

TUNKU ABDUL RAHMAN UNIVERSITY OF MANAGEMENT AND TECHNOLOGY

FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY

ACADEMIC YEAR 2023/2024

OCTOBER EXAMINATION

INFORMATION TECHNOLOGY BMIT3084
ENTERPRISE NETWORKING

THURSDAY, 19 OCTOBER 2023

TIME: 2.00 PM – 4.00 PM (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

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.

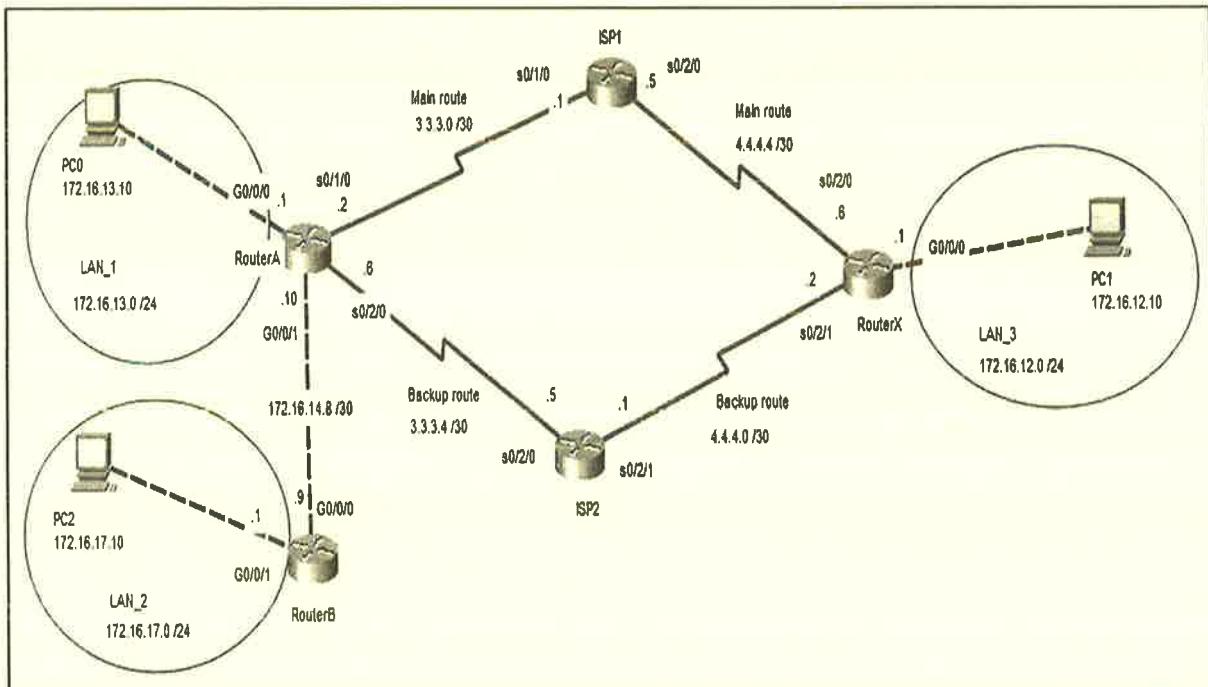


Figure 1-1: A network topology

- 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)
- 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)
- (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)
 - 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)
 - 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)

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

- d) Implement Open Shortest Path First (OSPF) configurations using network command with wildcard mask based on subnet mask in Router1 and Router2 in the network topology shown in Figure 1-2. Use OSPF process-id 888 and area-id 0. Propagate the default routes in Router1 to ISP for LAN_1 and LAN_2 to forward the traffic to ISP. Assume pre-configuration of default route in the Router1 and static routes in ISP were completed. Use Table 1-1 to document your answer.

