



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF COMPUTING AND INFORMATICS  
DEPARTMENT OF COMPUTER SCIENCE**

<b>QUALIFICATION: BACHELOR OF COMPUTER SCIENCE, BACHELOR OF INFORMATICS</b>	
<b>QUALIFICATION CODE: 07BACS, 07BAIF</b>	<b>LEVEL: 7</b>
<b>COURSE NAME: DATA NETWORKS</b>	<b>COURSE CODE: DTN611S</b>
<b>DATE: JULY 2022</b>	<b>PAPER: THEORY</b>
<b>DURATION: 2 HOURS</b>	<b>MARKS: 70 (100%)</b>

<b>SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION QUESTION PAPER</b>	
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THIS QUESTION PAPER CONSISTS OF 6 PAGES (Including this front page)

**INSTRUCTIONS**

- 1) Answer ALL the questions on the answer scripts provided.
- 2) Write clearly and neatly.
- 3) Be guided by the number of marks allocated when answering the questions.
- 4) Show all your calculations.
- 5) Number your questions clearly.

**Question 1:**

1. Which is the binary equivalence of 192.168.3.24?
  - a) 11000000. 00101000.00000011.00011000
  - b) 11000000. 10100100. 00000010.00011000
  - c) 01100000. 11101000. 00000010.00011000
  - d) 11000000. 10101000. 00000011.00011000
  
2. Which of the following correctly defines the function of the DNS server on the network?
  - a) To assign IP address information automatically to devices on the network.
  - b) To translate IP addresses into Domain names
  - c) To act as an intermediary between clients and remote servers
  - d) To host websites.
  
3. One of the advantages of a Star topology is:
  - a) Devices are managed centrally in the topology.
  - b) If the central device becomes faulty, all devices will be affected.
  - c) It is very expensive to set up as devices are connected to each other
  - d) Devices are connected in a circle, if one device becomes faulty, the whole topology is affected.
  
4. Wide Area Network could easily be described as a network that spans
  - a) A country
  - b) A city
  - c) A building
  - d) A house
  
5. Which layer of the OSI encapsulates MAC Address to the frame headers?
  - a) Physical
  - b) Presentation
  - c) Application
  - d) Data Link
  
6. Which port is used by SMTP to send mails over the network?
  - a) Port 80
  - b) Port 21
  - c) Port 20
  - d) Port 25
  
7. The default subnet mask for Class C IP address is:
  - a) /18

- b) /17
- c) /16
- d) /24

8. The \_\_\_\_\_ is a conceptual framework that enables diverse communication systems to communicate using standard protocols.
9. The \_\_\_\_\_ is an application protocol used to access remote devices on the network.
10. The \_\_\_\_\_ network topology gives the network users the greatest amount of fault tolerance.
11. In e-mails, \_\_\_\_\_ is a protocol that enables users to access their mail from any device connected to the network.
12. Each network interface card comes embedded with a unique address from the a manufacturer is called \_\_\_\_\_.
13. The delivery method that sends packets to devices in the network is called \_\_\_\_\_.
14. The process of adding layer-specific information is called \_\_\_\_\_.
15. The default port number for HTTP is \_\_\_\_\_.
16. A hub functions like a router on the network.
  - a) True
  - b) False
17. Wired mediums are also regarded as a guided medium
  - a) True
  - b) False
18. A session must be terminated at the end of each user datagram protocol sent.
  - a) True
  - b) False
19. When accessing a web server, the status code 200 indicates success.
  - a) True
  - b) False
20. A network is the interconnection of various networks.
  - a) True
  - b) False

**20 Marks]**

## **Question 2**

2.1 List two network architectures and explain the difference in the operation of these architectures. (4)

2.2. WAP IT Technologies is establishing its new company in Windhoek. They will be providing networking services to clients all over Namibia. You were recently hired to work for them as a junior network engineer.

a) Your first project entails designing the company network's topology. Your boss suggests that you use a bus topology, but you strongly oppose his idea and suggest using a hybrid topology. Convince your boss about your choice. (3)

b) The company will also need to provide e-mail services to their clients. Identify and explain three (3) main protocols required when configuring e-mails. (6)

c) The company secured a tender to provide networking services to GIPF a state-owned parastatal with close to 1500 employees and just bought new computing devices for all their employees. As a Network Administrator, which IP address assignment method will be appropriate in this environment and why? (4)

d) In addition to the servers and computers, other components that make up any networks comprise of routers, hubs, switches, twisted pair cables, wireless access points, and IP phones amongst others. Classify these devices as either host, communication links, or core network devices. (6)

Routers	
Switches	
Hubs	
Cables	
IP phones	
Access point	

e) When data is transmitted on the network, it changes form. What are the units of data processed by layers 1 to 4 of the OSI model called? (4)

**[27 Marks]**

### Question 3

Consider the diagram below when answering the questions. The default gateway for each network is the first usable address.





#### Question 4

1. Examine the output of the screenshot below to answer the questions that follow.

Figure 1

```
C:\Users\Virtua>tracert www.unam.na

Tracing route to www.unam.edu.na [41.205.129.157]
over a maximum of 30 hops:

  0  1 ms    1 ms    1 ms  fritz.box [192.168.178.1]
  1  70 ms   57 ms   51 ms  41.205.152.230
  2  36 ms   40 ms   44 ms  ADSL-41-205-134-241.ipb.na [41.205.134.241]
  3  32 ms   52 ms   42 ms  ADSL-41-205-129-57.ipb.na [41.205.129.57]
  4  12 ms   13 ms    8 ms  ADSL-41-205-129-58.ipb.na [41.205.129.58]
  5  42 ms   45 ms   45 ms  ADSL-41-205-129-157.ipb.na [41.205.129.157]
  6  44 ms   30 ms   35 ms  ADSL-41-205-129-157.ipb.na [41.205.129.157]
  7  47 ms   74 ms  1376 ms ADSL-41-205-129-157.ipb.na [41.205.129.157]

Trace complete.
```

- What is the name and purpose of the tool that generated output in figure 1 (2)
- What is the default gateway of the device this screenshot was taken from? (1)
- what is the IP address of the UNAM webserver? (1)
- Explain the first 4 columns of the output on the screenshot. (3)
- If you were to use the same tool from a different network, would you get the same output? Justify your answers. (2)
- Which other command can one use to determine the domain name, given the IP address? (1)

[10 Marks]

[Total Marks:70]

Exam ends