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; 07BACS	**LEVEL:** 7
COURSE: COMMUNICATION NETWORKS	**COURSE CODE:** CMN620S
DATE: NOVEMBER 2022	**SESSION:** 1
DURATION: 2 HOURS 30 MINUTES	**MARKS:** 70

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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THIS QUESTION PAPER CONSISTS OF 5 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

Indicate whether the following statements are true or false. [4]

1.1 RIP is a link state algorithm used to calculate routes within a network.

1.2 The speed of TCP is slower than UDP.

1.3 Without using a router, devices in different VLANs cannot communicate with one another.

1.4 The router to connect VLANs is connected to a switchport in trunk mode.

1.5 ARP is a protocol that is used to route packets with unkown destination.

Question 2

Choose the correct answer from the questions below: [6]

2.1 What is the valid host range is the IP Address 192.168.187.233 / 27 from?

a) 192.168.187.225 to 192.168.187.254
b) 192.168.187.193 to 192.168.187.224
c) 192.168.187.129 to 192.168.187.191
d) 192.168.187.65 to 192.168.187.95

2.2 If the subnet mask is 255.255.255.224, which of the following will be the broadcast mask address?

a) 202.15.19.127
b) 202.15.19.63
c) Both A and B
d) None of the above

2.3 Which of the following statements are advantages of VLANs. (Choose two)

a) VLANs can greatly simplify adding, moving or changing hosts on the network.

b) VLANs utilises packet filtering to enhance security.

c) VLANs provide a method of conserving IP addresses in large networks.

d) VLANs establish broadcast domains in switched networks.

e) VLANs provide a low-latency internetworking alternative to routed networks.

2.4 Which of the following command will save the router's configurations to NVRAM?

a) Router#save run start
b) Router#copy run start
c) Router#copy start run
d) Router#reload run start

Question 3

Define the following concepts/key words used in communication networks.

3.1 VLAN trunk port [2]

3.2 Network layer data plane [2]

Question 4

4.1 Explain the concept of circuit switching. [2]

4.2 State two advantages of circuit switching. [2]

4.3 Give an example where circuit switching can be used/more suitable. [1]

Question 5

5.1 Describe how a link-state routing algorithm works. [3]

5.2 Explain what happens when the link costs changes in a network with routers running distance vector algorithm. [3]

Question 6

Consider the router extract below:

```
Line 1) Router>enable
Line 2) Router#configure terminal
Line 3) Router(config)#line vty 0 9
Line 4) Router(config-line)#login
Line 5) Router(config-line)#exit
Line 6) Router(config)#enable secret cmn 2022
```

6.1 What is the purpose of the command in line 3? [2]

6.2 What is the purpose of the command in line 4? [1]

6.3 What password (line 6) has been configured here? Where will you be prompted to enter this password? [2]

Question 7

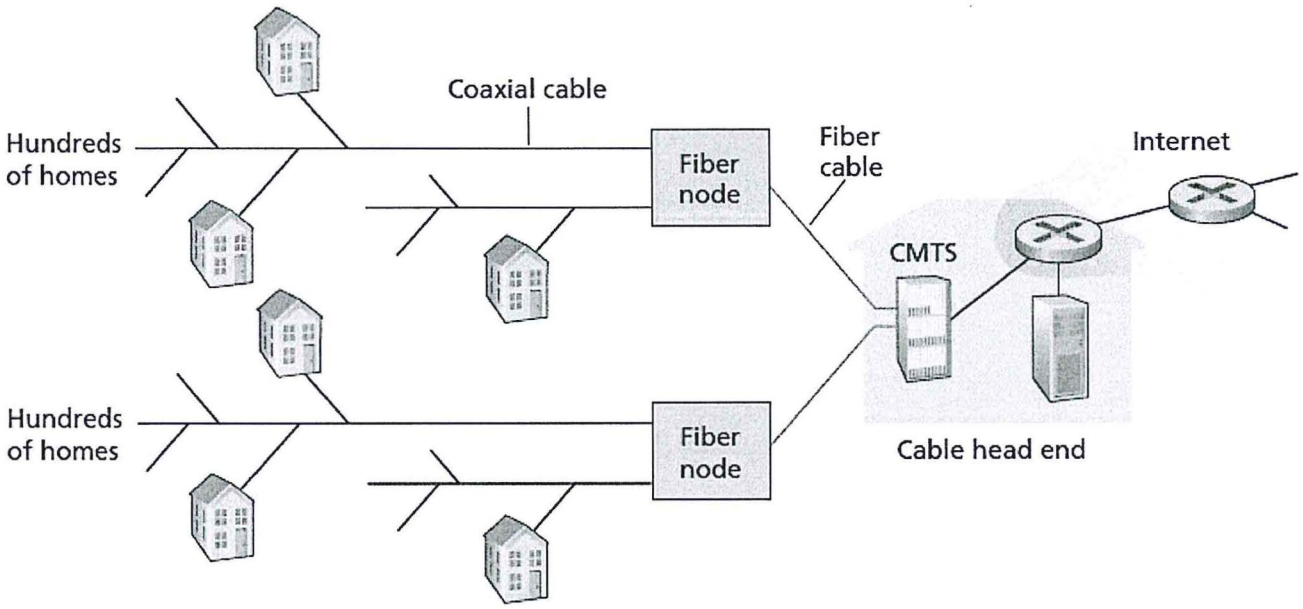
7.1 Explain three benefits of utilising VLANs in a network design. [3]

