



**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: JUNE 2023</b>	<b>PAPER: THEORY</b>
<b>DURATION: 2 HOURS</b>	<b>MARKS: 70 (100%)</b>

<b>FIRST OPPORTUNITY EXAMINATION 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:** Write down the question number and the correct answer next to it.

**[ 15 marks]**

1. The \_\_\_\_\_ is a network device that connects multiple networks:
  - a) Server
  - b) Transmission Media
  - c) Switch
  - d) Router
  
2. Which of the following correctly defines the function of the DNS on the network?
  - a) To assign IP addresses automatically to devices on the network.
  - b) To translate IP addresses into domain names and vice versa.
  - c) To act as an intermediary between clients and remote servers.
  - d) To host websites.
  
3. The method that enables the network administrators to tailor the subnet mask to their specifications.
  - a) Subnetting
  - b) IP Addressing
  - c) Subnet masking
  - d) Routing
  
4. The protocol used for reporting network errors and performing network diagnostics.
  - a) Internet Protocol
  - b) Internet Control Message Protocol
  - c) Network Address Translation
  - d) Transmission Control Protocol
  
5. The layer that ensures correct encoding and decoding of incoming and outgoing data in the network.
  - a) Physical
  - b) Presentation
  - c) Application
  - d) Data Link
  
6. In everyday life, a typical example of a client-server architecture is
  - a) Customers queueing at the till to wait for their items to be scanned in Shoprite
  - b) Patients waiting to be assisted by the dentist
  - c) Students registering for the 2021 academic year
  - d) All the above

7. The dotted subnet mask for the network number 10.0.8.0/26 is:
  - a) 255.255.255.192
  - b) 255.255.192.255
  - c) 255.255.0.0
  - d) 255.0.0.0
  
8. The default prefix subnet mask for IP address 192.168.3.4 is:
  - a) /18
  - b) /17
  - c) /24
  - d) /8
  
9. \_\_\_\_\_direct the correct segment to the correct application at the transport layer.
10. The default TCP header size is \_\_\_\_\_.
11. The \_\_\_\_\_ layer ensures reliable data transmission between adjacent devices on the network
12. In HTTP, code 3XX indicates \_\_\_\_\_.
13. The Transport layer takes data datagrams from the upper layers and breaks them into smaller chunks called\_\_\_\_\_.
  
14. Routers are only used in Wide Area Networks.
  - a) True
  - b) False
  
15. Wireless transmission can be done via radio waves only.
  - a) True
  - b) False
  
16. A data transmission session must be terminated at the end of each packet sent.
  - a) True
  - b) False
  
17. Tim is accessing the NUST webserver from his home network. Maria, who is in a different town, also connects to the NUST web server. Both Tim and Maria need to be physically connected to the same DNS server before they can access the NUST web server.
  - a) True
  - b) False
  
18. Data transmitted over the fiber optics is in the form of an electrical pulse
  - a) True
  - b) False

19. End-user devices can only interact with one application layer at any given time.

- a) True
- b) False

20. TCP is an underlying protocol for SMTP

- a) True
- b) False

## Question 2

[14 marks]

2.1 a newly established company recently hired Maria as an IT Technician; The company purchased 300 new computers for their employees. The IT manager asked Maria to configure the computers with the necessary settings to enable these computers to connect to the company's network and the Internet, respectively.

- a) List **four (4)** main network settings that Maria needs to configure on the newly purchased computers and explain the purpose of each setting. (4)
- b) Given the number of computers to be configured, which method of IP address assignment is suitable and why? (4)
- c) A user received her newly configured computer from Maria and would like to tell the method of IP address assignment. Explain how the user can go about this. (2)



### Question 3

Use the figure below to answer the following questions.

[24 Marks]

```
⊟ Hypertext Transfer Protocol
⊟ GET /igddesc.xml HTTP/1.1\r\n
  ⊟ [Expert Info (Chat/Sequence): GET /igddesc.xml HTTP/1.1\r\n]
    Request Method: GET
    Request URI: /igddesc.xml
    Request Version: HTTP/1.1
    Cache-Control: no-cache\r\n
    Connection: close\r\n
    Pragma: no-cache\r\n
    Accept: text/xml, application/xml\r\n
    Host: 192.168.178.1:49000\r\n
    User-Agent: Microsoft-Windows/6.1 UPnP/1.0\r\n
    \r\n
    [Full request URI: http://192.168.178.1:49000/igddesc.xml]
    [HTTP request 1/1]
    [Response in frame: 23]
```

3.1 Identify the following information.

- a) The type of HTTP packet in the figure. (1)
- b) The name of the document being requested. (2)
- c) The HTTP version (1)
- d) Format of acceptable information (1)

3.2 Explain the purpose of these methods in HTTP. (3)

- a) GET:
- b) PUT:
- c) POST:

3.3 HTTP runs on TCP services. Name any **four (4)** TCP attributes that make it a reliable protocol. (4)

3.4 You would like to access the NUST website on your computer using the domain name (www.nust.na). In detail, outline the series of activities that will take place prior to this page being delivered to your computer. (8)

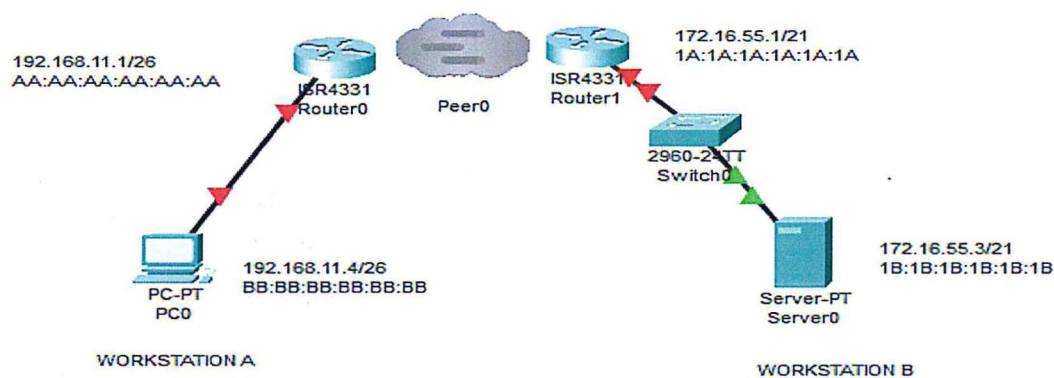
3.5 Explain two types of connections in HTTP. (4)

3.6 Explain the functions of TCP and UDP when sending an e-mail (4)

Question 4

[17 Marks]

4.1 Consider the network topology below to answer the questions following.



- a) Write down the subnet mask for **workstation A** in a dotted notation. Show all your calculations. (4)
- b) Calculate the network number of **workstation A**. Show your calculations. (4)
- c) Calculate the broadcast address for **workstation A**. Show your calculations. (4)
- d) Determine the last usable address for **workstation A** network. (2)
- e) Determine the number of usable addresses for **workstation B** network. (3)

[Total marks: 70]

*Paper ends*