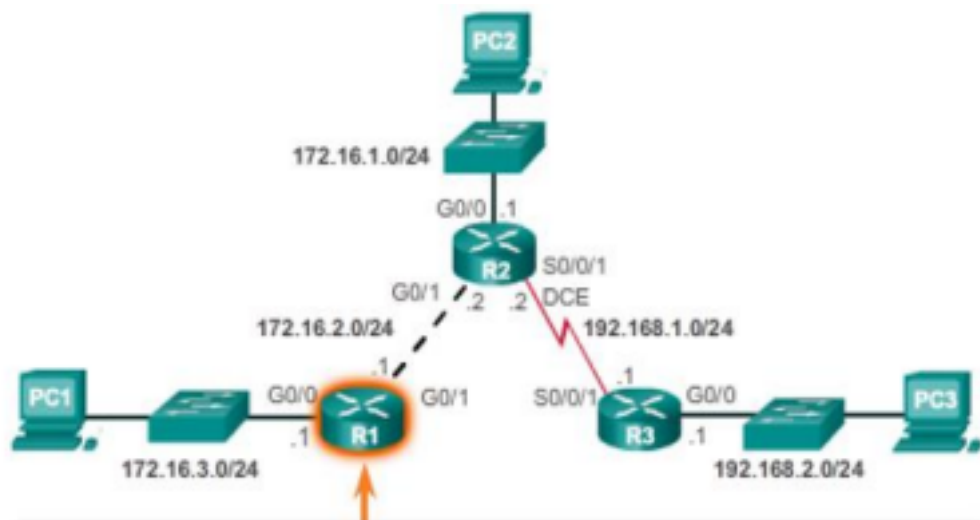


S 172.16.3.0

Standard static route using next hop ip address	Standard static route using route table exit interface(directly connected static route)
Recursive lookup routing table (multiple/two searches)	single search
slow speed	fast speed
high router resources needed	lesser router resources needed
AD (administrative distance) = 1	AD (administrative distance) = 1

2. Identify and illustrate one of the types of static route shown in R1's running-configuration.



```
R1# show ip route
<partial output omitted>
S 192.168.2.0/24 [1/0] via 172.16.2.2, GigabitEthernet 0/1
```

R1 = S

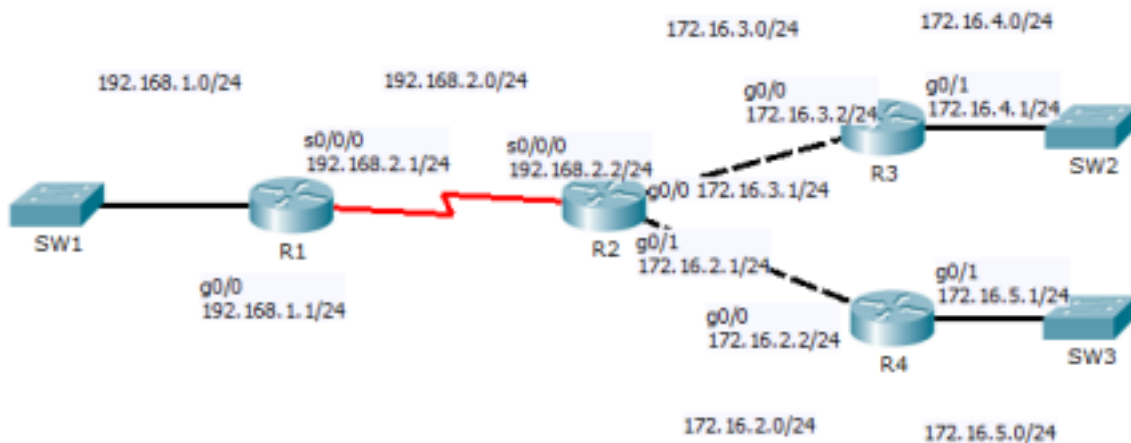
PC 3 & switch to the left of PC3 = D

```
ip route 192.168.2.0 255.255.255.0 g0/1 172.16.2.2
192.168.2.0 is exit interface
g0/1 & R2(172.16.2.2) is next hop ip
```



network topology below, answer the following questions:

3. Based on the



(a) In router R1, write a command to configure a **default static route** using the **exit interface**.

```
ip route 0.0.0.0 0.0.0.0 s0/0/0
```

(b) In router R1, write a command to configure a **summary static route** for network 172.16.2.0/24 – 172.16.5.0/24 using the **next hop IP address**.

