Strathmore
UNIVERSITY

SCHOOL OF COMPUTING AND ENGINEERING SCIENCES

BACHELOR OF SCIENCE IN COMPUTER NETWORKS AND CYBER SECURITY

END OF SEMESTER EXAMINATION

CNS1203: INTRODUCTION TO COMPUTER NETWORKS

DATE: 25th March 2022 Time: 2 Hours

Instructions

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

QUESTION 1 (COMPULSORY) [20 MARKS]

A. Consider the TCP connection mechanism.

i. What mechanism is used to set up a TCP connection? [1 marks]

ii. Why is the mechanism needed? [2 marks]

iii. Using a diagram, illustrate how the mechanism works. [4 marks]

B. Suppose the sender wants to transmit the information string, 111110. Using an arbitrary polynomial pattern, 1101, what is the frame check sequence (FCS) that is sent to the receiver? Show the message sent to the receiver*[show your working]* [7 Marks]

C. Show, in the correct order, the layers of the TCP/IP protocol stack that are implemented on the following network components: [6 Marks]

i. End System (host)

ii. Router

iii Switch

QUESTION 2 [20 MARKS]

A. An organization is granted a block of addresses with the beginning address 14.24.74.0/24. The organization needs to have 3 subblocks of addresses to use in its three subnets as

shown: One subblock of 120 addresses, another subblock of 60 addressesand the third subblock of 10 addresses.

i. How many addresses are in this block/network? Show the first and the last address. [4 Marks]

ii. Using the format of the table below, provide the details of the 3 subnets (Show all your workings). [12 Marks]

Subnet	Subnet Network Address	Subnet Mask (Dotted decimal)	Addresses Range	Broadcast Address	Gateway Addres
1					
2					
3					

B. Explain the difference between Software Define Networks (SDNs) and cloud computing. [4 Marks]

QUESTION 3 [20 MARKS]

A. Place the following five protocols at the correct layer in the TCP/IP protocol stack: SMTP, PPP, TCP, and ICMPv6. [5 Marks]

B. Explain how the following commands work. [6 Marks]

i. Ping

ii. Trace route

iii. Nslookup

C. Using relevant examples and illustrations, differentiate between classes A, B and C addresses in IPV4. Comment on private and reserved addresses. [5 Marks]

D. CSMA/CD and CSMA/CA are variants of carrier-sense multiple access (CSMA) which is a media access control (MAC) protocol in which a device verifies the absence of other traffic before transmitting on a shared transmission medium. Explain how the protocol CSMA/CA work. [4 Marks]

QUESTION 4 [20 MARKS]

A. Can you aggregate the prefixes 199.1.1.0/25, 199.1.1.128/26, and 199.1.1.192/26 to one single subnet? If so, specify (in CIDR notation) the resulting aggregated prefix. If not, explain why. *[show your working]* [6 Marks]

B. Using illustrations, differentiate between Local Area Network (LAN) and Wireless Local Area Network (WLAN). [10 Marks]

C. There are many different variations of computer malware that network and security administrators have a role in detecting and removing it from affecting computer resources. Explain the following computer malwares; [4 Marks]

i. Trojans

ii. Worms

iii. Spyware

iv. Ransomware

QUESTION 5 [20 MARKS]

A. Describe any three services provided by the link layer of the TCP/IP model. [6 Marks]

B. With the help of a diagram, explain the process of dynamic IP assignment by DHCP server. [6 Marks]

C. Using the OSI reference model, illustrate the concept of encapsulation and decapsulation between two host devices – Machine A and Machine B. [8 Marks]