KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2024/2025 ACADEMIC YEAR
THIRD YEAR, SECOND SEMESTER EXAMINATION
FOR THE BACHELOR OF SCIENCE IN COMPUTER SCIENCE
KCS 403 – ADVANCED COMPUTER NETWORKS

Date: 09TH April 2024
Time: 2:30PM – 4:30PM

INSTRUCTIONS TO CANDIDATES
ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

a) Differentiate between the following network terms:
   i) IP address and MAC address (3 Marks)
   ii) Half and Full Duplex (3 Marks)
   iii) DNS and DHCP Servers (3 Marks)
b) List four major differences between TCP and UDP protocols (4 Marks)
c) describe the significance of subnet masking and default gateway when assigning internet protocol addresses. (4 Marks)
d) With an aid of a diagram, describe the concept of TCP sliding(windowing). (4 Marks)
e) Briefly describe the following TCP protocols and their port numbers
   i) Telnet (2 Marks)
   ii) SSH (2 Marks)
   iii) FTP (2 Marks)
f) Describe two major algorithms that are applied by server-client model mode of communication. (4 Marks)
g) You have been assigned the role of managing wireless network of ABC company. Discuss various ways you can use to secure ABC wireless network against unauthorized access. (3 Marks)

QUESTION TWO (20 MARKS)

a) Upon completion your degree in computer science, you have been invited by Elimu School to undertake various networking duties. You were provided the following:
   IP: 192.168.8.0/24
   Network of networks: 18

Task:

   i) Find the ranges of the first 6 networks. (6 Marks)
   ii) Calculate the valid hosts per each network. (3 Marks)
   iii) Calculate total number of networks. (2 Marks)
   iv) Explain why you cannot assign the first and the last ip addresses of each network range (3 Marks)
b) Your friend computer was not connecting the internet, upon checking the ip address you found 169.254.12.30, what is the name of this ip address and what are the causes of this IP address and how to resolve this problem. (4 Marks)

QUESTION THREE (20 MARKS)

a) You have been invited by KWUST to undertake various networking duties. You were provided the following:

> IP: 192.168.8.0/24
> Number of Host per network: 40

Task:
- i) Find the ranges of the first 4 networks. (6 Marks)
- ii) Calculate the total number of networks. (3 Marks)

b) There are two major known coloring cabling standards, which include T568A and T568B. describe the T568B coloring code in order. (6 Marks)

c) Describe the following IP communications
- i) Unicast (1 Marks)
- ii) Broadcast (2 Marks)
- iii) Multicast (2 Marks)

QUESTION FOUR (20 MARKS)

a) With the help of a diagram, describe the process of client requesting IP address from the DHCP server. (7 Marks)

b) You have been provided with a cisco router, write a configuration code that will enable it to be a DHCP server. (9 Marks)

c) Using relevant examples, describe two IPV6 compression rules. (4 Marks)

QUESTION FIVE (20 MARKS)

a) Give the functions or applications of the following network troubleshooting commands
- i) Tracert (2 Marks)
- ii) Nslookup (2 Marks)
- iii) ICMP (ping) (2 Marks)
- iv) Ipconfig/all (2 Marks)

b) Describe a step-by-step process of setup a peer-to-peer network model on Microsoft windows. (8 Marks)

c) Give any four advantages of fiber optic as a transmission media. (4 Marks)