

TUNKU ABDUL RAHMAN UNIVERSITY OF MANAGEMENT AND TECHNOLOGY

FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY

ACADEMIC YEAR 2024/2025

OCTOBER EXAMINATION

BMIT3084 ENTERPRISE NETWORKING

TUESDAY, 22 OCTOBER 2024

TIME: 9.00 AM – 11.00 AM (2 HOURS)

BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN INFORMATION SECURITY
BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN INTERNET TECHNOLOGY
BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN SOFTWARE SYSTEMS
DEVELOPMENT

Instructions to Candidates:

Answer **ALL** questions. All questions carry equal marks.

BMIT3084 ENTERPRISE NETWORKING

Question 1

As a network engineer, you are required to configure a company's network topology with different types of static routes and also explain the static routing concepts to their staffs. Answer the following questions to ensure successful communications between all routers and hosts in Figure 1-1. Assume Internet Protocol version 4 (IPv4) addressing is configured in all devices.

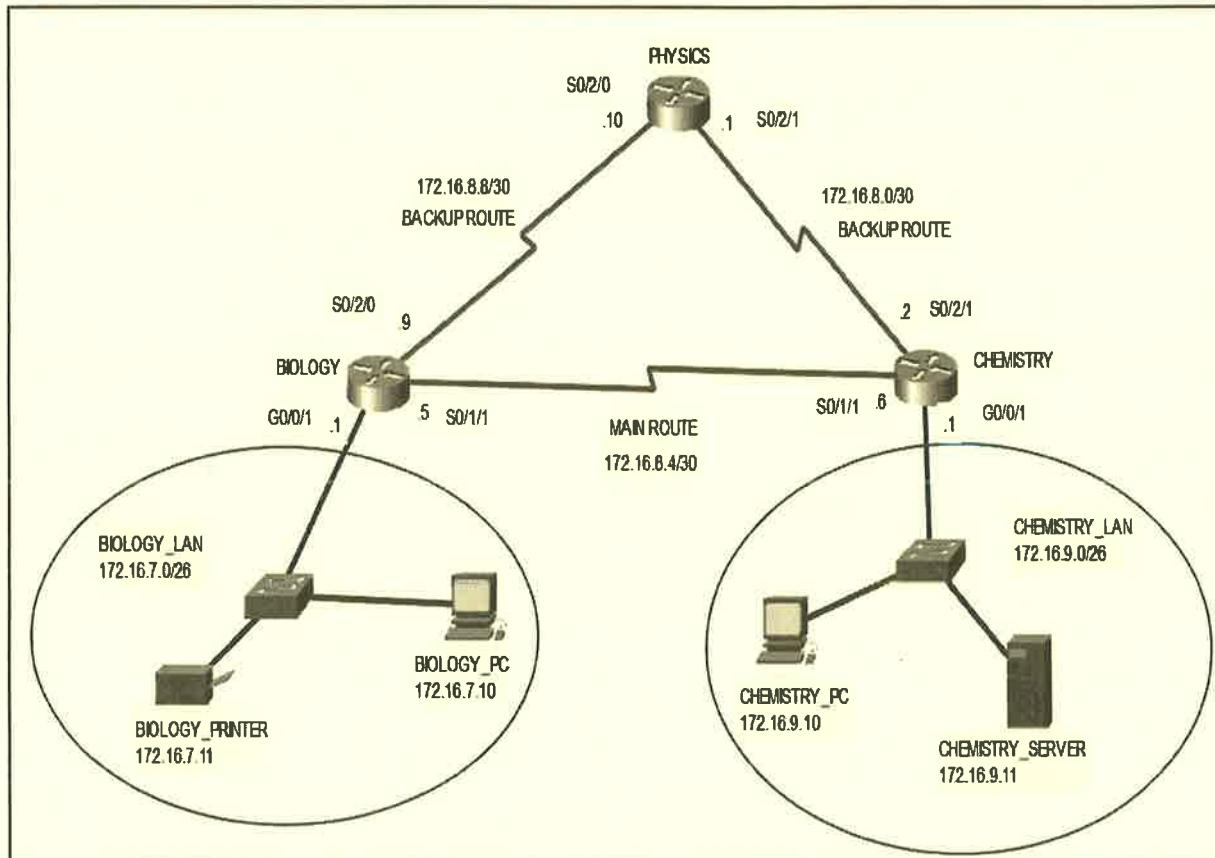


Figure 1-1: A network topology

- a) (i) Configure a **Standard static route** and a **Floating Standard static route** in **BIOLOGY** using next hop IP address to forward traffic to the **CHEMISTRY_LAN**. State your assumptions for the Floating Standard static route. (4 marks)
- (ii) Configure a **Standard static route** and a **Floating Standard static route** using **exit interface** in **CHEMISTRY** to forward packets to **BIOLOGY_LAN**. State your assumptions for the Floating Standard static route. (4 marks)
