



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

Faculty of Computing and Informatics

Department of Computer Science

QUALIFICATION: Bachelor of Computer Science in Cyber Security	
QUALIFICATION CODE: 07BCCS	LEVEL: 7
COURSE: Internet and WAN Telecommunications	COURSE CODE: IWT711S
DATE: June 2025	SESSION: 1
DURATION: 2 hours	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. None

Section A [14 marks]

Question 1

For the following questions, answer True/False.

[6]

- 1.1 10.255.254.1 is an example of a public IP Address.
- 1.2 In Analog WANs, modems are used to convert digital data to analog and vice versa.
- 1.3 A CODEC is a device that is used to simultaneously perform the analog to digital conversion (encoding) and digital to analog conversion (decoding).
- 1.4 The Ethernet cables offer data transmission speed ranging from 10 Mbps to 1000 –
- 1.5 Single-mode fiber has higher bandwidth and lower attenuation than multi-mode fiber.
- 1.6 The range of private IP addresses for class A starts from 10.0.0.0 to 10.10.255.255.

Question 2

Choose the correct answer from the multiple-choice questions below.

[8]

- 2.1 Which of the following is not true regarding IPv6?
 - a) The header includes the flow label field
 - b) It has a 128 bit source address and a 128 bit destination address
 - c) The header includes a "header checksum"
 - d) It makes use of Hop Limit instead of Time To Live

- 2.2 The frequency of a signal is usually expressed in _____.
 - a) hertz
 - b) volts
 - c) decibels
 - d) seconds

- 2.3 The _____ wave is the simplest analog signal.
 - a) periodic
 - b) digital
 - c) composite
 - d) sine

- 2.4 Which VPN technology implements confidentiality?
- a) ESP
 - b) MD5
 - c) ISAKMP
 - d) AES
- 2.5 The client knows that it no longer needs an IP address, which DHCP packet type will be sent to a DHCP server?
- a) DHCP renew
 - b) DHCP decline
 - c) DHCP release
 - d) DHCP NAK
- 2.6 Which of the following is the correct network address for the IPv6 node with IPv6 address?
- a) 2000:3000:8B74:0130:2E0:8FFF:FE89:1A02/64?
 - b) 2000::2E0:8FFF:FE89:1A02/64
 - c) 2000:3000:8B74:0130::/64
 - d) 2000:3000:8B74:0130:2E0::/64
- 2.7 _____ will control speed and timing of WAN communication?
- a) SDLC
 - b) DCE
 - c) HDLC
 - d) DTE
- 2.8 Terrestrial microwave communication can use _____ for transmission.
- a) repeaters
 - b) parabolic dish antenna
 - c) aperture antenna
 - d) all of the above

Section B [56 marks]

Question 3

Define the following concepts as used in communication networks.

- 3.1 Delay distortion [2]
3.2 Circuit switching [2]

Question 4

- 4.1 What is unguided media? [2]
4.2 How do radio waves differ from microwaves in transmission? [2]

Question 5

- 5.1 How does Synchronous TDM differ from Asynchronous TDM? [4]
5.2 For each of the following types of multiplexing, provide a real-world application/scenario example. [3]
FDM: _____
TDM: _____
WDM: _____
5.3 What is the role of a multiplexer and a demultiplexer? [2]

Question 6

- 6.1 Name and explain the three types of VPN. [6]
6.2 IPsec is one of the protocols that can be used in VPNs. Explain any two benefits of IPsec. [2]

Question 7

- 7.1 Why must a satellite have distinct uplink and downlink frequencies? [2]
- 7.2 What factors determine antenna gain? [2]
- 7.3 What is the primary cause of signal loss in satellite communications? [2]

Question 8

What are the roles of the following MPLS routers?

