MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2015/2016

FIRST YEAR SECOND SEMESTER EXAMINATIONS FOR THE
DEGREE OF BACHELOR OF SCIENCE, DEVELOPMENT STUDIES
AND BUSINESS ADMINISTRATION WITH INFORMATION
TECHNOLOGY

MAIN CAMPUS

UCI 102: COMMUNICATION SYSTEMS

Date: 3rd May, 2016

Time: 2.30 - 4.30 pm

INSTRUCTIONS:

- Answer question ONE and any other TWO questions.

QUESTION ONE

a) Define a LAN

(2marks)

b) Explain the following computer networking devices giving motivation for using each of them

   i)   Bridge

                               (2marks)

   ii)   Switch

                               (2marks)

   iii)   Repeater

                               (2marks)

c) The ISO/OSI Reference Model is a framework that you can use to understand how information travels throughout a network.

   i) What prompted the model's evolution? (2 marks)

   ii) State any 3 advantages of layering. (2 marks)

   iii) How do network vendors benefit from the model? (2 marks)

   iv) Describe the functions of the following layers in the model:

      a) Session (2 marks)

      b) Transport (2 marks)

      c) Network (2 marks)

QUESTION TWO

a) A small, independent, business/home/life insurance company consisting of an owner, a manager, an administrator and five agents decides to implement a network. The company occupies half of a small building in an office park. Their volume of business has been stable for the past four years but has been increasing lately. To handle the increased volume of business, two new agents will be hired.
Everyone in the company has a computer. When the employees share information, they do it verbally or copy the information to floppies and swap disks. In general, agents handle only their specific client s, and the information their clients provide is confidential. The office administrator has an eight- year old laser printer. The agents all have their own dot matrix printers.

As part of the migration to a networking environment, the company has decided to purchase a high-speed laser printer.

Required
You are tasked with designing the network for this company.
  i) What type of network, server-based or peer-to-peer, would you suggest for this company? Explain. (4 marks)
  ii) What network topology would be appropriate in this situation? Why? (3 marks)
  b) List any 3 factors that a network designer considers when setting up a network. (3 marks)
  c) List and explain any 3 factors that influence the choice of a transmission media. (6 marks)
  d) Explain the functions of the following 2 network devices.
    i)   Transceivers (2 marks)
    ii) Hubs (2 marks)

QUESTION THREE
  a) Explain the following terms as used in computer communication systems
    i)   Attenuation (1mark)
    ii) Topology (1mark)
  b) Briefly discuss steps or phases of the Network Design Methodology.
    [8 Marks]
  c) Explain the differences between Peer-to-peer network and client server network (6marks)
  d) Give two advantages and two disadvantages of using Fiber optics over metallic cables (4marks)

QUESTION FOUR
  a) A person wishes to start a family business whose main operation will be typesetting and laying out publications. His finances allow him to only purchase two computers, a DeskJet printer and a network ready photocopier. He has approached you for advice on how he can set up a very basic network connecting all these devices.
  Required:

Clearly explain how you would help him set up the network stating what you would require (in terms of cables, any extras that might be required) to have the network up and running. (8 Marks)

b) What motivates cyber crime? (3 marks)

c) How can we protect our communication systems from the various attacks instigated by our adversaries? (3 marks)

d) Distinguish between secret key cryptography and public key cryptography. (2 marks)

e) Discuss how each of the four properties of a survivable system can be achieved. (4marks)

QUESTION FIVE

a) Define the following terms
   i) Cross talk (2marks)
   ii) Protocol suite (2marks)

b) Explain four strategies for meeting performance metrics (4marks)

c) Describe chronological steps in troubleshooting network problems (8marks)

d) (i) How does the NIC of a receiving PC use the destination MAC address (2 Marks)

   (ii) How long is a MAC address and how is it written? (2 Marks)