Open University *of* Mauritius

BSc (HONS) COMPUTER SCIENCE [OUbs033]

EXAMINATION FOR: January - February 2022

MODULE : Network Technologies [OUbs033212]

DATE : Saturday 22 January 2022

DURATION : 2 Hours

INSTRUCTIONS TO CANDIDATES

1. This question paper consists of **FIVE (5) QUESTIONS**.
2. Answer **ALL Questions**.
3. Always start a new question on a fresh page.
4. Total marks: **100**

This question paper contains 5 questions and 4 pages.

ANSWER ALL QUESTIONS

QUESTION 1 [20 MARKS]

a) Using the help of a diagram, explain the key differences between the OSI 7 Layer model and the TCP/IP Reference model.

(5 marks)

b) Which network devices operate at the following layers of the OSI Model?

i. Layer 1
ii. Layer 2
iii. Layer 3
iv. Layer 1 Up to Layer 7

(5 marks)

c) Indicate the Protocol Data Unit (PDU) used at each layer of the OSI Layer Model.

(5 marks)

d) Using a diagram, describe data encapsulation/de-encapsulation within the OSI Reference Model.

(5 marks)

QUESTION 2 [20 MARKS]

a) Explain the differences between circuit switching and packet switching and provide examples of each technology.

(5 marks)

b) Differentiate between frame relay and DSL.

(5 marks)

c) Recommend a primary and where relevant a backup network access media for the following scenarios:

i. Connecting 2 retail shops which are 100m apart.

ii. A new embassy based in Mauritius which needs to have a secured, reliable connection to its mother country.

iii. A new bank branch needs to connect to its Head Office which is 5kms away.

iv. A recreational park on a mountainous region needs internet access - there is currently no fibre or copper connectivity.

v. A staff just moved to a new house and does not have an internet connection yet, he needs to urgently work from home.

(5 marks)

d) Draw the logical topology for a simple network - a company which has a router connecting to the internet, 2 switches which have 5 workstations connected to each switch, an access point and 2 laptops connecting through wifi.

(5 marks)

QUESTION 3 [20 MARKS]

a) Explain the key differences between Link State routing protocols and Distance Vector protocols and give an example of each.

(5 marks)

b) Using a diagram, describe how OSPF works, what metric and algorithm this routing protocol uses to find the best path to a destination.

(5 marks)

c) Using a diagram, describe how BGP routes traffic between different Autonomous Systems.

(5 marks)

d) Describe the 3-way handshake protocol for TCP Connection Establishment.

(5 marks)

QUESTION 4 [20 MARKS]

a) Compare Twisted pair, Coaxial and Fibre optics considering features such as network type, transmission distance, cost, security and transmission speed.

(5 marks)

b) What are the differences between Single-mode and Multi-mode fibre?

(5 marks)

c) What are the components of an optical transmission system and explain how data is transmitted from source to destination?

(5 marks)

d) You are a network administrator and you have been provided the prefix 192.168.5.129 /28. You have been requested to find out the network address, broadcast address and the range of usable ip addresses that can be allocated to workstations.

(5 marks)

QUESTION 5 [20 MARKS]

a) Describe the advantages of wireless networks over wired networks.

(5 marks)

b) Using a diagram, explain the concept of a Virtual Private Network and provide some common applications.

(5 marks)

c) What are some of the common applications of Bluetooth and describe some of the features of this protocol?

(5 marks)

d) What are some common components of a Wireless LAN.

(5 marks)