172.16.2.0/24 - 172.16.5.0/24 using the next hop IP address (only continuous can use summary static route)

172.16.2.0 = 172.16.0000 0010

172.16.5.0 = 172.16.0000 0101

8+8+5=21

172.16.0000 0000.0000 0000 => 172.17.0.0

```
ip route 172.16.0.0 255.255.248.0 192.168.2.2
```

(c) In router R2, write a command to configure a **standard static route** for network 192.168.1.0/24 using the **exit interface**.

```
ip route 192.168.1.0 255.255.255.0 s0/0/0
```

(d) In router R2, write two commands to configure **fully specified static routes** for network 172.16.4.0/24 and 172.16.5.0/24.

```
ip route 172.16.4.0 255.255.255.0 g0/0 172.16.3.2
```

```
ip route 172.16.5.0 255.255.255.0 g0/1 172.16.2.2
```

4. Suggest the most appropriate routing methods to be implemented for a small network topology shown below to forward packets from R1 to ISP and vice versa. Justify your answers.

ip route 192.168.10.0 255.255.255.0 s0/0/1 (standard static route)

ip route 192.168.11.0 255.255.255.0 s0/0/1 (standard static route)

To summarize the both commands to a single command:

i. write in binary

1100 0000.1010 1000.0000 1010.0000 00000 => 192.168.10.0

1100 0000.1010 1000.0000 1011.0000 00000 => 192.168.11.0

ii. start from left to right until unmatching column

iii. count from left to right how many columns match $8+8+7=23$ => /23

iv. copy the matching bits

1100 0000.1010 10000.0000 1010.0000 0000 => 192.168.10.0

ip route 192.168.10.0 255.255.254.0 s0/0/1 (summary route)

R1

ip route 0.0.0.0 0.0.0.0 209.100.10.10 /30

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5. Figure 1-1 shows a network topology with the Internet Protocol version 4 (IPv4) configurations done on all routers interfaces and Personal Computers (PCs).

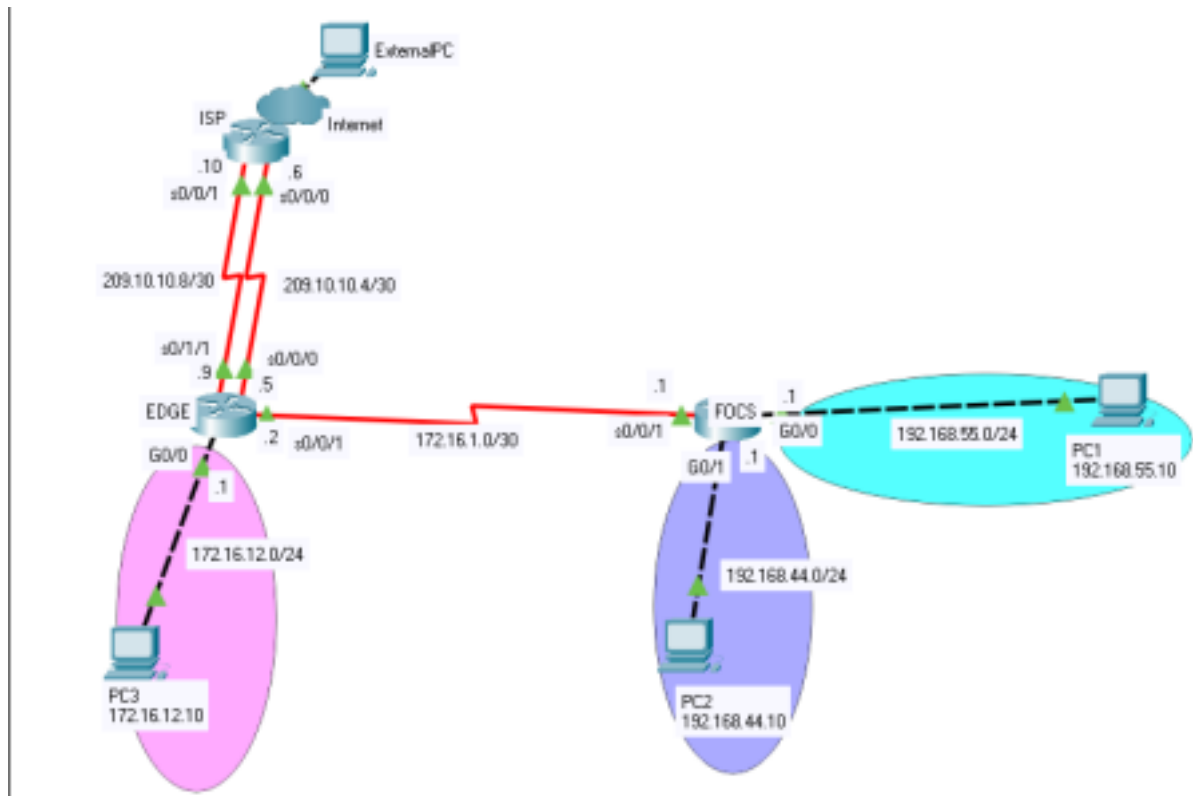


Figure 1-1: A network topology

Based on Figure 1-1, determine the appropriate static routes configurations with justifications in the respective routers (EDGE and FOCS). ISP is already pre-configured with static routing. Use Table 1-1 to document your answer.

