NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Faculty of Computing and Informatics

Department of Computer Science

QUALIFICATION: BACHELOR OF COMPUTER SCIENCE IN CYBER SECURITY BACHELOR OF COMPTER SCIENCE	
QUALIFICATION CODE: 07BCCS; 07BCMS	LEVEL: 7
COURSE: COMMUNICATION NETWORKS	COURSE CODE: CMN620S
DATE: JANUARY 2025	SESSION: PAPER 2
DURATION: 2 HOURS 30 MINUTES	MARKS: 80

SECOND OPPORTUNITY / SUPPLEMENTARY EXAMINATION QUESTION PAPER	
EXAMINER(S)	MR. NASIMANE EKANDJO MS. LOINI IIYAMBO MS. HELENA HAINANA MR. BEN MWASHEKUNA MR. SHOOPALA NAMBAHU MS. TALENI ANDJAMBA MS. ADELHEID GEINGOS
MODERATOR:	MR. EDWARD NEPOLO

THIS QUESTION PAPER CONSISTS OF 7 PAGES
(Excluding this front page)

INSTRUCTIONS

1. Answer ALL the questions.
2. Write clearly and neatly.
3. Number the answers clearly.
4. When answering questions you should be guided by the allocation of marks. Do not give too few or too many facts in your answers.

PERMISSIBLE MATERIALS
1. Non-programmable calculator.

Question 1

For the following questions, answer True/False. [5]

1.1 The default VLAN in most switches in VALN 1.

1.2 In an enterprise access network (Ethernet), transmission rates ranges from 10 Mbps, 100 Mbps, 1 Gbps to 10 Gbps.

1.3 Intra-AS routing makes use of Exterior Gateway Protocol (EGP).

1.4 An IP address 200.70.70.1 can only be used outside a LAN because it is a public IP address.

1.5 When utilising a cable network or DSL access network, the upstream transmission rate is higher than the downstream transmission rate.

Question 2

Choose the correct answer from the multiple choice questions below. [5]

2.1 What protocol is commonly used for VLAN tagging in Ethernet frames?

   a) ARP

   b) PPP

   c) 802.1Q

   d) ICMP

2.2 An Ethernet cable that is made up by having one end of 568A standard and the other end of 568B is a/an _____ .

   a) Crossover cable

   b) Rollover cable

   c) Straightthrough cable

   d) Serial cable

2.3 After how long can a router wait to hear from its neighbor in order for it to consider that its neighbor is no longer reachable?

    a)   30 seconds

    b)   3 minutes

    c)   30 minutes

    d)   No limit of waiting time

2.4 Which of the following will be needed by a PC in order to send a packet to a destination outside its own subnet?

    a)   VLAN

    b)   ARP

    c)   Default gateway

    d)   Switch

2.5 Which two DHCP packet types contain an IP address to be leased to a client?

    a)   Offer and Release

    b)   Offer and NAK

    c)   Offer and Acknowledgement

    d)   Offer and Renew

    e)   None of the above

Question 3

3.1 In a network that is configured with OSPF as a routing protocol, what are the benefits of dividing that network into areas? [2]

