



Strathmore
UNIVERSITY

SCHOOL OF COMPUTING AND ENGINEERING SCIENCES
BACHELOR OF COMPUTER NETWORKS AND SECURITY
END OF SEMESTER EXAMINATION
CNS1203: INTRODUCTION TO COMPUTER NETWORKS

DATE: 3rd December, 2024

Time: 15:30-17:30 Hours

Instructions

1. This examination consists of **FIVE** questions.
2. Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.

Question 1

- a) Draw the TCP/IP protocol stack and state (**precisely**) the role of each layer. (4 marks)
- b) Differentiate between the following terms:
 - i. Virtual circuit network vs. datagram network
 - ii. Peer to peer network vs. client server network.
 - iii. Private address space vs. public address space(6 marks)
- c) Explain what kind of transmission medium should be used to connect two buildings that are 500 m apart that requires high amounts of data to be exchanged frequently. (3 marks)
- d) State three objectives of network security. (3 marks)
- e) Explain two reasons why VLANs are useful in the Strathmore University network. (4 marks)
- f) You want to set up a small office. State two network devices that you need and explain what their roles would be. (6 marks)
- g) Explain two reasons why Safaricom has shifted towards a software defined network. (4 marks)

Question 2

- a) State two functional differences between the following:
 - i. Network layer and data link layer

- ii. Transport layer and application layer (4 marks)
- b) Draw a diagram comparing the TCP/IP model and the OSI model. (3 marks)
- c) Define the following terms:
 - i. Modulation
 - ii. Bandwidth
 - iii. Latency
 - iv. Round trip time(4 marks)
- d) Explain two applications of Internet of Things (4 marks)

Question 3

- a) State three features of Ethernet. (3 marks)
- b) Explain the working mechanism and importance of the following in a network:
 - i. Address resolution protocol
 - ii. Switch self-learning(6 marks)
- c) Discuss the following MAC protocols:
 - i. CSMA/CD
 - ii. Polling
 - iii. Slotted ALOHA(6 marks)

Question 4

- a) State two options you have to have your PC assigned an IP address. (2 marks)
- b) Explain two reasons why network address translation is beneficial to organizations. (3 marks)
- c) Consider the following IP address: 192.168.4.0/27. Compute the following:
 - i. Number of subnets
 - ii. Number of hosts per subnet
 - iii. Subnet mask(6 marks)
- d) Define the following terms:
 - i. Default gateway
 - ii. Loopback IP address
 - iii. Subnet
 - iv. Global unicast IPv6 IP address

(4 marks)

Question 5

a) You want to browse www.daystar.ac.ke. Explain DNS resolution would work so that your device is able to reach the website.

(5 marks)

b) Explain the steps involved when a one types an email to when the email is downloaded and read by the receiver. Describe how the necessary protocols are applied and the softwares to be used. Assume that Peter is writing an email to Mary.

(6 marks)

c) Define the following terms

- i. Virtual private network
- ii. Firewall

(4 marks)