- (iii) Explain the implementation of a **Floating Standard static route** in **BIOLOGY**. (4 marks)

- b) (i) Configure a **Standard static route** using **next hop IP address** in **PHYSICS** to forward packets to **BIOLOGY_LAN** and another **Standard static route** using **exit interface** in **PHYSICS** to forward packets to **CHEMISTRY_LAN** respectively. (3 marks)
- (ii) Explain the impact on **PHYSICS** routing table search or lookup process with the implementation of two **Standard static routes** in Question 1 b) (i). (4 marks)

BMIT3084 ENTERPRISE NETWORKING**Question 1 (Continued)**

- c) Assume all the static routes configured had been removed. You are required to implement **Open Shortest Path First (OSPF)** configurations using the network command with wildcard mask based on subnet mask in **BIOLOGY** and **PHYSICS** only. Use OSPF process-id 321 and area-id 0. Use Table 1-1 to document your answer.

Table 1-1: Documentation Table

Router name	Configurations
	(6 marks)

[Total: 25 marks]

Question 2

- a) (i) Describe a Dynamic Host Configuration Protocol (DHCP) spoofing attack. (1 mark)
- (ii) Suggest **TWO (2)** attacks that attackers may perform using misleading information obtained during the DHCP spoofing attack. (6 marks)
- b) Analyse the network topology in Figure 2-1 and implement Access Control List (ACL) to filter the network traffic and answer the following questions. All PCs and routers can communicate with each other.