7.2 Which protocol is used to configure trunking on a switch? [2]

7.3 Mention the main type of encapsulation trunking protocol that is an IEEE standard. [2]

Question 8

The figure below shows the hybrid fiber-coaxial cable network as a type of an access network. Consider the figure and answer the questions that follow:



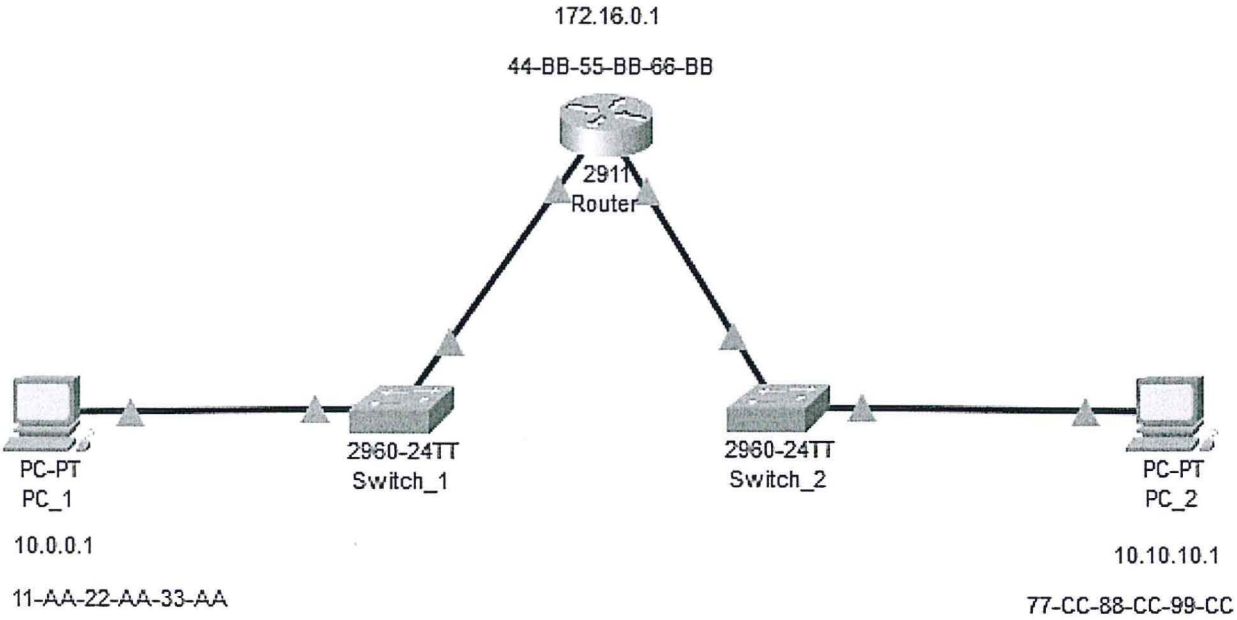
8.1 Explain how this type of access network works. [2]

8.2 Outline the purpose of the Cable Modem Termination System (CMTS). [2]

8.3 Why is it difficult for downstream and upstream transmission rates to reach their maximum rates? [2]

Question 9

The figure below shows a switched network. The switches are not configured with any VLAN. Assume that PC_1 knows the IP address and the MAC address for the router. Further, assume that PC_1 knows the IP address of PC_2.



9.1 Explain in detail how PC_1 will communicate with PC_2 provided that they are not on the same LAN. You are required to focus on addressing at IP (datagram) and MAC layer (frame). [4]

9.2 Link-layer switches are known to be plug and play. In other words, they are self-learning. Explain what this means. [3]

Question 10

Concider the class B IP address block: 172.22.0.0 /21

Utulising VLSM, calculate subnets that will meet the departmental needs of the organisation below:

- Administration – 350 users
- Management – 15 users
- Finance – 55 users
- Sales – 25 users

You are required to re-draw the table below and then fill it in with the necessary information as per your subnetting. [20]

Network Name	Network Address	Usable host range	Broadcast Address	Subnet Mask
Administration				
Management				
Finance				
Sales				

Marks distribution: [1.5 marks for each network address]

[1.5 marks for each host range]

[1 mark for each broadcast address]

[1 mark for each subnet mask]

Total = 20 marks

End of exam