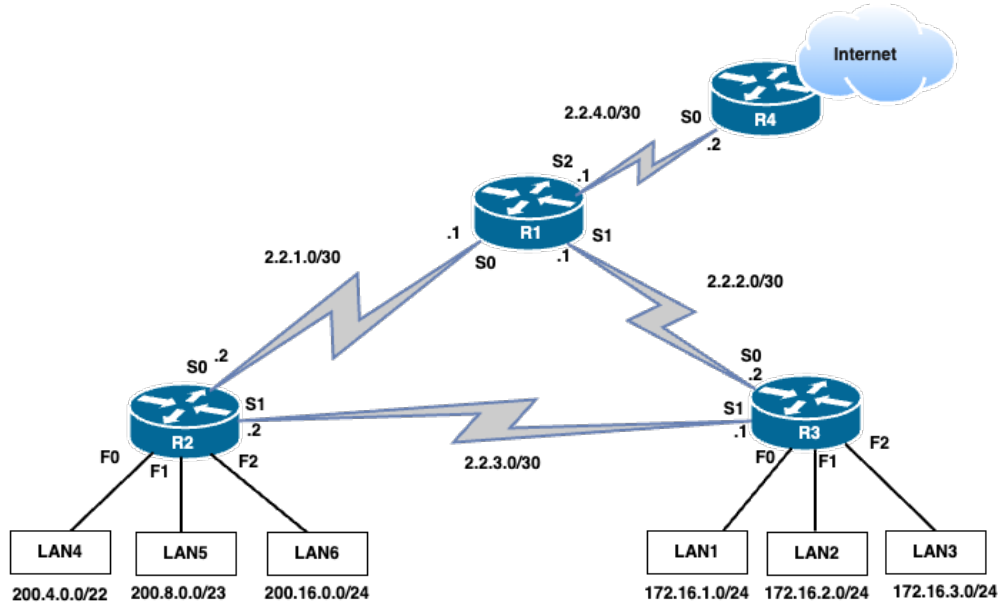Ans: Configuring DHP-relay using helper address.

Quiz: 05		**Total Marks: 10**
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Q1. Consider the following topology and answer the following questions:

a) On R2, identify the networks that will be added to the table without any routing configuration.   [2]
Ans: 200.4.0.0/22; 200.8.0.0/23; 200.16.0.0/24; 2.2.3.0/30; 2.2.1.0/30.
b) Configure a recursive default static route on R2.   [2]
Ans: R2#ip route 0.0.0.0   0.0.0.0   2.2.1.1
c) Configure a directly attached floating default static route in R2 for the above if R3 is connected to R4 using interface S2.   [2]
Ans: R2#ip route 0.0.0.0   0.0.0.0   S1   5   (AD >1)
d) Determine the significance of [20/0] in the routing table.   [1]
Ans: AD – 20 and cost – 0.

Q2. A research group at a university has deployed a data visualization dashboard on a computer in their secure lab. The server runs at the private IP address 192.168.20.100 and listens on port 5000. The lab network is connected to the internet through a university gateway router that provides NAT and uses a single public IP address. A collaborator from another institution tries to access the dashboard using the university's public IP but reports that the connection fails.

a) Why is the collaborator unable to access the dashboard using only the university's public IP? [1]

Ans: Network Address Translation (NAT) alone lacks the knowledge to determine which internal machine should receive an incoming connection. Consequently, the collaborator's request to the router's public IP address is disregarded without the implementation of a port forwarding rule.

b) What specific network configuration would allow the collaborator to reach the server on 192.168.20.100:5000 from outside the university network? [1]

And: Port Forwarding

Q3. **State** the messages that are exchanged between any PC and a DHCP server for renewal of a leased IP address. [1]

Ans:

DHCP Request (DHCPREQUEST) and
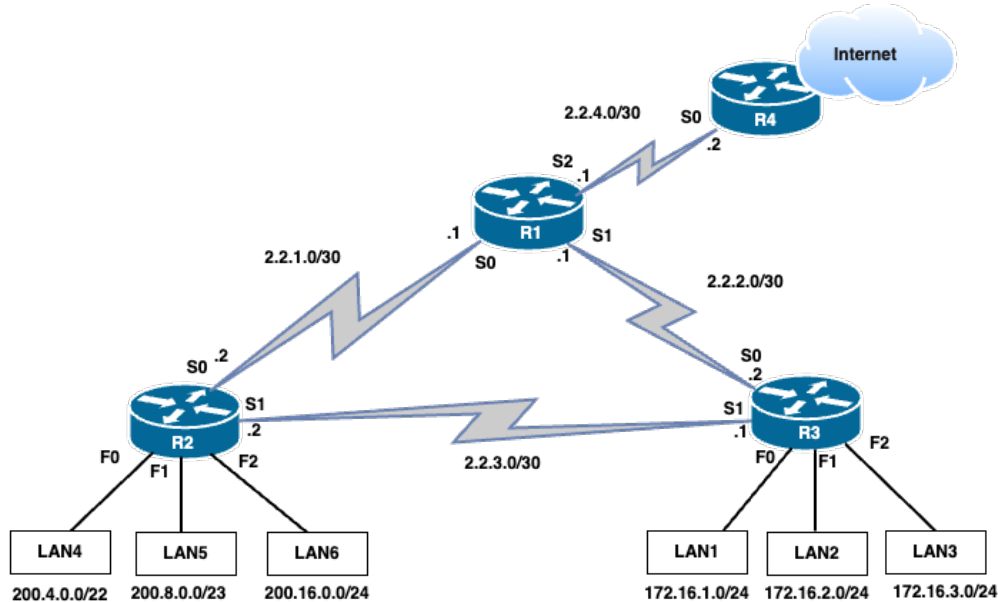DHCP Acknowledgment (DHCPACK)

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Q1. Consider the following topology and answer the following questions:

a) On R3, identify the networks that will be added to the table without any routing configuration.   [2]
Ans: 172.16.1.0/24;
          172.16.2.0/24;
          172.16.3.0/24;
          2.2.2.0/30;
          2.2.3.0/30

b) Configure a recursive default static route on R3.   [2]
Ans: R3#ip route 0.0.0.0   0.0.0.0   2.2.2.1

c) Configure a directly attached floating default static route in R3 for the above if R3 is connected to R4 using interface S2.   [2]
Ans: R3#ip route 0.0.0.0   0.0.0.0   S2   5   (AD>1)

d) Determine the significance of [20/0] in the routing table.   [1]
Ans: AD – 20 and cost – 0.

Q2. A student hosts a Flask web app in the lab at private IP `192.168.10.25`, listening on port `5000`. The lab router has a public IP and does NAT. The student shares only the public IP with a professor to review, but the professor cannot access the app.

a) Why can't the professor access the web app using only the public IP?   [1]
b) How should the router be configured to allow external access?   [1]

Answer:

a) Network Address Translation (NAT) alone lacks the knowledge to determine which internal machine should receive an incoming connection. Consequently, the professor's request to the router's public IP address is disregarded without the implementation of a port forwarding rule.

b) Set up Port forwarding on the router.

Q3. Why DHCP-REQUEST message is a broadcast message?   [1]

The DHCPREQUEST is broadcast both to reach the server (since client may not have an IP yet) and to notify all DHCP servers which offer was accepted.