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; 07BCMS	**LEVEL:** 7
COURSE: COMMUNICATION NETWORKS	**COURSE CODE:** CMN620S
DATE: JANUARY 2024	**SESSION:** PAPER 2
DURATION: 2 HOURS 30 MINUTES	**MARKS:** 70

SECOND OPPORTUNITY / SUPPLEMENTARY 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. [6]

1.1 An IP address 172.30.0.1 can be issued to a LAN because it is a private IP address.

1.2 The TCP header contains fewer fields than the UDP header.

1.3 Routers in an AS that have the responsibility of routing packets to destinations outside the AS are called gateway routers.

1.4 With link-state routing protocol, the devices in the network need to know all other devices and not only the neighbours.

1.5 A control plane in network layer is responsible for moving packets from source to destination. It also determines how a datagram arriving on a router input port is forwarded to router output port.

1.6 TCP is more preferable for voice circuit.

Question 2

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

2.1 Which OSI layer does IP rely to determine whether packets has been lost and to request for retransmission?

a) Application
b) Transport
c) Network
d) Physical

2.2 You are connecting two switches together. Which type of cable should you use?

a) Roll over
b) Coaxial
c) Crossover
d) Straight-through

2.3 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

2.4 Which statement best describes the purpose of a routing protocol?

a) It is used to build and maintain ARP tables.

b) It provides a method for segmentation and reassembling data packets.

c) It allows an Administrator to devise an addressing scheme for the network.

d) It allows a router to share information about known networks with other routers.

2.5 Which of the following is correct regarding class B address of IP address?

a) Network bits = 18; Host bits = 14

b) Network bits = 12; Host bits = 14

c) Network bits = 17; Host bits = 16

d) Network bits = 14; Host bits = 16

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

a) `Router#copy run start`

b) `Router#copy start run`

c) `Router#save start run`

d) `Router#save run start`

Question 3

3.1 Explain the difference between SMTP protocol and IMAP protocol. [4]

3.2 Give any an example of User Agent of an email. [1]

Question 4

4.1 Explain the difference between inter-AS routing and intra-AS routing as approaches to scalable routing. [4]

4.2 Give an example of a routing protocol that supports inter-AS routing. [1]

Question 5

5.1 Explain why the distance vector algorithm is said to be distributed, iterative and asynchronous. [3]

5.2 Explain what happens when the link-cost changes to a low or high value. [2]

Question 6

When developers develop applications, they choose one of the available transport-layer protocols. They (developers) make a choice depedning on the services provided by the available transport-layer protocol(s). Mention and expalin any three services that a transport-layer protocol can offer to applications invoking it. [6]

Question 7

7.1 Differentiate between a static route and a default route. [2]

7.2 Below, is an example of a configured route. Describe what the configuration does. [2]

```
R1(config)# ip route 192.168.1.0   255.255.255.0   10.1.1.2
```

Question 8

Consider the figure below that shows the output that results from the `show ip route` command and answer the questions that follow:

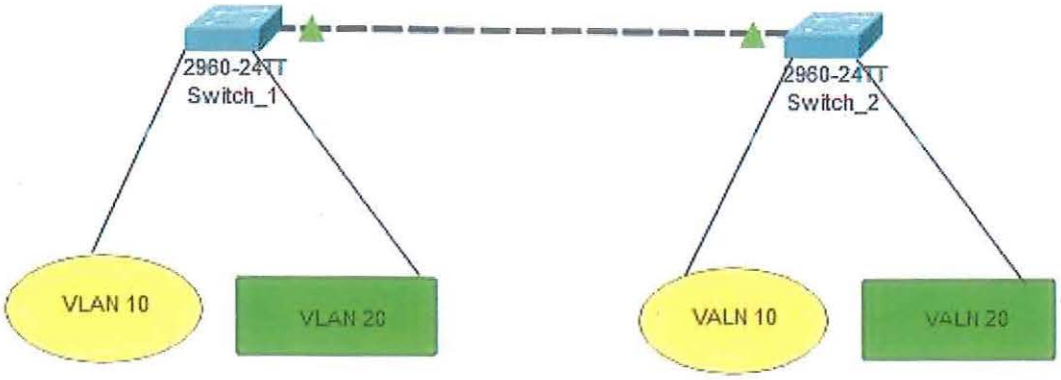
```
Router#show ip route
Gateway of last resort is not set

Line 1)  1.0.0.0/32 is subnetted, 1 subnets
Line 2) C    1.1.1.1 is directly connected, Loopback0
Line 3) C   172.20.7.125/27 is directly connected
Line 4) R    2.2.2.2 [120/12] via 10.12.12.2, 00:00:06, Fa0/0
Line 5)     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
Line 6) C      10.12.12.0/24 is directly connected, Fa0/0
Line 7) L      10.12.12.1/32 is directly connected, Fa0/0
Line 8) O      2.2.2.2 [110/2] via 192.168.23.2, 00:02:47, Fa0/0
```

8.1 Through which routing protocol does the address in line 8 is learned. [1]

8.2 What is the network number where the IP address in line 3 belongs?. [2]

Question 9

Consider the figure below to answer the questions that follow:



9.1 A host in VLAN 10 within switct_1 need to communicate to a host in VLAN 10 within switch_2. Explain how the switches have to be configured for the communication to take place. [2]

9.2 What is mean by frame tagging? [2]

9.3 What is the purpose of IEEE 802.1q standard in a switched network? [2]

9.4 Name the two types of frame tagging methods (also known as frame encapsulation protocols.). [2]

Question 10

Given the IP Addresses below, provide the network number, the broadcast address and the equivalent subnet mask.

10.1 172.17.222.222 /17

Network number: _____ [2]

Broadcast Address: _____ [1]

10.2 192.168.177.77 /27

Network number: _____ [2]

Broadcast Address: _____ [1]

Question 11

As a Network Administrator of a company, you are given a class B IP address block: 172.31.0.0 /17

Utulising CIDR, calculate the subnets that will be assigned to each department of the company. You are informed that each department requires 1200 users:

As per your subnetting, clearly indicate:

10.1 Number of subnets that will be created. [2]

10.2 Number of usable hosts per subnet. [2]

10.3 Re-draw the table below and write down the information as per your subnetting. [12]

	Subnet	Host Range	Broadcast Address	Subnet Mask
Subnet 1				
Subnet 2				

Marks distribution: [2 marks for each network address]

[2 marks for each host range]

[1 mark for each broadcast address]

[1 mark for each subnet mask]

Total = 12 marks

End of Paper