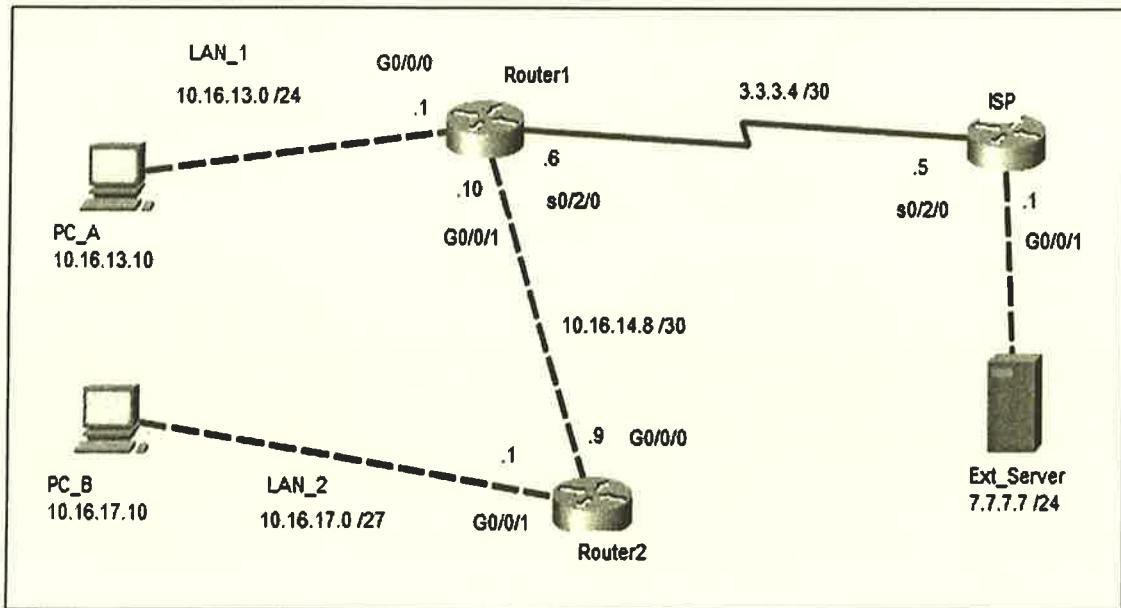


Figure 1-2: A network topology

Table 1-1: Documentation Table

Router name	Configurations

(8 marks)

[Total: 25 marks]

Question 2

- a) Many network penetration tools are developed to test network security but many of these tools are used by hackers for exploitation and attack. Propose **TWO (2)** network penetration tools and **ONE (1)** example for each of the proposed network penetration tools in your explanation.
(6 marks)

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

- b) OSPF configurations were implemented in all routers and all PCs can communicate with each other in Figure 2-1 network topology. Answer the following questions.