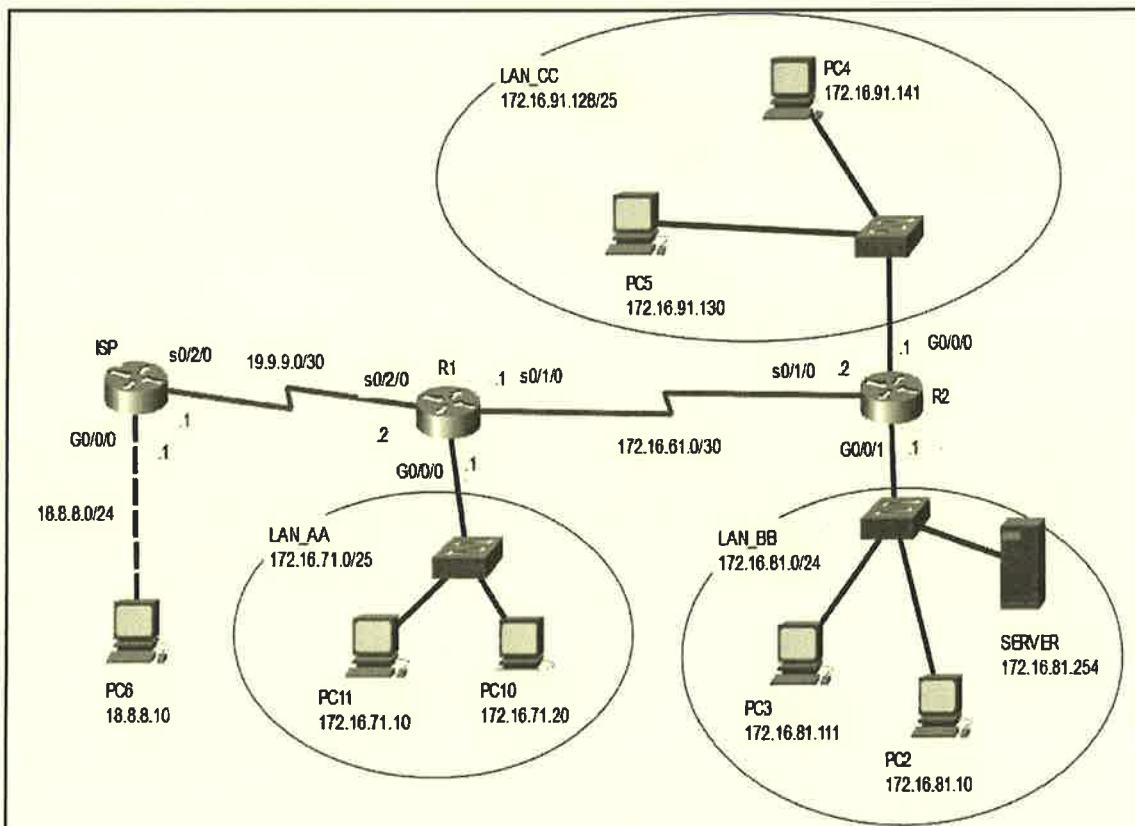


Figure 2-1: A network topology

BMIT3084 ENTERPRISE NETWORKING**Question 2 b) (Continued)**

- (i) Apply a standard access list numbered 68 to block **PC11** to communicate with **SERVER**. Allow all other traffics. Use suitable keyword(s) in the ACL. Indicate the router, interface, and direction to apply the ACL. (6 marks)
- (ii) Apply an extended access list named **ALLOW_ACCESS**. The **LAN_CC** network is able to perform **HTTPS** on the **SERVER**. In addition, **LAN_CC** network can ping hosts with odd numbered IP addresses in **LAN_BB** network. Deny all other traffic, which must be explicitly written in your ACL. Use **port number** for service and suitable keyword(s) in your ACL. Indicate the router, interface, and direction to apply the ACL. (12 marks)

[Total: 25 marks]

Question 3

Analyse Figure 3-1 and Figure 3-2 on DHCP (Dynamic Host Configuration Protocol), Static NAT and PAT (Port Address Translation) configurations. OSPF and static routing protocols are configured in the respective routers.

