



**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 Computer Science	
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COURSE: Internet and WAN Telecommunications	COURSE CODE: IWT711S
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DURATION: 2 hours	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. None

Section A [15 marks]

Question 1

For the following questions, answer True/False.

[7]

- 1.1 In WANs, modems are used to convert digital data to analog data and vice versa.
- 1.2 The IPv6 address: 2001:0EC8:55::CD23:0:0:0405 is equivalent to 2001:0EC8:55:0:CD23::0405.
- 1.3 ADSL can only achieve upstream speeds of up to 100 Kbps and downstream speeds of up to 1 Mbps.
- 1.4 Satellites can use both microwaves and radio waves to transmit information.
- 1.5 172.16.32.0.1 is an example of a private IP Address.
- 1.6 A digital transceiver is used to convert digital data to digital analog and vice-versa.
- 1.7 TTL propagation can be disabled to hide the MPLS network topology.

Question 2

Choose the correct answer from the multiple choice questions below.

[8]

- 2.1 Which of the following describes an industry-wide standard suite of protocols and algorithms that allows for secure data transmission over an IP-based network that functions at the layer 3 Network layer of the OSI model?
 - a) HDLC
 - b) VPN
 - c) IPSec
 - d) xDSL
- 2.2 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) It makes use of Hop Limit instead of Time To Live
 - d) None of the above

- 2.3 The _____ of a signal is usually expressed in hertz (Hz).
- a) amplitude
 - b) frequency
 - c) phase
 - d) voltage
- 2.4 The PCs on your company's internal network are assigned IP addresses from DHCP servers, and the packets that they send to the Internet are translated through a NAT-enabled router. What type of NAT enables the router to populate the translation table from a pool of unique public addresses, as the PCs send packets through the router to the Internet?
- a) Static NAT
 - b) PAT
 - c) Dynamic NAT
 - d) ARP
- 2.5 Which of the following primarily uses guided media?
- a) Cellular telephone system
 - b) Satellite communications
 - c) Radio broadcasting
 - d) Local telephone system
- 2.6 In the transmission of terrestrial microwaves, _____ can regenerate the signal at each antenna.
- a) Repeaters
 - b) Switches
 - c) Routers
 - d) Any of the above
- 2.7 A received signal is often not exactly the same as the original signal due to _____
- a) Attenuation
 - b) distortion
 - c) Noise
 - d) All of the above
- 2.8 In MPLS Network, At the first Edge LSR, label is added to the packet. This process is called
- a) pop
 - b) push
 - c) swap
 - d) hph

Section B [55 marks]

Question 3

Define the following concepts as used in communication networks.

3.1 Crosstalk [2]

3.2 Multiplexing [2]

Question 4

4.1 Name the three IP address allocation mechanisms that are supported by DHCP. [3]

4.2 What is DHCP Relay Agent used for? [2]

4.3 Mention any three drawbacks of utilizing DHCP services on a network. [3]

Question 5

5.1 Differentiate between Frequency Division Multiplexing (FDM) and Wavelength Division Multiplexing WDM [4]

5.2 Explain why guard bands are used in FDM. [2]

Question 6

Match the following descriptions to their appropriate terms regarding a periodic signal. [4]

Term	Description
Peak Amplitude (A)	Rate at which the signal travels or repeats.
Period (T)	Measure of the relative position in time within a single period of a signal.
Phase (ϕ)	Maximum value/strength of signal over time.
Frequency (f)	The time of a signal, at which the amount of time it takes for one repetition.

Question 7

Discuss the design of ADSL and how it works. [5]

Question 8

8.1 Explain how frame relay works. [3]

8.2 What is a DLCI as used in frame relay? [2]

8.3 Explain four benefits of utilising frame relay. [4]

Question 9

Consider the figure below regarding VPN configuration and answer the questions that follows:

```
Line 1 R1(config)# crypto isakmp policy 10  
Line 2 R1(config-isakmp)# encryption aes  
Line 3 R1(config-isakmp)# authentication pre-share  
Line 4 R1(config-isakmp)# group 2  
Line 5 R1(config-isakmp)# exit  
Line 6 R1(config)# crypto isakmp key cisco address 10.2.2.2
```

9.1 What is the purpose the configuration in line 2? [1]

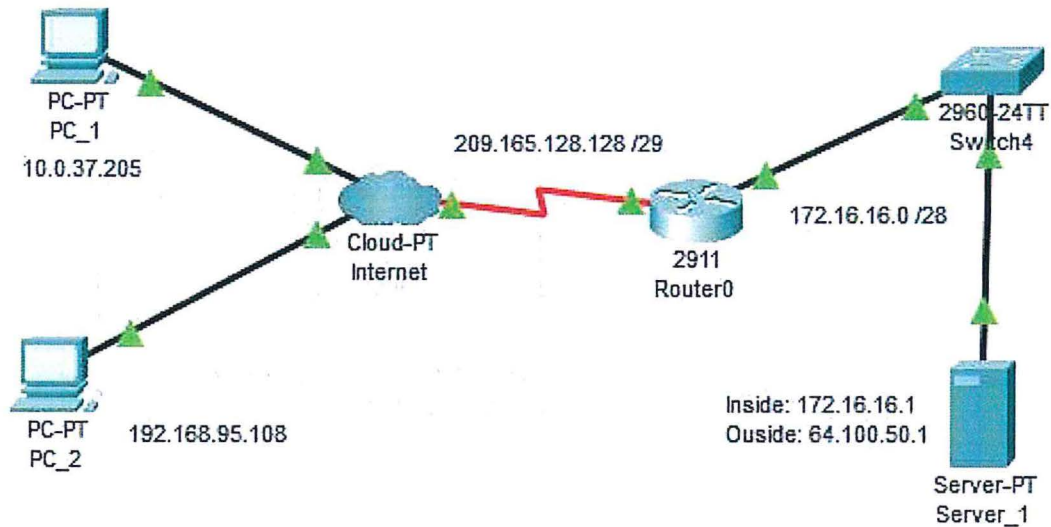
9.2 What is the purpose the configuration in line 4? [2]

9.3 What is the purpose the configuration in line 6? [2]

9.4 Explain two advantages and two disadvantages of utilising a VPN in a network. [4]

Question 10

Consider the figure below and answer the questions that follow:



- 10.1 Write down the full command that will create a static NAT translation to map the Server_1 inside address to its outside address. [3]
- 10.2 Mention any other method that can be used to configure NAT. [1]
- 10.3 Write down the commands that will configure the correct inside and outside interfaces on the router. Write separate commands for each of the two interfaces. [4]
- 10.4 Write down the command that you can issue on the router to verify the static NAT configurations. [2]

End of exam paper