UGANDA MARTYRS UNIVERSITY

NKOZI AND LUBAGA
FACULTY OF SCIENCE
END OF SEMESTER I, 2023/24 EXAMINATION

PROGRAMS: BscIT

YEAR OF STUDY: 3

COURSE UNIT: SYSTEMS ADMINISTRATION AND COMPUTER MAINTENANCE
DATE:
                                                          TIME: 3 HRS

EXAMINATION INSTRUCTIONS:

i.   The paper is composed of two sections: section A and section B.
Attempt **all** questions from **Section A** and any **three** from **Section B**

Section A: Attempt All Questions

1. Which of the following is used to print high quality printing? such as building plan, circuits diagram etc. a) Laser printer b) Inkjet printer c) Plotter d) All	(2) Which of the following is used to input data into image format? a) Scanner b) Keyboard c) Mouse d) Joystick
(3) What is the intersection of a column and a row on a worksheet is called .... a) Column b) Cell c) Address d) None	(4) The speed at which the CPU processes data to convert is measured in what: a) Megahertz b) Gigahertz c) Nanoseconds d) A and B
(5) In computer monitors, CRT stands for _____. a) Cadmium Ray Tube b) Cathode Ray Tube c) Cathode Ray Twist d) Cathode Rim Tube	(6) LCD is expanded as _____. a) Linear Crystal Display b) Liquid Crystal Dialog c) Liquid Crystal Display d) Liquid Canister Display
(7) Modern (DUPLEX) printer (like LASER jet, inkjet printers) may be connected to a computer using _____ port. a) RS232/ serial b) USB c) PS/2 d) VGA	(8) Broadband connection may be connected through _____ port. a) RJ45/ Ethernet b) USB c) PS/2 d) VGA

(9) High definition graphics output may be taken from _____ port of a PC.
   a) 3.5mm jack
   b) HDMI
   c) RJ45
   d) LPT

(10) Which of the following are the input devices that enable direct data entry into a computer system from source documents?
   a) System Access devices
   b) Data acquiring devices
   c) Data retrieving devices
   d) Data Scanning devices

(11) Which of the following packages allows individuals to use personal computers for storing, retrieving, editing and converting photographs?
   a) Bitmap editors
   b) Graphics packages
   c) Spreadsheet packages
   d) Animation packages

(12) What's the best way to protect your hard drive data?
   a) regular backups
   b) periodically defrag it
   c) run chkdsk at least once a week
   d) run scandisk at least once a week

(13) To display the list of files and directories, _____Linux command is used.
   a) ls
   b) chmod
   c) mkdir
   d) Rmdir

(14) _____ Linux command changes the access mode of a file.
   a) pwd
   b) chmod
   c) mkdir
   d) rmdir

(15) Which one of the following would be considered as a way that a computer virus can enter a computer system ?
   a) Opening an application previously installed on the computer
   b) Borrowed an illegal copy of software
   c) Viewing a website without causing any additional transactions
   d) None of these

(16) Specialized programs that assist users in locating information on the Web are called ....
   a) Information engines
   b) Search engines
   c) Web browsers
   d) Resource locators
   e) None of these

(17) The essential difference between an operating system like Linux and one like Windows is that _____
   a) Windows can run with an Intel processor, whereas Linux cannot
   b) Linux is proprietary, whereas Windows is not
   c) any programmer can modify Linux code, which is not permitted with Windows
   d) there are multiple versions of Linux, but only one version of Windows
   e) None of these

(18) Which of the following is NOT an advantage of open-source operating systems over proprietary versions?
   a) Free use and distribution
   b) Availability of technical support
   c) Availability of source code
   d) Ability to modify code
   e) None of these

(9) Which one of the following is NOT a Document Editor Data Storage file?

    a) *.docx

    b) *.odt

    c) *.rtf

    d) *.ods

(20) Which one of the following is NOT a Presentation Editor Slides file?