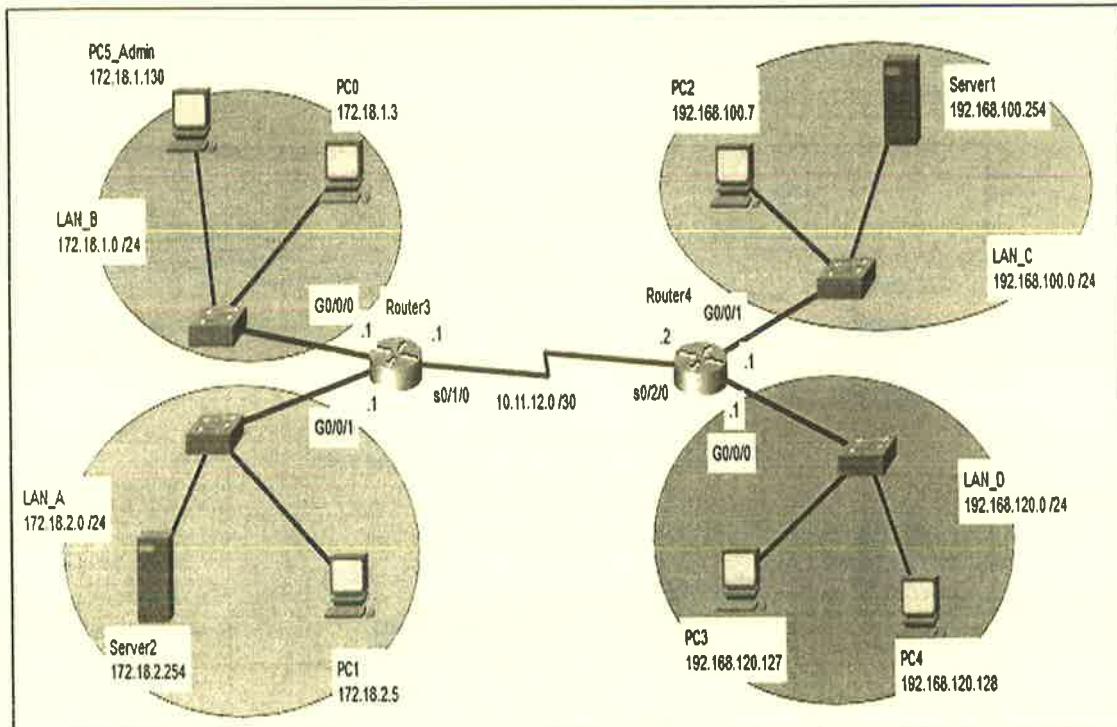


Figure 2-1: A network topology

- Write a standard access list numbered 13 to allow **PC5_Admin** to telnet into **Router3**. Deny all other traffic which must be explicitly written in your ACL. Use suitable keyword(s) in the ACL. Indicate the router, interface, and direction to apply the ACL. (6 marks)
- Write an extended access list named **ACCESS_LEVEL** which will allow the second half of **LAN_D** network access to ping hosts with odd numbered IP addresses in **LAN_C**. Deny all other traffic. Use **port number** for services and suitable keyword(s) in your ACL. Indicate the router, interface, and direction to apply the ACL. (9 marks)
- Differentiate applying access list on incoming and outgoing port of a router. (4 marks)

[Total: 25 marks]

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Question 3

Figure 3-1 shows the network topology that is set up with OSPF and static routing protocols in their respective configurations. All devices can communicate with each other. As a network associate, troubleshoot and identify the errors along with the solutions for DHCP (Dynamic Host Configuration Protocol) and PAT (Port Address Translation) configurations in the EDGE_ROUTER.

