Open University *of* Mauritius

BSc (HONS) COMPUTER SCIENCE [OUbs033]

BSc (HONS) APPLIED ICT WITH SPECIALISATION [OUbs017]

EXAMINATION FOR: June - July 2023

MODULE : Networking Technologies [OUbs033212]
Network and Data Communications [OUbs017124]

DATE : Friday 23 June 2023

DURATION : 2 Hours

INSTRUCTIONS TO CANDIDATES

1. This question paper consists of **SECTION A** and **SECTION B**.
2. **SECTION A** is **COMPULSORY**.
3. Answer **ANY TWO (2) questions** from **Section B**.
4. Always start a new question on a fresh page.
5. Total marks: **100**

This question paper contains 5 questions and 6 pages.

SECTION A

COMPULSORY

QUESTION 1 [30 MARKS]

Context based question

MauClodio Studio is interested in starting its own Music Store, Quality Sounds, in Mauritius. You have been appointed as the consultant company and have been mandated to design the network solution.

MauClodio Studio will start with two stores, but plan to add two more stores across the island within one year. The store will sell new and used music and allow customers to get "online" in your stores and download music.

a) Propose a high-level topology for Moclodio clearly mentioning all network devices, Telecommunication Lines, backbones and network cabling etc.

(10 marks)

b) Describe which equipment would form part of your LAN and WAN.

(2 marks)

c) Enumerate **two (2)** main differences between a LAN and a WAN.

(4 marks)

d) Your service provider requested you to use 192.168.200. 0/ 26.

i. Explain what do you understand by 192.168.200.0

(2 marks)

ii. Explain the meaning of /26 and its purpose

(2 marks)

e) Differentiate between Private IP and Public IP

(4 marks)

f) List Private IP addresses for class A, B and C

(6 marks)

QUESTION 2 [10 MARKS]

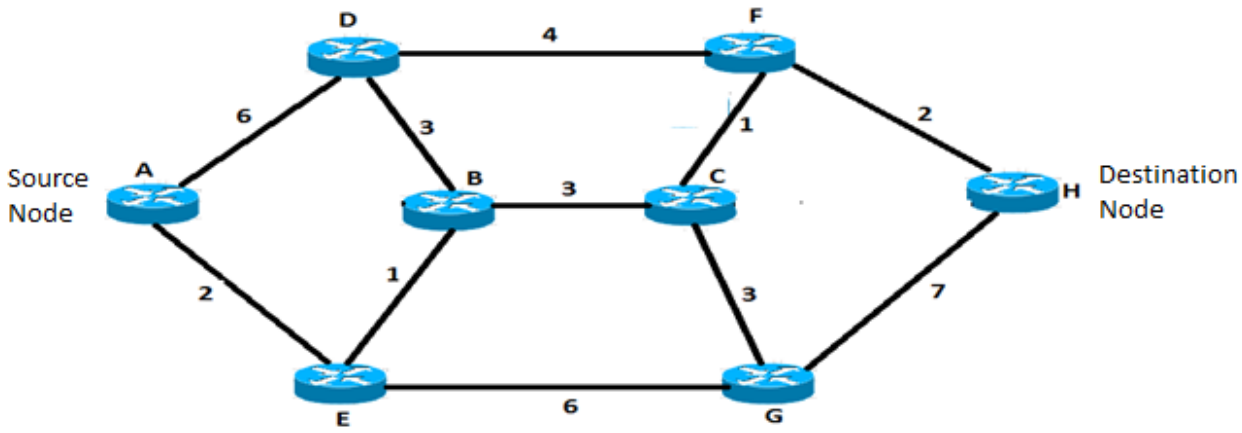
Letters A to H represents routers and the figures between the routers are the metric.

a) Give **two (2)** examples of dynamic routing algorithm.

(2 marks)

b) Find the route from source to destination node using a static, non adaptive routing algorithm.

(8 marks)



SECTION B

ANSWER <u>ANY TWO (2)</u> QUESTIONS

QUESTION 3 [30 MARKS]

You are informed that there will be four departments and an average of 40 to 50 computers per department of your company. Your Director requested you to use IP “192.168.150.0/ 26” and to provide the following answers.

a) Explain which subnet you would use and why?

(4 marks)

b) Produce the subnet prefix, show your workings.

(4 marks)

c) Calculate the number of Host per subnet.

(4 marks)

d) List the Network Addresses of all the subnets.

(4 marks)

e) List the Broadcast Addresses of all the subnets

(4 marks)

f) List the valid IP addressed of all the subnets.

(8 marks)

g) Explain what should be done if the number of users in one of your departments increase up to 65.

(2 marks)

QUESTION 4 [30 MARKS]

a) Explain the difference between OSI and TCP/IP protocol suite.

(4 marks)

b) List and describe the different layers in the TCP/IP protocol suite

(8 marks)

c) With the help of an example differentiate between UDP and TCP

(4 marks)

d) Elaborate on the need for IP and datagrams

(4 marks)

e) "Three-Way Hand Shake or a TCP 3-way handshake is a process which is used in a TCP/IP network to make a connection between the server and client".

i. List the **four (4)** message types of the TCP 3-way handshake.

(4 marks)

ii. Explain the process of the TCP 3-way handshake with the help of a clearly labelled diagram.

(6 marks)

QUESTION 5 [30 MARKS]

a) When you sign up with an Internet Service Provider (ISP), you will either end up with a static IP address or a dynamic IP address.

i. Differentiate between a static IP address and a dynamic IP address

(4 marks)

ii. How are the commands "ipconfig/release" different from "ipconfig/renew"

(4 marks)

iii. Provide **three (3)** advantages of using static IP over dynamic IP

(6 marks)

b) Enumerate the steps when a DHCP server assigned an IP address to a client.

(10 marks)

c) Routers keep a tight eye on the Internet's functionality. ICMP, or Internet Control Message Mechanism, is an error-reporting protocol that operates in conjunction with IP.

To troubleshoot, using ping command, the user selects the destination by typing its IP address or name into the command line, such as #ping 192.168.200.150.

Define any **three (3)** of the following ICMP message below;

i. Destination Unreachable

(2 marks)

ii. Echo Request

(2 marks)

iii. Echo Reply

(2 marks)

iv. Parameter Problem

(2 marks)