    a) *.pptx

    b) *.ppt

    c) *.pdf

    d) *.odp

Section B: Answer any 3 Questions

Automating backups with bash script

Taking backups is something that we all do on a regular basis so why not automate it? Take a look at the following **backup.sh** script:

```bash
#!/bin/bash

backup_dirs=("/etc" "/home" "/boot")
dest_dir="/backup"
dest_server="server1"
backup_date=$(date +%b-%d-%y)

echo "Starting backup of: ${backup_dirs[@]}"

for i in "${backup_dirs[@]}"; do
sudo tar -Pczf /tmp/$i-$backup_date.tar.gz $i
if [ $? -eq 0 ]; then
echo "$i backup succeeded."
else
echo "$i backup failed."
fi
scp /tmp/$i-$backup_date.tar.gz $dest_server:$dest_dir
if [ $? -eq 0 ]; then
echo "$i transfer succeeded."
else
echo "$i transfer failed."
fi
done

sudo rm /tmp/*.gzecho "Backup is done."
```

An array named **backup_dirs** is created to stores all directory names that we need to backup. Three other variables are created thereafter:

- **dest_dir:** To specify the backup destination directory.
- **dest_server:** To specify the backup destination server.
- **backup_time:** To specify the date of the backup.

For all the directories in the **backup_dirs** array, we create a gzip compressed tar archive in **/tmp**, then we use the scp command to send/copy the backup to the destination server. Finally, we remove all the gzip archives from **/tmp**.

backup.sh script when run, returns the feedback below:

```
kabary@handbook:~$ ./backup.sh
Starting backup of: /etc /home /boot
/etc backup succeeded.
etc-Aug-30-20.tar.gz 100% 1288KB 460.1KB/s 00:02
/etc transfer succeeded.
/home backup succeeded.
home-Aug-30-20.tar.gz 100% 2543KB 547.0KB/s 00:04
/home transfer succeeded.
/boot backup succeeded.
boot-Aug-30-20.tar.gz 100% 105MB 520.2KB/s 03:26
/boot transfer succeeded.
Backup is done.
```

Question B1. Question: Re-write the Script, Adding 10 Comments to explain the functionality of lines wherever necessary.

Question B2: Read the Brief About Mark Richard Shuttleworth, an Icon in the history of computing, and answer the questions that follow:

Mark Shuttleworth, (born September 18, 1973, Welkom, South Africa), South African entrepreneur, philanthropist, and space tourist who became the first South African in space.

This son of a surgeon and a nursery school teacher, was a student at the University of Cape Town in 1995 when he founded Thawte, a consulting firm that became a world leader in innovating Digital Certificates and Internet security for electronic commerce transactions, now known as **Secure Socket Layer (SSL Certificates).** He sold the firm in 1999 to the U.S.-based company VeriSign for about $575 million and with his profits founded a venture capital firm and a nonprofit organization dedicated to funding education initiatives in Africa.

In 2001, at a personal cost of $20 million, Shuttleworth bought a seat on a Russian spacecraft and began the First African in Space project. For nearly a year he trained in Star City, Russia, and in Kazakhstan for a mission aboard a Soyuz capsule to the International Space Station (ISS). On April 25, 2002, Shuttleworth lifted off on Soyuz TM-34 with two cosmonauts, commander Yury Gidzenko of Russia and flight engineer Roberto Vittori of Italy, from the Baikonur Cosmodrome in Kazakhstan and docked two days later at the ISS. Shuttleworth spent eight days aboard the space station, where he conducted scientific experiments for South Africa. He returned to Earth aboard Soyuz TM-33 on May 5, 2002.

Upon returning, Shuttleworth traveled widely and spoke about ICT innovations and spaceflight to schoolchildren around the world. In 2004, he started the development of Ubuntu through his company Canonical Ltd. **Ubuntu is a free and open-source Linux distribution based on Debian.** The company fueled the modern world and created an operating system Ubuntu, which can connect almost everything to the internet. Ubuntu is now redesigned to power Internet of Things (IoT) and Cloud computing. Earlier the Ubuntu project created desktop and operating system software for free distribution to computer users, with a special focus on expanding personal computer access in Africa and other developing countries. "Ubuntu: Linux for human beings" is built with intention to rally people out of poverty. It also means Ubuntu - Humanity Shared, or Ubuntu - Together we can. **Mark Shuttleworth has participated heavily in the development of Linux, and Free and Open Source Software (FOSS).** In the late 1990s, Mark participated as one of developers of Debian operating system. In 2006, it was announced that Shuttleworth became **first patron of KDE, the endeavor that realized the KDE linux GUI we now use.**

Mark, being a philanthropist, since 2001, looks out for social innovators who are helping to change the world for the better, and helps them through the Shuttleworth Foundation.