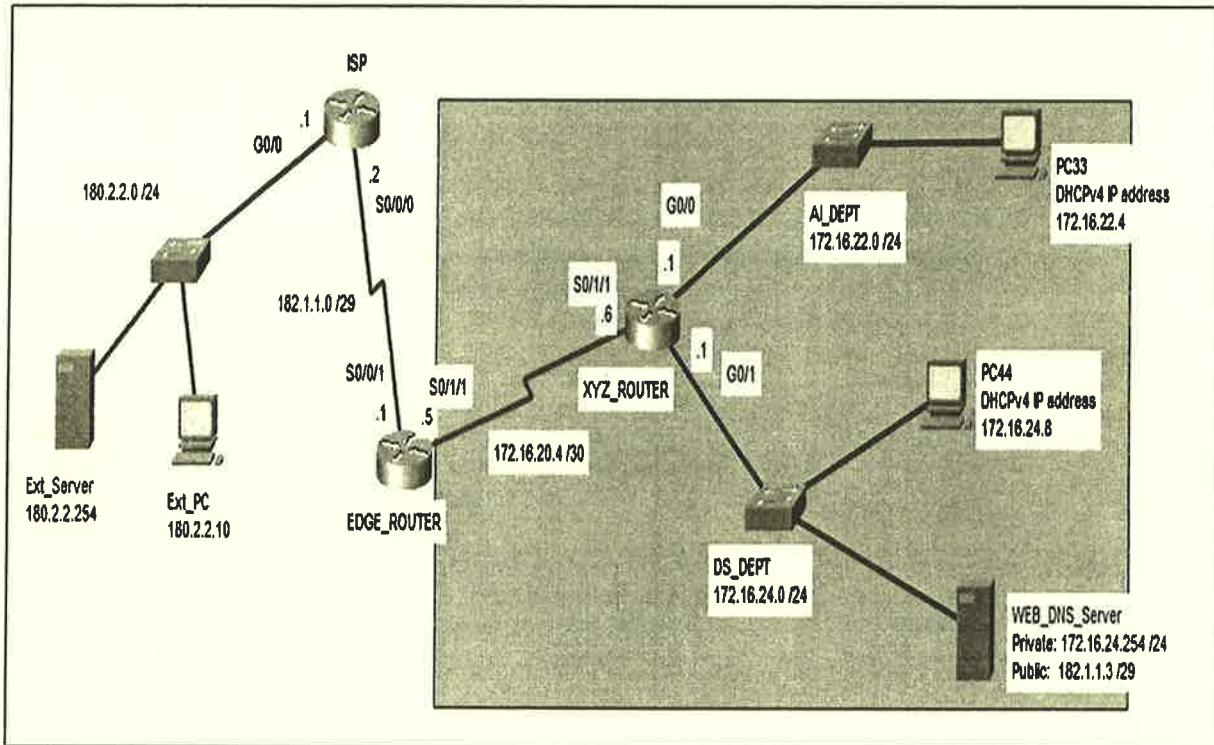


Figure 3-1: A network topology

EDGE_ROUTER	XYZ_ROUTER
ip dhcp excluded-address 172.16.24.1 172.16.24.7	interface GigabitEthernet0/0
ip dhcp excluded-address 172.16.24.254	ip address 172.16.22.1 255.255.255.0
ip dhcp pool DS_DEPT_DHCP	interface GigabitEthernet0/1
network 172.16.14.0 255.255.255.0	ip address 172.16.24.1 255.255.255.0
dns-server 172.16.24.254	:
interface Serial0/0/1	interface Serial0/1/1
ip address 182.1.1.1 255.255.255.248	ip address 172.16.20.6 255.255.255.252
interface Serial0/1/1	:
ip address 172.16.20.5 255.255.255.252	
clock rate 2000000	
ip nat inside source list 55 pool NAT_POOL	
access-list 55 permit 172.16.22.0 0.0.0.255	
access-list 55 permit 172.16.24.0 0.0.0.255	
:	

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

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

- a) **EDGE_ROUTER** is configured with DHCP server configurations. PC33 and PC44 were unable to obtain the IP addresses and other DHCP configurations successfully. Analyse the DHCP configurations in Figure 3-1 and Figure 3-2. Use Table 3-1 to document all errors, provide the solutions/correct configurations for the respective errors and lastly justified your answers. State your assumptions in your answers. (13 marks)

Table 3-1: Documentation Table

Errors	Solutions	Justifications

- b) (i) Examine Figure 3-1 and propose a Static NAT configuration for the **WEB_DNS_SERVER** to be reachable from the Internet. A public address **182.1.1.3/29** is assigned to the **WEB_DNS_SERVER** from the external network address of **182.1.1.0/29**. (5 marks)
- (ii) Analyse Figure 3-1 and Figure 3-2. Identify errors and provide solutions for PAT configurations to use the **remaining** public IP addresses from the external network address **182.1.1.0/29** as the pool of addresses. All the internal PCs should be able to ping the **Ext_PC**. Use Table 3-2 to document your answers. (7 marks)

Table 3-2: Documentation Table

Errors	Solutions

[Total: 25 marks]

Question 4

- a) Tourists would like to have Internet connectivity while visiting Kuala Lumpur. Suggest **ONE (1)** type of modern WAN connectivity option to support such requirement. Justify your answers. (6 marks)
- b) ABC Sdn. Bhd. is implementing a secure Virtual Private Networks (VPN) connection using IPsec. Illustrate **FOUR (4)** essential security functions in IPsec framework and provide **ONE (1)** example for each security function to protect VPN interesting traffic. (12 marks)
- c) (i) Explain network traffic that is predictable and smooth. (3 marks)
- (ii) Suggest **TWO (2)** approaches to prevent packet loss because of congestion on interfaces. (4 marks)

[Total: 25 marks]