



# **JARAMOGI OGINGA ODINGA UNIVERSITY FOR SCIENCE & TECHNOLOGY**

**School of Informatics and Innovative Systems**

**Department of Computer Science and Software Engineering**

**KISUMU LEARNING CENTER**

**ICT 2113      NETWORK INSTALLATION, MAINTENANCE & ADMINISTRATION  
Y1S1**

## **Instructions**

1. The paper contains FIVE questions
2. Answer Question One (Compulsory) and ANY OTHER TWO questions.
3. Answer each questions on a new page

### **QUESTION ONE (COMPLUSORY)**

**[30 MARKS]**

- a) Briefly explain how you would configure three different VLANs within the same network so that they may be able to communicate with each other. [8 Marks]
- b) State the advantages of segmenting your network into VLANs [5 Marks]
- c) Define communications protocol and differentiate it from a standard [4 Marks]
- d) Differentiate between a computer operating system (OS) and network operating system (NOS) [6 Marks]
- e) Briefly explain your understanding of disk mirroring [3 Marks]

- f) List the strengths of Linux/ Unix operating systems [4 Marks]

**QUESTION TWO [20 MARKS]**

- a) Identify the importance of a network server? [3 Marks]
- b) Identify and describe any three different network topologies, stating their weaknesses and strengths [9 Marks]
- a) In a client/server system, a client transmits a request to a server, the server performs a processing operation, and the server returns a result. List all the possible problems that can occur with transmission in this scenario. [8 Marks]

**QUESTION THREE [20 MARKS]**

- a) You want to create a local area network that protects the contents of the network server's hard disks from disk crashes. List all the different techniques for providing this protection that have been presented thus far. [6 Marks]
- b) Is a thin client computer more advantageous in a corporate setting or in a user's home? Explain. [4 Marks]
- c) How does a switch differ from a hub? [4 Marks]
- d) You have three computers at home, and you want to network all the three together. Two computers are on the main floor of the house, but the third is upstairs in a bedroom. Briefly explain how you would interconnect the three computers so that they could operate on one local area network. [6 Marks]

**QUESTION FOUR [20 MARKS]**

- a) After the latest round of corporate reorganizations, you now have six internal divisions where you used to have seven. The technology department tries to organize the network layout by keeping users in each division on their own segment of the network, but it is getting tired of rearranging the wires in the closets to accommodate these changes. What might you suggest that the technology department use instead to support the six internal divisions? [5 Marks]
- b) You are working for a company that is composed of three departments: general support, marketing, and sales. General support occupies the first floor, while marketing and sales are on the second floor. General support has 28 workstations, marketing has 10

workstations, and sales have 30 workstations. Some applications require that data be transferred between departments, but generally each department has its own applications. Everyone needs access to the Internet, the company internal Internet (intranet), and e-mail. Design a local area network solution for this company. Show the locations of all workstations and interconnecting devices, such as hubs, switches, and routers, if any are used.

Show also the connection to the outside phone service that provides Internet access. What type of local area network wiring would you recommend? What type of local area network topology and protocol would you recommend? Draw a floor plan for each floor. If possible, show both floor plans on one page.

Use the following assumptions:

1. Available hubs and switches have a maximum of 24 ports.
2. Some software applications and large data sets reside on departmental servers.
3. To support e-mail, a server is needed.
4. To support the company intranet, a server is needed.
5. The company does not have an unlimited budget but is willing to invest in quality technology.

[15 Marks]

#### **QUESTION FIVE**

**[20 MARKS]**

- a) A small business with 100 computer workstations is installing a new local area network. All of the users perform the usual operations of e-mail, word processing, Internet browsing, and some preparation of spreadsheets. Approximately one-quarter of the employees perform a large number of client/server requests into a database system. Which local area network operating system would you recommend? State your reasoning.
- [5 Marks]**
- b) Create a hypothetical business with approximately 50 to 100 employees. Place the employees in two or three different departments. Assign to each department a title and basic job duties. All employees in all departments use personal computers for numerous activities. Identify the computer activities for the employees of each department. Then create a security policy for the employees of each department. Be sure to address when and where the employees have access to computer resources, and if any types of transactions should be restricted.
- [15 Marks]**