- 8.1 Label Edge Router (LER) or "ingress node". [2]
- 8.2 Label Switching Router (LSR) or "transit node" [2]
- 8.3 Egress Node [2]

Question 9

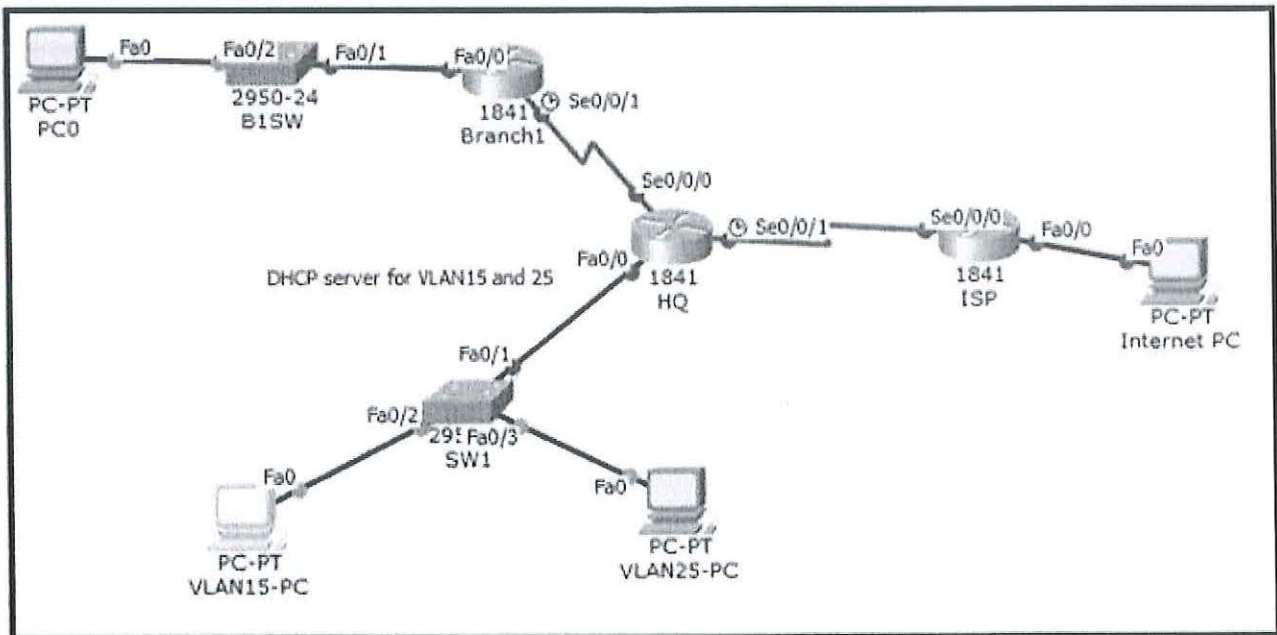
- 9.1 Give a sample Cisco IOS command that will forward TCP port 80 on public IP 198.51.100.1 to internal server 10.0.0.10. [3]
- 9.2 Outline two benefits and two drawbacks of NAT. [4]

Question 10

- 10.1 There is a maximum data transmission distance limit when using UTP cables. What is the maximum distance limit for CAT 6? [1]
- 10.2 What is the difference between multi-mode and single-mode fiber-optic cable? [2]
- 10.3 Which type twisted pair cable will you use to connect:
- a) Switch to switch [1]
 - b) PC to router [1]
 - b) PC to switch [1]

Question 11

Consider the figure below and answer the questions that follow:



HQ router is used as a DHCP server for VLANs 15 and 25. Suppose the networks 192.168.25.192/27 and 192.168.25.224/27 are used for VLAN 15 and 25 respectively.

The gateways for all the routers are configured with the last usable IP Address for each subnets.

- 11.1 Which IP address are you going to use for VLAN 15 gateway? [1]
- 11.2 State the network, subnet mask and gateway that is configured on the HQ router for VLAN25 [3]
- 11.3 Which address/es will be excluded from automatic assignment for VLAN 15 and VLAN25? [2]

End of Paper