3.2 What is the role of a designated router (DR)? [2]

3.3 Explain the process of electing a DR and a Backup DR. [3]

Question 4

4.1 Explain two disadvantages of twisted pair cable. [2]

4.2 What is the difference between multi-mode and single-mode fiber-optic cable? [2]

Question 5

5.1 What is DSL access network and how does it work? [3]

5.2 In what way is the enterprise access network (ethernet) different from DSL access network? [2]

5.3 Name any two network access type other than the two mentioned above. [2]

Question 6

6.1 Outline three benefits of utilizing VLANs in a network? [3]

6.2 Consider the topology below and answer the questions that will follow.
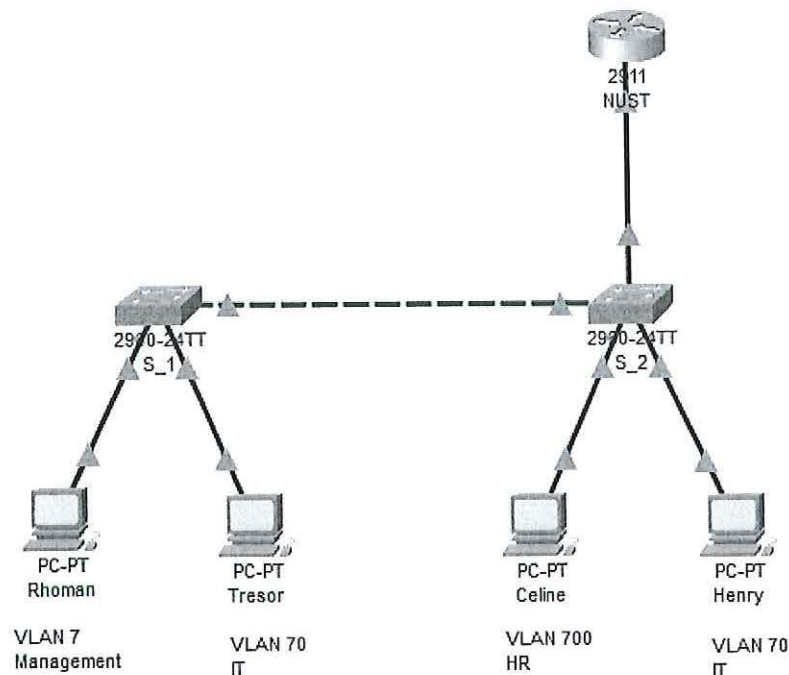
a) What is the specific name of the ports that links the two switches together? [2]

b) What is the specific name of the port that links S_1 to Celine PC? [1]

c) How many subnets can be created on VLAN 700? [1]

6.3   Below is an extract of S_1 after the command `show vlan` was issued.

```
S_1#sh vlan

VLAN Name                             Status     Ports
---- -------------------------------- ---------- --------------------------------
1    default                          active     Fa0/2, Fa0/3, Fa0/4, Fa0/5
                                                 Fa0/6, Fa0/21, Fa0/22, Fa0/23
                                                 Fa0/24, Gig0/1, Gig0/2
7    Management                       active     Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                 Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                 Fa0/15
70   IT                               active     Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                                 Fa0/20
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Transl Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
7    enet  100007     1500  -      -      -        -    -        0      0
70   enet  100070     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0
```
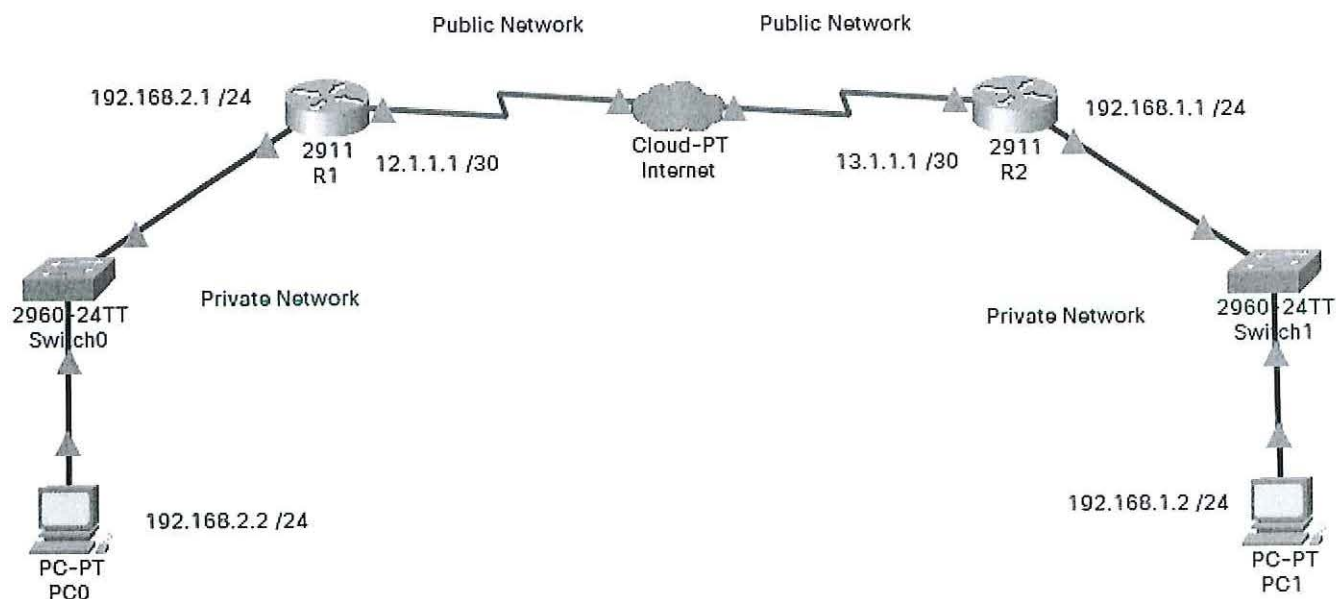
How many VLANs have been created on the switch?   [1]

