Strathmore UNIVERSITY

SCHOOL OF COMPUTING AND ENGINEERING SCIENCES

BACHELOR OF SCIENCE IN COMPUTER NETWORKS AND SECURITY

CNS 1203: INTRODUCTION TO COMPUTER NETWORKS

END OF SEMESTER EXAM

Date: 19th March, 2025 **Time:** 08.30 - 10.30

Instructions:

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

QUESTION ONE

a) With the help of a diagram explain the difference between Half Duplex and Full Duplex, in the communication of networks and give an example of each. **(4 Marks)**

b) Outline and explain the FOUR major characteristics of any data Communications System to be effective. **(4 Marks)**

c) List and explain the THREE Error detection Techniques in computer Networks **(3 Marks)**

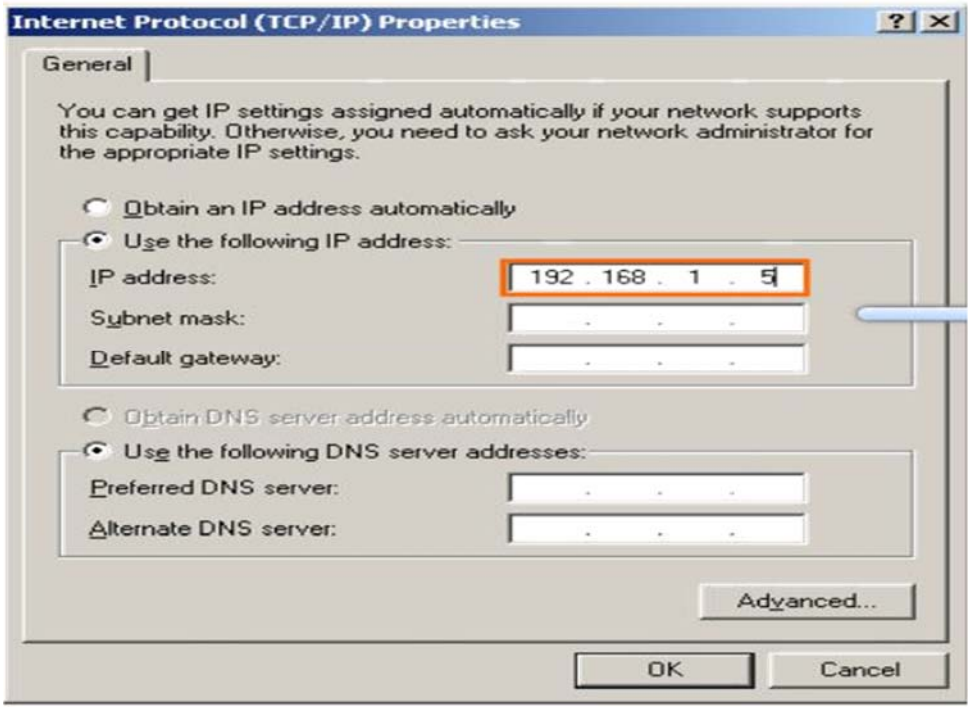
d) Explain the following Terms that are used in Computer Network **(4 Marks)**

i) SIGNAL
ii) Encoding
iii) Unipolar
iv) MAN
v) LAN
vi) Polar
vii) Bipolar
viii) Non-Return to Zero

e) List and explain the Techniques of Multiplexing in Computer Networks. **(4 Marks)**

f) When trouble shooting a computer Network, list and explain TWO major commands that can be used and how they are used. **(4 Marks)**

g) Use the FIG 1. To answer the questions below



Given the above IP address in a computer, and given the IP Address 192.168.1.5/24 use it to answer the following questions:- **(7 Marks)**

i) Give the Subnet Mask of this IP address
ii) Indicate what class of IP address is this IP Address
iii) Give the Network address
iv) Give the range of IP adresses for this IP address .
v) How many subnets will it have?
vi) What will be the broadcast address?
vii) What will be the host address?

QUESTION TWO

a) The OSI layer 3, provide s services to exchange the individual pieces of data over the network between identified end device, Outline and explain the **FOUR** basic processes that will be used to accomplish this end-to-end transport. **(6 marks)**

b) List and explain the **FIVE** layer 2 protocols used in the OSI Reference model ,given the wide range of physical media used across the range of topologies in Networking.

(5 Marks)

c) i) Explain the **TWO** most common Transport Layer protocols of TCP/IP Protocol suite. **(2 Marks)**

ii) List the various applications that are used by the two protocols in (Q2C i)). **(2 Marks)**

QUESTION THREE

a) Explain the functions of the following Network hardware on the network, and indicate at what layer of the OSI reference mode the device operates in? (5 Marks)

i) Hubs
ii) Switches
iii) Routers
iv) Servers
v) Network Interphase Card (NIC)

b) Outline and explain FIVE Network requirements and Design goals that would help to build a good Network. (5 Marks)

c) Differentiate between a Tree topology and Mesh topology as used in Computer Networks

(4 Marks)

d) List and explain any **TWO** cables that used in building Computer Networks. (1 Marks)

QUESTION FOUR

a) As a network Administrator in XYZ organization, and you are tasked with the implementation of a Firewall for the Organization. What are the major building blocks of a good Firewall System that you would have to consider before putting the Firewall in place? (4 Marks)

b) List and explain **FIVE** network threats that can affect the Network in (Q4a) above. (5 Marks)

c) Explain what does DMZ stand for in secured Computer Network , and explain its function.

(3 Marks)

d) When implementing a DMZ, there are rules that are assigned to the organization list, explain the **THREE** rules. (3 Marks)

QUESTION FIVE

a) In networks a hierarchical design is used to group devices into multiple Networks in a layered approach, list and explain the THREE basic layers of the Hierarchical design and their functions.

(6 Marks)

b) Outline the **FOUR** advantages of the Hierarchical networks in (Q5a) above. **(4 Marks)**

c) Explain the following terms used in wireless Technologies :- **(2 Marks)**

i) Infrared

ii) Radio Frequency

d) Outline and explain **THREE** Limitations of the wireless Technology. **(3 Marks)**