- (i) Standard static routes using **next hop IP address**. PC1 and PC2 are able to communicate with PC3. (9 marks)

FOCS

ip route 172.16.12.0 255.255.255.0 172.16.1.2

EDGE

ip route 192.168.44.0 255.255.255.0 172.16.1.1

ip route 192.168.55.0 255.255.255.0 172.16.1.1

- (ii) Default static route as a primary route using **next hop IP address**. PC3 is able to ping ExternalPC. Make your assumptions. (5 marks)

EDGE(main)

ip route 0.0.0.0 0.0.0.0 209.10.10.6

ip route 0.0.0.0 0.0.0.0 209.10.10.10 5 (< can be any number as long as the number >1)

- (iii) Floating default static route as a secondary route or backup route using **next hop IP address**. PC3 is able to ping ExternalPC. Make your assumptions. (6 marks)

Table 1-1: Documentation Table

Item	Router name	Static route configurations	Justifications
(i)			Default static route is used to match all packets to send to the ISP
(ii)			Floating default static route is used to provide a backup path to a primary static or dynamic route, it will only show up when main route fails, the AD must be bigger than 1
(iii)			

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6. As a network associate, you have been consulted to provide solutions to a network topology with the Internet Protocol version 6 (IPv6) addressing and configurations in all routers interfaces and Personal Computers (PCs) as shown in Figure 1-1.

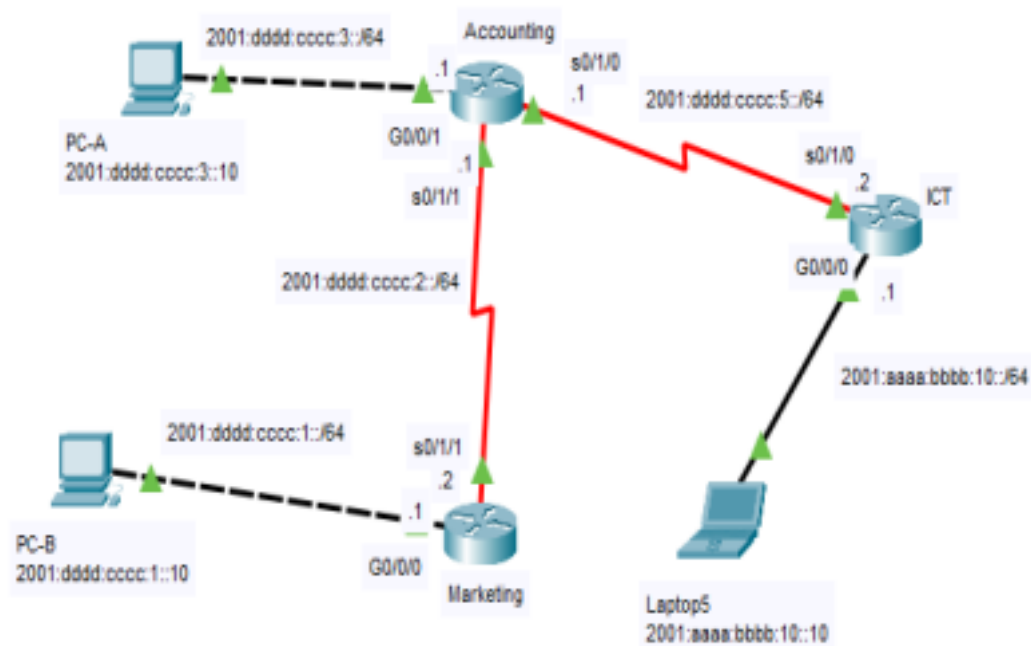


Figure 1-1: A network topology (202201)

Analyze and propose IPv6 standard static routes using **next hop IP address** configurations in all routers shown in Figure 1-1. Use Table 1-1 to document your answer. This is to provide communications between PC-A, PC-B and Laptop5. (13 marks)

Table 1-1: Documentation Table

Router name	Static route configurations
Marketing	ipv6 unicast routing
Accounting	ipv6 route 2001:aaaa:bbbb:10::/64 2001:dddd:cccc:5::2
ICT	ipv6 route 2001:dddd:cccc:1::/64 2001:dddd:cccc:2::2

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7. 202305 BMIT3084

You have been employed as a network engineer to set up and configure the company's network topology as shown in Figure 1-1 using Internet Protocol version 4 (IPv4) addressing and different types of static routes. Answer the following questions to ensure successful communications between PC0, PC2 and all hosts on the Internet including PC1. Assume ISP1 and ISP2 static routing configurations had completed.