Question 7

Consider the network topology below and answer the questions that follow:

7.1 From the above network topology, indicate which device interface (IP address) belong to:

    a)   Inside local: _____   [1]

    b)   Inside global: _____   [1]
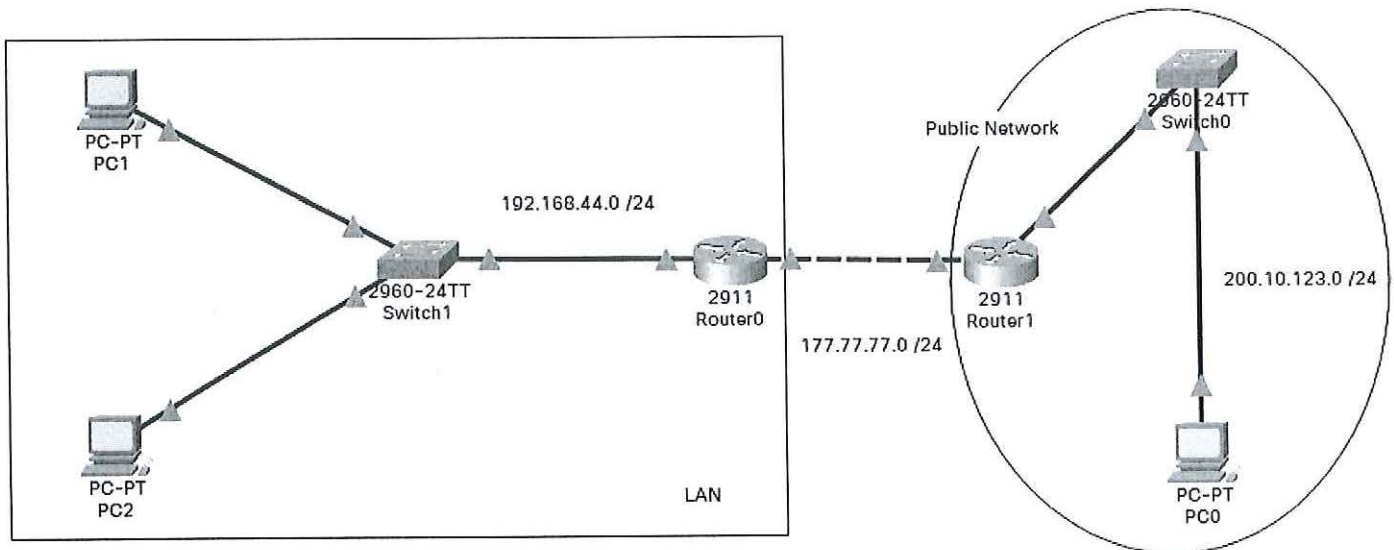
    c)   Outside local: _____   [1]

    d)   Outside global: _____   [1]

7.2 Explain two purposes of configuring Network Address Translation (NAT) on a network. [2]

7.3 Explain any two methods that can be used to implement NAT.   [4]

Question 8

Consider the figure below and answer the questions that follow:

8.1 Write down the full commands that will configure a static route on Router1 so that the router can direct traffic to their destinations. Assume the IP address of Router0's interface leading to Router1 is 177.77.77.1, while the IP address of Router1's interface leading to Roouter0 is 177.77.77.2.   [2]

8.2 On Router0, configure a standard access list using an access list of id 10 and permit any device on the subnet 192.168.44.0 /24.   [3]

8.3 PC1 and PC2 are required to obtain their IP addresses dynamically from router Router0. This router therefore needs to be configured with DHCP services.

