

**MAKERERE UNIVERSITY
COLLEGE OF COMPUTING & INFORMATION SCIENCES
SCHOOL OF COMPUTING & INFORMATICS TECHNOLOGY**

END OF SEMESTER II EXAMINATION 2021/2022

PROGRAMME: BIST, SE

YEAR OF STUDY: II

COURSE NAME: SYSTEM ADMINISTRATION

COURSE CODE: IST 2201

DATE: 19th August 2022

TIME: 12 – 3 PM

EXAMINATION INSTRUCTIONS

1. ATTEMPT ALL QUESTIONS IN SECTION A (40 MARKS)
2. ATTEMPT THREE (03) QUESTIONS IN SECTION B (60 MARKS)
3. DO NOT OPEN THIS EXAM UNTIL YOU ARE TOLD TO DO SO
4. ALL ROUGH WORK SHOULD BE IN YOUR ANSWER BOOKLET

SECTION A (40 MARKS): ANSWER ALL QUESTIONS IN THIS SECTION

- a) Give any four tasks of a systems administrator in an organization? (4 Marks)
- b) Why must Systems Administrators avoid using administrator rights for tasks that don't require them? (2 Marks)
- c) Briefly explain how one becomes a systems administrator (4 Marks)
- d) What are IT infrastructure services (2 Marks)
- e) List any four IT infrastructure services you would integrate into an organization (4 Marks)
- f) Mention any four tasks performed by an operating system (4 Marks)
- g) Differentiate between the kernel and shell (2 Marks)
- h) List any two LINUX/UNIX commands (2 Marks)
- i) Describe the work done by a kernel as a major component of the operating system (2 Marks)
- j) List any four of the world's most popular server operating systems with enterprise class management and administrative tools. (4 Marks)
- k) Describe four file system types by giving examples (4 Marks)
- l) A service is more than hardware and software. Give four qualities of a good service in an IT infrastructure (4 Marks)
- m) Give the principles for designing reliable services. (2 Marks)

SECTION B (60 MARKS)

ATTEMPT ANY THREE QUESTIONS FROM THIS SECTION

Question One

a) Briefly explain the difference between the following

- i. A Work group and a Domain (4 Marks)
- ii. A Domain controller and an Active directory (4 Marks)
- iii. A Tree and a Forest (4 Marks)

You have been asked to create a new active directory forest for a new research project between Makerere University and Kyambogo University. The two institutions will be sharing research across the forest. Because of the sensitivity nature of project, you must ensure that the directory is as secure as possible. You are considering the option of using Windows Server 2019 installation on the servers at Makerere and Kyambogo. You are required to answer the following questions

- b) Mention two major functions of active directory in the two institutions network (2 Marks)
- c) Briefly explain why you need a DNS server before deploying an active directory at both institutions (2 Marks)
- d) Describe the process of installing DHCP in windows server 2019. (4 Marks)

Question Two

- a) Explain the following (5 Marks)
 - i. Disk
 - ii. Partition
 - iii. Volume
 - iv. SWAP
 - v. Caching

- b) Why is it a good idea to put some folders (such as /var, /home, etc) on a separate drive from other data files and programmes? (2 Marks)
- c) You are considering purchasing 1 TB disks for your servers. What parameters would you use to compare disks from multiple vendors? (5 Marks)
- d) What are filesystems? Explain the operation of journaling filesystems (3 Marks)
- e) Draw the file system tree structure for Linux/Unix OS or Windows and explain the information/files stored under each folder (5 Marks)

Question Three

- a) What is the difference between cloud computing and virtualization? (4 Marks)
- b) With your knowledge of system administration and cloud computing, briefly explain the common types of cloud deployment models (6 Marks)
- c) You are hired as a System Administrator for Greenland Bank; you have been tasked to study the possibilities of migrating part of the banks infrastructure to the cloud. You are required to answer the following questions
 - i. Before deploying to the cloud, it is necessary to consider Greenland's bank business requirements. Mention any four key issues you must put into consideration (4 Marks)
 - ii. With examples in relation to Greenland's bank IT infrastructure, briefly explain the difference between CapEX and OpEX (4 Marks)
 - iii. "The current Greenland's bank traditional IT infrastructure is CapEX oriented" Briefly discuss (2 Marks)

Question Four

- a) Systems sold as servers are different from systems sold to be clients or desktop workstations, and these servers have features that are different from client hardware. As a systems administration student, identify and explain at least five features of server hardware (5 Marks)

b) You have been appointed as a consultant for Uganda Commercial Bank. The bank would like a plan to ensure that in the event of any disaster, ranging from human errors, hardware failures, viruses, fire or even bombs, they are able to recover all their data and continue operations normally.

i. What are your considerations for data center equipments? (6 Marks)

ii. What are your hardware/software considerations for the servers?

(4 Marks)

iii. What are your considerations for selecting backup types and backup drives

(5 Marks)

Question Five

Explain the functions and operations of the following services. (Use diagrams where possible)

i. DNS (4 Marks)

ii. FTP (4 Marks)

iii. Mail Service (4 Marks)

iv. Web Server (4 Marks)

v. File Sharing (4 Marks)

Question Six

a) Presumably, what could be the reason that the `<cat filename>` command start giving the following error message? (1 Mark)

--bash: cat: Command not found

b) How can we pass arguments to a script in Linux? And how to access these arguments from within the script? (2 Marks)

c) In Linux or Unix-like systems, you may come across file names including the following special characters (e.g., `&` `$` `?` `*`) The Bash shell considers most of the above special characters as commands. How will you delete a file that has special characters in its file name? (4 Marks)

- d) The shell recognizes both single and double quote characters. However, there is an important difference between single and double quotes. What is the difference? (4 Marks)
- e) Explain the difference between the expressions below (2 Marks)
- e1 -a e2 and e1 && e2
- e1 -o e2 and e1 || e2
- f) What data type is the variable “Unix” in the script below? (3 Marks)
- Unix=('Debian' 'Red hat' 'Suse' 'Fedora');
- echo \${#Unix[@]}
- echo \${#Unix}
- echo \${#Unix[3]}
- ecco \$("\${Unix[@]}” “Red Hat”)
- g) What is the output of the script above? (4 Marks)

END

“It’s not about money or connections – it’s the willingness to outwork and outlearn everyone” Mark Cuban