Strathmore
UNIVERSITY

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

DATE: 5th December, 2023 **Time: 08:00-10:00 Hours**

Instructions

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

Question 1

a) Draw the OSI model and state **(precisely)** the role of each layer.

(5 marks)

b) Differentiate between the following terms:
   i. Packet switching vs. circuit switching.
   ii. Peer to peer network vs. client server network.
   iii. Multicast vs. anycast.

(6 marks)

c) State three differences between TCP and UDP

(3 marks)

d) Explain the role of ports in networking and state any three known port numbers (and their associated protocols).

(3 marks)

e) State the three types of automatic repeat request.

(3 marks)

f) Explain the difference between the following network devices
   i. Hub and switch
   ii. Router and switch

(6 marks)

g) Explain two benefits of a VLAN

(4 marks)

Question 2

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

(4 marks)

b) Draw a diagram comparing the TCP/IP model and the OSI model.

(3 marks)

c) Explain the operation of optical fibre cable.

(4 marks)

d) Define the following terms:
   i. Content delivery network
   ii. Software defined network

(4 marks)

Question 3

a) Differentiate between logical link control and MAC layers of the data link layer.

(3 marks)

b) Write short notes on the following LAN technologies.
   i. Ethernet
   ii. Token ring
   iii. FDDI

(6 marks)

c) Discuss the following MAC protocols:
   i. CSMA/CD
   ii. TDMA
   iii. FDMA

(6 marks)

Question 4

a) State any three features of IPv6

(3 marks)

b) Define the term classless inter domain routing (CIDR) and explain its significance.

(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) Distinguish between:
   i. Private address space and public address space.
   ii. Link state routing protocol and distance vector routing protocol.

(3 marks)

Question 5

a) Distinguish between connectionless and connection-oriented multiplexing at the transport layer.

(3 marks)

b) Briefly describe the TCP three way handshake (connection establishment).

(2 marks)

c) Briefly describe the following protocols:
   i. DNS
   ii. HTTP
   iii. FTP

(6 marks)

d) Write short notes on the following:
   i. Virtual private network
   ii. Firewall

(4 marks)