Source: https://www.britannica.com/biography/Mark-Shuttleworth, https://briefly.co.za/82637-mark-shuttleworth-bio-age-family-ubuntu-space-profiles-net-worth-contacts.html

B2a: What are digital certificates or SSL certificates and how do they facilitate Internet security?

B2b: In his effort to make the internet and bank transactions secure, Mark Shuttleworth has always sought to utilize his ICT knowledge to make the lives of ordinary people much better, instead of running after profit. How has the Ubuntu Operating System helped people?

B2c: Explain the terms FOSS and Ubuntu

B2d: In his distribution of Ubuntu FOSS, Mark believes that every household should have computers with internet access. How can a family benefit from these services?
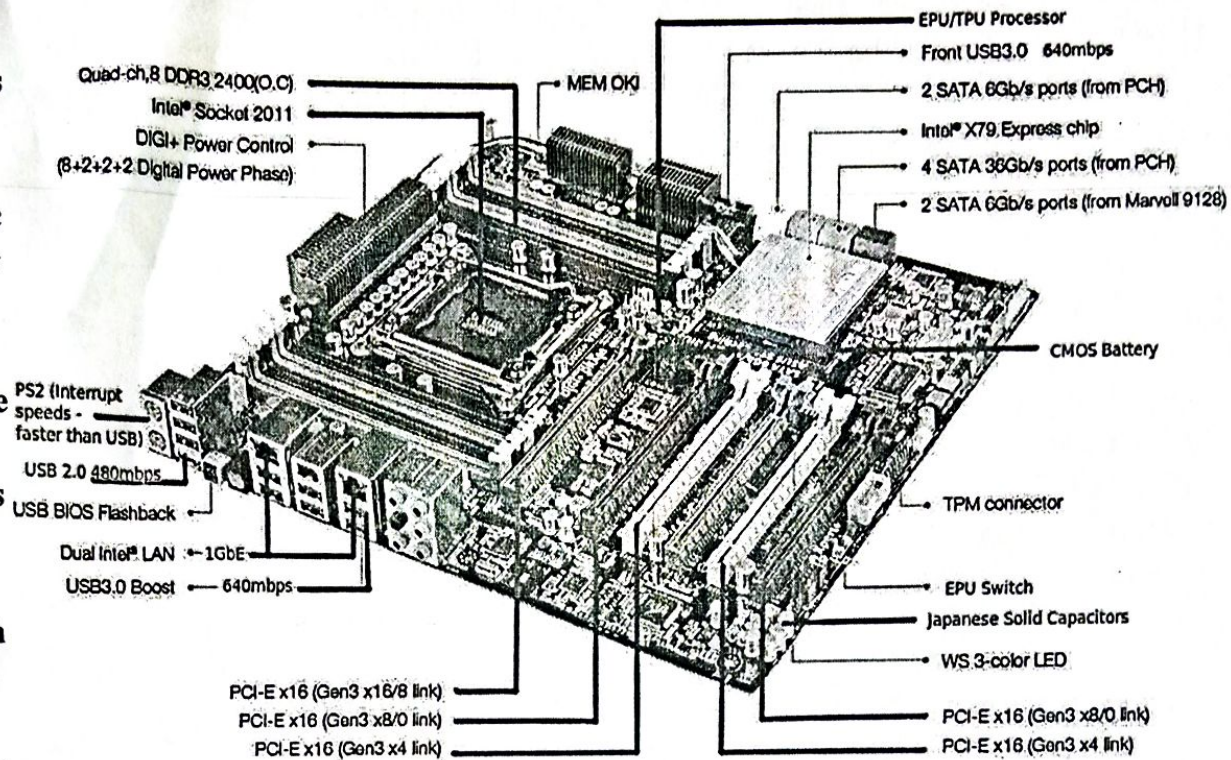
Jues
tion
B3:
Selec
t any
ten
(10)
name
d
parts
of
this
moth
erbo
ard,
expla

in their purpose and give a reason for their performance specifications and compatibility.

Quad-ch,8 DDR3 2400(O.C)
Intel Socket 2011
DIGI+ Power Control
(8+2+2+2 Digital Power Phase)

MEM OK!

