Open University *of* Mauritius

BSc (HONS) COMPUTER SCIENCE [OUbs033]
BSc (HONS) APPLIED ICT WITH SPECIALISATION IN [OUbs017]

EXAMINATION FOR: November - December 2023

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

DATE   :   Friday 17 November 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 4 questions and 5 pages.

QUESTION 1 [40 MARKS]

Your company is appointed as consultant for a new Call Centre in Mauritius. The Subnet IP Address 172.22.10.* /23 is provided and the list of departments with the proposed number of users are as follows;

Call Centre LAN	200 Users	Finance LAN	60 Users
Supervisor LAN	120 User	ICT LAN	50 Users

You are required to show your workings and answer the following questions;

a) Define 172.22.10.* /23 in terms of its type of IP and Subnet Mask

(6 marks)

b) How many valid hosts are available with '/23'.

(4 marks)

c) From the information provided, work out and fill in the blanks in the table below

Departments	Network Address	Valid Host Address Range	Broadcast Address	Number of Idle IP Address
Call Centre				
Supervisor				
Finance				
ICT				
	1 Mark each	**2 Marks each**	**1 Mark each**	**1 Mark each**

(20 marks)

d) The public IP address of a system is the IP address that is used to communicate outside the network.

    i. Differentiate between Private and Public IP

(4 marks)

    ii. The choice of a valid Private IP address from Class A, B, or C depends on the number of authorised users. Please provide the list.
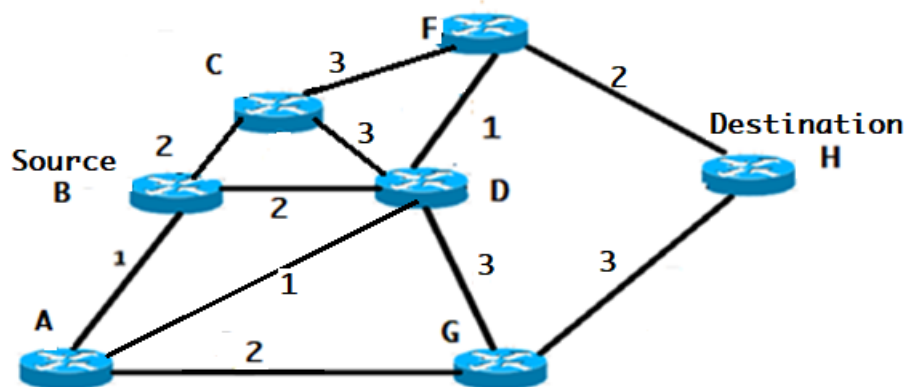
(6 marks)

SECTION B
ANSWER ANY TWO (2) QUESTIONS

QUESTION 2 [30 MARKS]

Whenever we issue the traceroute command, routers provide the best route based on its routing table. The diagram below shows a set of hops from the Source router B to Destination router H and the figures between the routers refer to its metric.

a) Explain why routing table are important for packet flow.

(4 marks)

b) It is understood that Static Routing is simpler than Dynamic routing, explain why and how Dynamic Routing is more complex.

(8 marks)

c) Using a static, non-adaptive routing mechanism from the network diagram below, work out and show your workings for the following;

    i. Enumerate all the steps for a static, non-adaptive routing mechanism

(6 marks)

    ii. The best route from B to H

(4 marks)

    iii. The second best from B to H

(4 marks)

    iv. The longest route from Source to Destination

(4 marks)

QUESTION 3 [30 MARKS]

a) Vertical Redundancy Check is also known as Even Parity Checking. Work out the Even Parity check for data 110001.

(4 marks)

b) In LRC we use a block of codes as the parity bit**.** We will take each block of data and calculate the parity bit longitudinally instead of vertically. The sender will send the original data along with the block of parity bit generated.

Suppose we have to send the data, '11100111 11011101 00111001 10101001', Using even parity checking, calculate the parity bit.

(6 marks)

There are two processing methods involved in Checksum, The Sender Checksum and the Receiver Checksum. We have to send 10110011 10101011 01011010 11010101.

c) Calculate the sender side Checksum.

(8 marks)

d) Calculate the receiver side Checksum.

(8 marks)

e) How would you know that the data has been correctly transmitted?

(4 marks)

QUESTION 4 [30 MARKS]

Your Chief Finance Officer who has the responsibility of ICT attended a CIO conference and learned about Proxy Server and DHCP.
On his way to the office, he requested the following clarification from you with the idea of enhancing the ICT infrastructure of the company.

a) Define the Proxy server with a clearly labeled diagram.

(4 marks)

b) How the Proxy server would add value to the organisation's network infrastructure by describing **two (2)** advantages of the Proxy.

(6 marks)

c) There are four (4) types of Proxy were mentioned, how would a High Anonymity Proxy be helpful to the organisation

(4 marks)

d) Are there any risks associated with the Proxy Server? If Yes provide **two (2)** risks that may influence the decision of the CFO for not implementing the Proxy server.

(6 marks)

e) IP assignment may be done via a DHCP server. What is a DHCP Server

(2 marks)

f) Describe the **four (4)** steps of the DHCP server with the help of a diagram.

(8 marks)