Consider the table below and write down the commands needed to configure a DHCP on Router0. [3]

DHCP Pool Name	Starting IP Address	Ending IP Address	Network Mask
CMN_EXAM	192.168.44.1	192.168.44.254	/ 24

8.4 Write down the command that will exclude IP addresses: 192.168.44.1 to 192.168.44.10 from being leased to the hosts on the LAN. [2]

Question 9

Consider the following network topology and answer the questions that will follow.
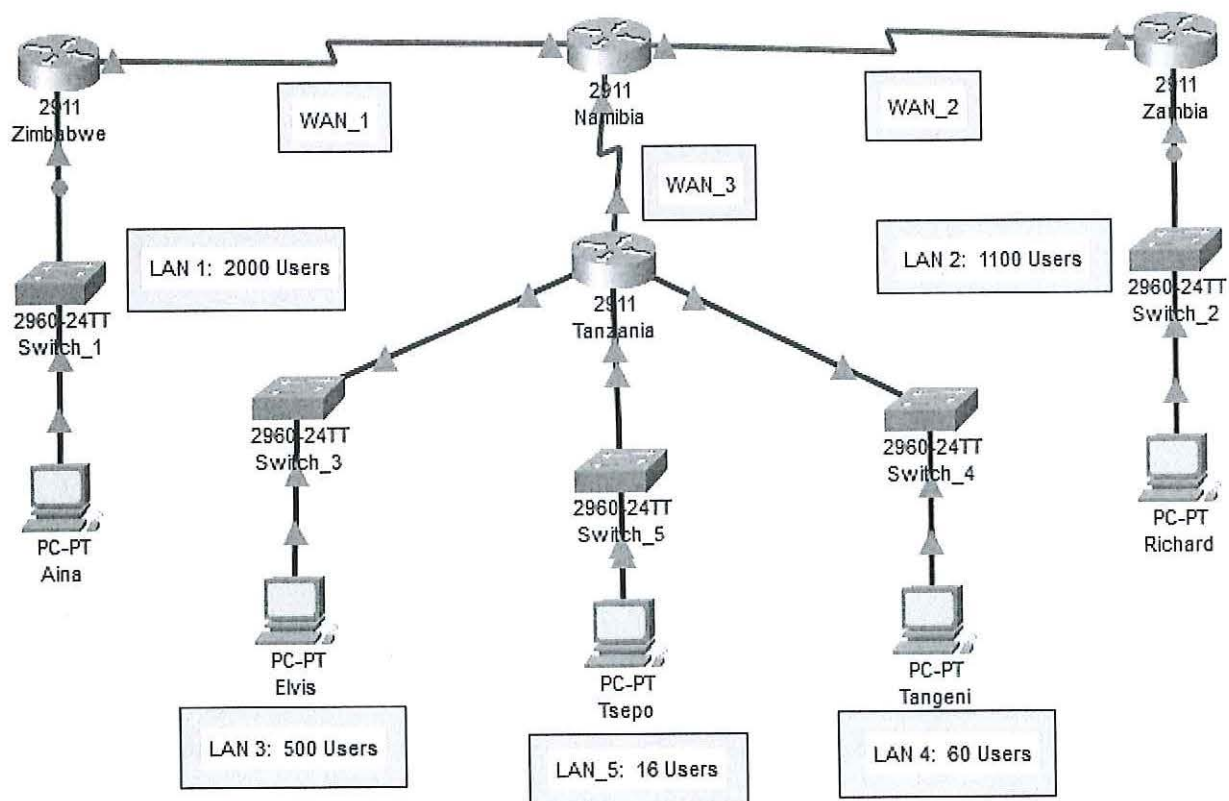
Execute the following requirements:

You have been allocated the class B IP address block 172.28.0.0 /19.

9.1   Subnet this IP address block to provide valid IP addresses to all users in the five LANs. You are also required to provide valid IP addresses to the WAN links between the routers.

Re-draw the table below and fill it in: [20]

LAN/WAN	Network Number	Subnet Mask (/)
LAN 1:		
LAN 2:		
LAN 3:		
LAN 4:		
LAN 5:		
WAN 1		
WAN 2		
WAN 3		

Marks distribution: [1.5 marks for each network number]

[1 mark for each subnet mask]

Total = 20 marks

9.2   The recommended IP address for Aina PC is the last IP address of that subnet. Write down this IP address.   [1]

Elvis: _____

9.3   The recommended IP address for Tanzania router's interface leading to LAN 5 is the first IP address of that subnet. Write down this IP address.   [1]

Tanzania: _____

9.4   Assume that the routing protocol configured in this network is RIP. From the networks listed below, choose any two networks that will be learned by Tanzania router.   [2]
LAN 1;   LAN 2;   LAN 3;   LAN 4;   LAN 5   WAN 1;   WAN 2;   WAN 3

End of Paper