MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 401: NETWORK MANAGEMENT

DATE: **TIME:**

INSTRUCTIONS: Answer Question ONE and Any Other TWO Questions.

QUESTION ONE (COMPUTER) (30 MARKS)

a) Define the following terms: (4 marks)
   i) Network management
   ii) Network security
   iii) User authentication
   iv) Fault tolerance

b) Discuss the TWO major network management protocols. (4 marks)

c) Describe the THREE major ways of authenticating users in a network system. (6 marks)

d) Wireless networks have become the backbone of network access for any organizations. However, this has come with a lot of security concerns. As a potential cyber security consultant, elaborate FIVE techniques that could be used to secure wireless networks (5 marks)

e) Use the case study below to answer the question that follow:
   As computing needs continued to grow, an online financial services company faced a problem all too common in today's data centers. The company was running out of space to house physical servers, and its existing cooling infrastructure couldn't keep up. New workloads meant the addition of physical systems, and valuable time was spent configuring those systems and balancing power distribution. Finally, the company turned to server virtualization technology to help solve its space problems and improve efficiency. Today, the company is 75% virtualized and runs 200 VMs on just 10 physical servers, leading to an estimated 33% savings in power use.

i) Explain the concept of network virtualization. (2 marks)
ii) Explain THREE types of server virtualizations that could have been adopted by the company. (6 marks)
iii) Highlight THREE benefits the company is likely to enjoy after adopting this technology. (3 marks)

QUESTION TWO (20 MARKS)

a) With regards to network security policies, discuss the following statement: "Human beings are not moral creatures, we are creatures of habit. Thus law and policy enforcement is about making ethical choices habitual ones." (2 marks)
b) Identify FOUR network issues and describe how you can trouble shoot each of the identified issue. (8 marks)
c) Highlight FIVE components of a good network security policy document. (5 marks)
d) Outline FIVE encryption techniques that can be applied in network security. (5 marks)

QUESTION THREE (20 MARKS)

a) People who attempt intrusion can be classified into several different categories. Describe any FOUR major categories. (4 marks)
b) Discuss THREE security measures for preventing intrusion in a network system. (6 marks)
c) Highlight FOUR factors that have brought an increased emphasis on network security. (4 marks)
d) Describe the role of each of the below commands in network management: (6 marks)
i) Ipconfig
ii) Ipconfig/all
iii) ping
iv) tracert
v) nslookup
vi) netstat

QUESTION FOUR (20 MARKS)

a) Differentiate between high availability and fault tolerance. (4 marks)
b) Today's network managers face a number of demanding problems. Discuss THREE major issues that they are likely to be of great concern to them. (6 marks)
c) Using a sample URL like www.mksu.ac.ke, highlight the steps undertaken by domain name server in domain resolution from when a user types the URL on a web browser to the time the IP address of the respective host is identified. (5 marks)
d) While managing their networks, international organizations have indicators which they use to ascertain efficiency and network quality. Describe FIVE such indicators. (5 marks)

QUESTION FIVE (20 MARKS)

a) The network management model is the primary means of understanding the major functions of network management systems. Based on this model, describe the FOUR conceptual areas of a network management system. (8 marks)

b) Explain the following network failure and recovery statistics. (4 marks)

i) The mean time between failures (MTBF)

ii) Mean time to repair (MTTR)

iii) Mean time to respond (MTTR)

iv) Mean time to fix (MTTF)

c) Assume that you have been appointed as the Network administrator for Machakos University. Describe FOUR measures that you can undertake in order to improve the performance of the University's network. (8 marks)