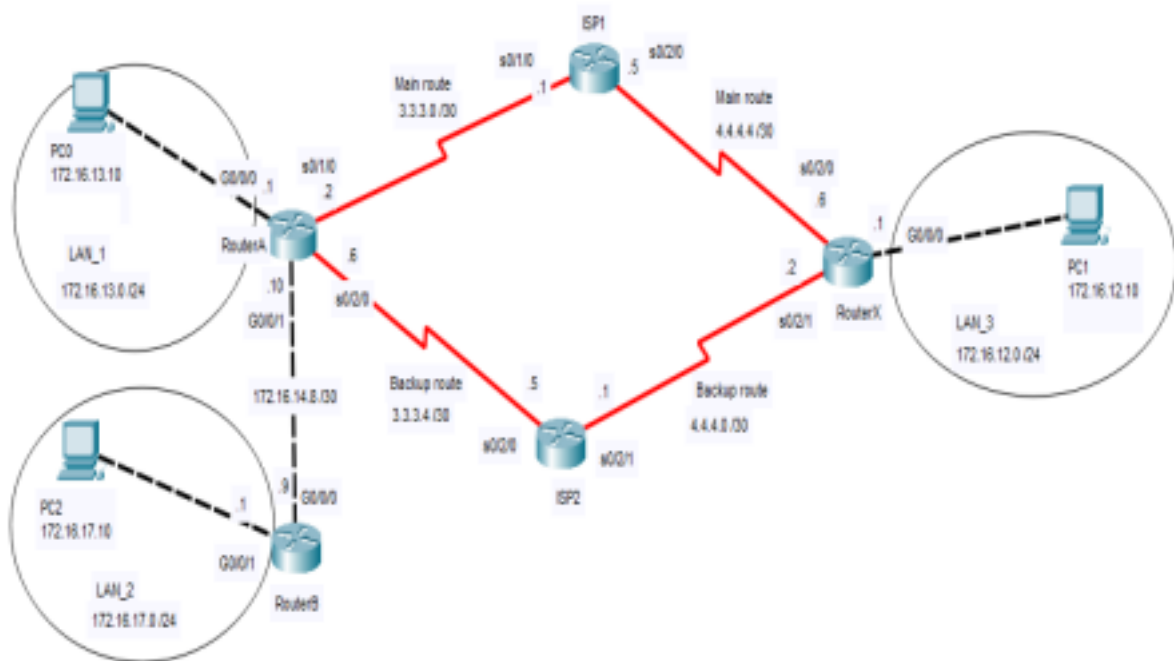


Figure 1-1: A network topology

- a) In **RouterA**, configure a **default static route** and a **floating default static route** using the next hop IPv4 address to forward the packets to ISP1 and ISP2 respectively. State your assumption in your answer. (4 marks)

```
RouterA(config)# ip route 0.0.0.0 0.0.0.0 3.3.3.1
```

```
RouterA(config)# ip route 0.0.0.0 0.0.0.0 3.3.3.5 6
```

- b) In **RouterX**, configure a **default static route** and a **floating default static route** using the next hop IPv4 address to forward the packets to ISP1 and ISP2 respectively. State your assumption in your answer. (4 marks)

```
RouterX(config)# ip route 0.0.0.0 0.0.0.0 4.4.4.5
```

```
RouterX(config)# ip route 0.0.0.0 0.0.0.0 4.4.4.1 2
```

- c) (i) In **RouterA**, configure a **fully specified standard static route** by using the next hop IPv4 address to forward packets to **LAN_2** network. (2 marks)

```
RouterA(config)# ip route 172.16.17.0 255.255.255.0 172.16.14.9
```

- (ii) In **RouterB**, configure a **fully specified default static route** by using the next hop IPv4 address for hosts in **LAN_2** to forward packets to hosts in **LAN_1** and all hosts on the Internet. (2 marks)

```
RouterB(config)# ip route 0.0.0.0 0.0.0.0 172.16.13.1
```

- (iii) Analyse Figure 1-1 and explain the implementation of a **fully specified static route**. Include one of the fully specified static route implementations either in RouterA or RouterB in your explanation. (5 marks)

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