EPU/TPU Processor
Front USB3.0 640mbps
2 SATA 6Gb/s ports (from PCH)
Intel X79 Express chip
4 SATA 36Gb/s ports (from PCH)
2 SATA 6Gb/s ports (from Marvoll 9128)

CMOS Battery

PS2 (Interrupt speeds - faster than USB)
USB 2.0 480mbps
USB BIOS Flashback
Dual Intel LAN - 1GbE
USB3.0 Boost - 640mbps

TPM connector

EPU Switch
Japanese Solid Capacitors
WS 3-color LED

PCI-E x16 (Gen3 x16/8 link)
PCI-E x16 (Gen3 x8/0 link)
PCI-E x16 (Gen3 x4 link)

PCI-E x16 (Gen3 x8/0 link)
PCI-E x16 (Gen3 x4 link)

Question B4: Carefully analyze the Modern Motherboard above:

a) Name two (2) missing common output components/port(s).

b) Suggest how the missing port(s) can be incorporated into the computer.

c) What is the advantage of excluding the component(s) on the motherboard assembly.

d) Suggest the appropriate hard drive and/or optical drive to attach to this motherboard and give reasons for compatibility and data transmission speeds

Question B5: Carefully analyze the Modern Motherboard above:

A TPM, or a trusted platform module, is a physical or embedded security technology (microcontroller) that resides on a computer's motherboard or in its processor. TPMs use cryptography to help securely store essential and critical information on PCs to enable platform authentication. They store a variety of sensitive information—such as user credentials, passwords, fingerprints, certificates, encryption keys, etc to keep computing safe from external attacks.

a) Give 2 advantages of utilizing computers that feature a TPM 2.0

b) Give 2 disadvantages of Utilizing Computers that feature a TPM 2.0

EPU stands for Energy Processing Unit. The main function of the EPU is to minimize power consumption to the least required currency levels. This helps the system to save power while doing certain tasks. This has everything to do with power efficiency. This unit will perform most of necessary configurations by powering off the unnecessary I/O controllers. Some other tasks might be reduced to their factory settings to have the best results possible.

c) Give 2 advantages of using computers with the EPU enabled.

d) Give 2 likely disadvantages of using computers with the EPU enabled.

Question B6:

10GbE, short for 10 Gigabit Ethernet, is a group of technologies for an ultra-fast wired network that transmits data frames at a rate of 10 billion bits per second. 10 Gbps lets you transfer at a rate of 1.25 GB/s when you copy a file to another computer through the network. This basically equates to sending a 20 GB file in under 20 seconds. Regarding Electromagnetic Interference (EMI) and Crosstalk, and relating to speed of data, and efficiency of network:-

a) Explain an Unshielded Twisted Pair (UTP) cable:

b) Explain a Shielded Twisted Pair (STP) cable.

c) Explain a Foil Twisted Pair (FTP) cables

d) Explain a Shielded Foil Twisted Pair (S/FTP) cable

e) Explain Electromagnetic Interference (EMI) and Crosstalk
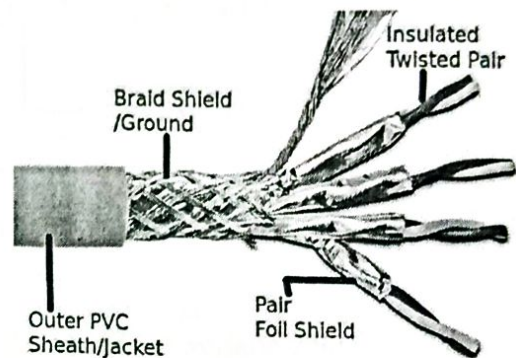
Question B7: Data-Backup is a means to accomplish the goal of protecting Information and to Ensure business Continuity, from the ramifications of lost data.

a) What is a Full Backup?

b) What is Incremental Backup?

c) What is Differential Backup?

Disaster recovery (DR) and Business continuity is are part of ICT Systems security planning. Policies and procedures that focus on protecting an organization or business from any significant effects in the event of a negative event, such as device or building failures, Cyberattacks, or natural disasters.

d) Explain Storage Area Network (SAN)

e) Explain Network Attached Storage (NAS)