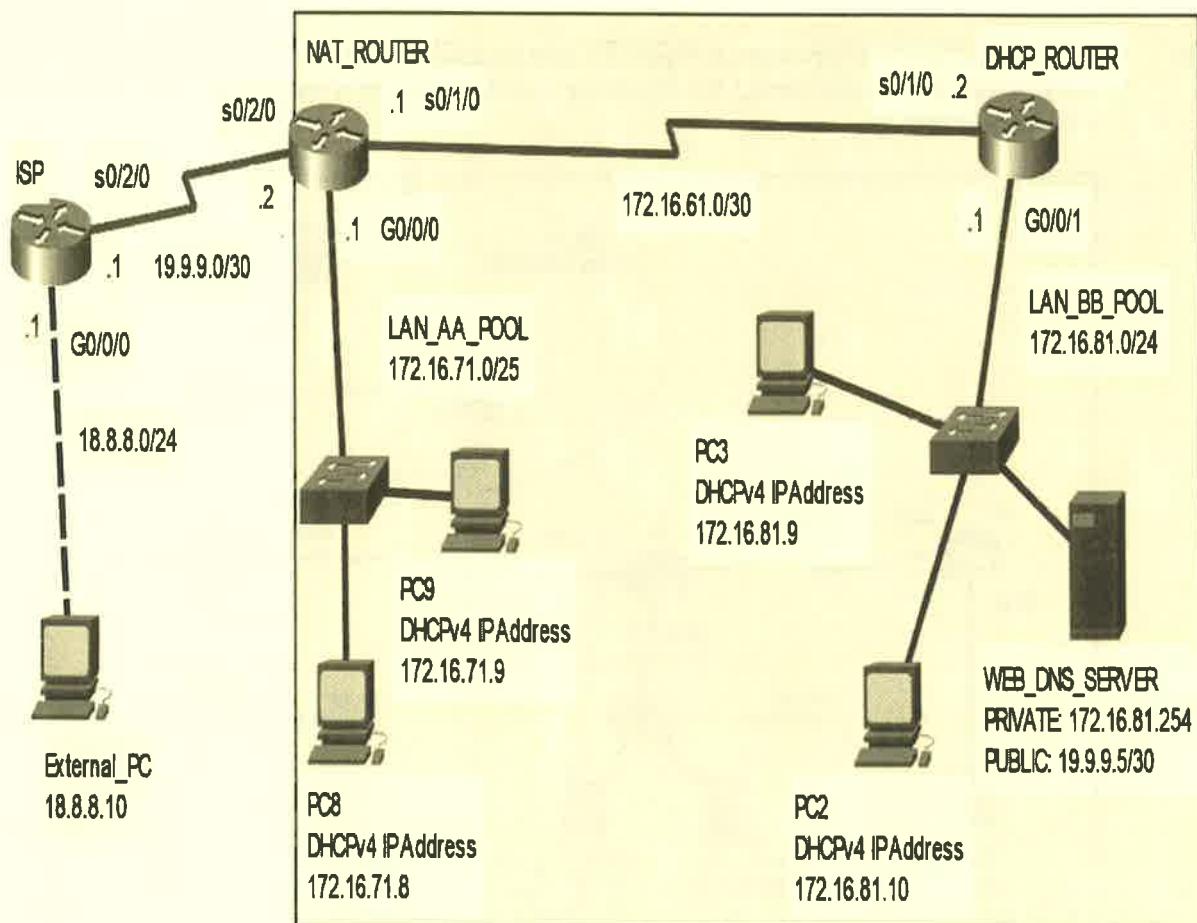


Figure 3-1: A network topology

BMIT3084 ENTERPRISE NETWORKING**Question 3 (Continued)**

NAT_ROUTER	DHCP_ROUTER
interface GigabitEthernet0/0/0 ip address 172.16.71.1 255.255.255.128	ip dhcp excluded-address 172.16.81.1 172.16.81.8 ip dhcp excluded-address 172.16.81.254 ip dhcp excluded-address 172.16.71.1 172.16.71.7
interface Serial0/1/0 ip address 172.16.61.1 255.255.255.252	ip dhcp pool LAN_BB_POOL network 172.16.81.0 255.255.255.252 dns-server 172.16.81.254
interface Serial0/2/0 ip address 19.9.9.2 255.255.255.252	interface GigabitEthernet0/0/1 ip address 172.16.81.1 255.255.255.0
ip nat inside source list 1 pool NAT_POOL overload	interface Serial0/1/0 ip address 172.16.61.2 255.255.255.252

Figure 3-2: Partial output of “show run” commands

- a) **DHCP_ROUTER** is configured as a DHCP server. PCs are having a problem obtaining the IP addresses and other DHCP configurations successfully. Analyse the partial output of “show run” commands in Figure 3-2 and network topology in Figure 3-1. Use Table 3-1 to document all errors, provide the solutions/correct configurations for the respective errors and lastly justify your answers. State your assumptions in your answers. (12 marks)

Table 3-1: Documentation Table

Errors	Solutions	Justifications

- b) (i) Implement **Static NAT** configurations in the respective router and apply to the router’s interfaces for the **WEB_DNS_SERVER** to be reachable from the Internet. A public address **19.9.9.5** is assigned to the **WEB_DNS_SERVER** from the external network address of **19.9.9.4/30**. (5 marks)
- (ii) Identify errors and provide solutions for **PAT** configurations to use the **remaining** public IP address from the external network address **19.9.9.4/30** as the pool of address. All the internal PCs should be able to ping the **External_PC**. Use Table 3-2 to document your answers. (8 marks)

Table 3-2: Documentation Table

Errors	Solutions

[Total: 25 marks]

BMIT3084 ENTERPRISE NETWORKING**Question 4**

- a) (i) Give **TWO (2)** comparisons between a private Wide Area Network (WAN) and a public WAN. (6 marks)
- (ii) Each broadband solution has advantages and disadvantages. Explain **TWO (2)** factors to be considered when selecting broadband solutions. (4 marks)
- b) Examine **TWO (2)** types of Virtual Private Networks (VPNs) used by mobile workers. (6 marks)
- c) Differentiate the characteristics of voice, video, and data traffic for QoS (Quality of Service) policy. (9 marks)

[Total: 25 marks]