UGANDA CHRISTIAN UNIVERSITY
A Centre of Excellence in the Heart of Africa

FACULTY OF ENGINEERING, DESIGN AND TECHNOLOGY
DEPARTMENT OF COMPUTING AND TECHNOLOGY
ADVENT 2024 SEMESTER <u>TEST</u>

PROGRAM: *[BACHELOR OF SCIENCE IN ELECTRONICS AND COMMUNICATION SCIENCE]*

YEAR: 1   **SEMESTER:** 1

COURSE NAME: *[ICT PRINCIPALS]*

TEST DATE: OCTOBER 2024

TIME ALLOWED: *1 hour*

Test Instructions
   a) Attempt <u>all questions</u>

Question One (10 Marks)

a) Define a Communication system.
Communication system is a system which describes the exchange of information or data between two stations, i.e. between transmitter and receiver   [*2 Marks*]
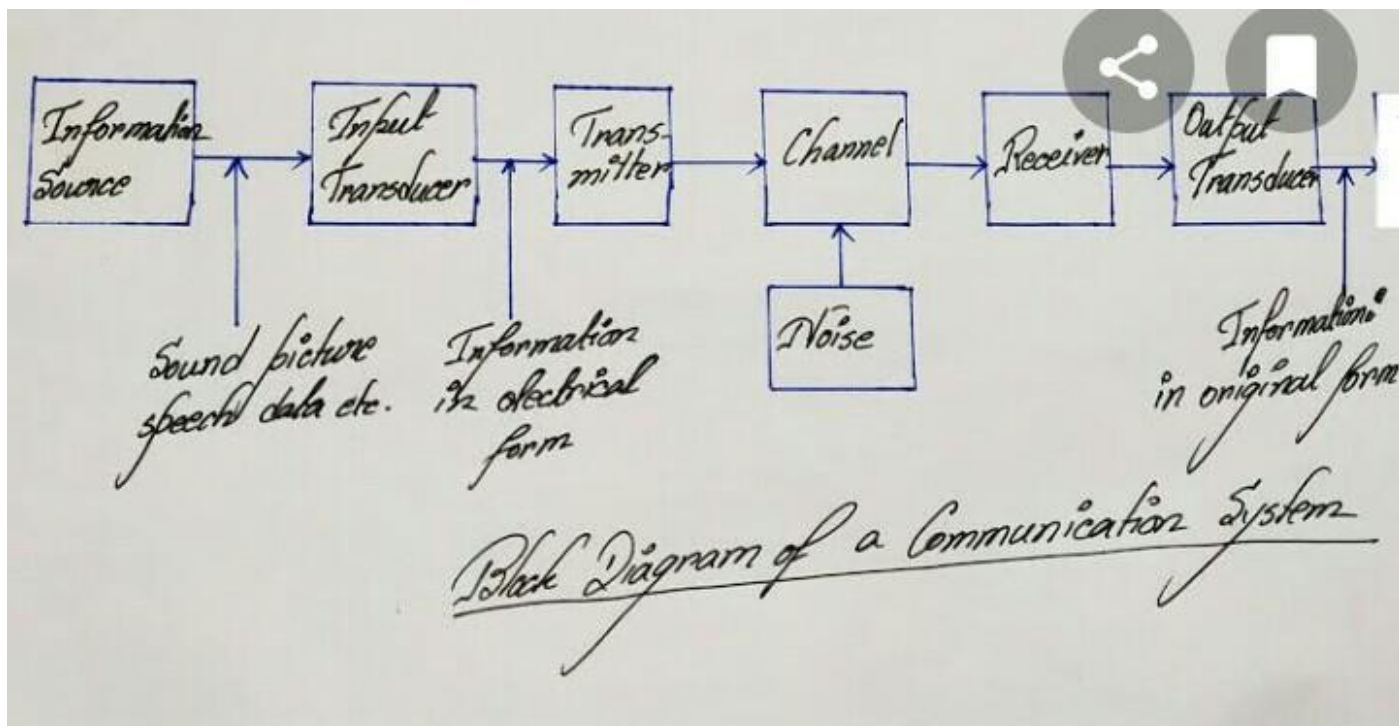

   b)Differentiate between causal and non-causal systems.   [*3 Marks*]
Causal system : A system is said to be causal system if its output depends on present and past inputs only and not on future inputs.
Non Causal system: A system whose present response depends on future values of the inputs is called as a non-causal system.

   c) With the help of an illustration explain the components of a communication system.   [*5 Marks*]
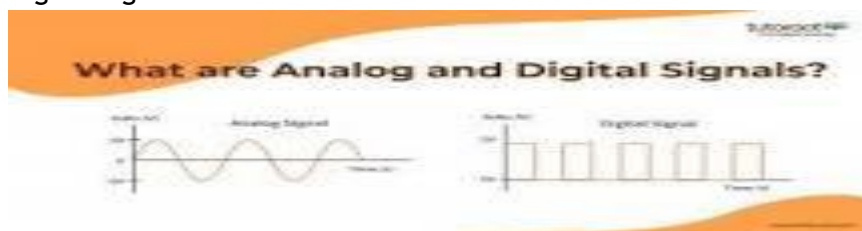The essential components of a communication system are information source, input transducer, transmitter, communication channel, receiver and destination.

Black Diagram of a Communication System

Question Two (10 Marks)

a) Differentiate between analog and digital transmission. [**2 Marks**]
Analog signals are used to communicate information in a continuous function of time while a digital signal transmits data in a discrete function of time.

b) Explain the modes of transmission. [**4 Marks**]
Simplex (SX) – one direction only, e.g.TV
▪ Half Duplex (HDX) – both directions but not at the same time, e.g. CB radio
▪ Full Duplex (FDX) – transmit and receive simultaneously between two stations, e.g. standard telephone system.

c) Transmission impairment is where the signal received differs from the signal transmitted. Explain three impairments known to you. [**4 Marks**]
Attenuation:
noise: Noise is a general term which is used to describe an unwanted signal which affects a wanted signal.
distortion

Question Three (10 Marks)

a) Compare and contrast Unshielded Twisted Pair (UTP) and Shielded Twisted Pair (STP) cables, focusing on their advantages and disadvantages. [**5 Marks**]

Parameter	UTP	STP
Full Form	UTP stands for Unshielded Twisted Pair.	STP stands for Shielded Twisted Pair.
Grounding Cable	In UTP grounding cable is not necessary.	While in STP grounding cable is required.
Data Rate	Data rate in UTP is slow compared to STP.	Data rate in STP is high.
Cost	The cost of UTP is less.	While STP is costlier than UTP.
Maintenance	Less maintenance needed.	Much more maintenance is needed.
Noise	Noise is high compared to STP.	Noise is less.
Generation of crosstalk	The generation of crosstalk is also high compared to STP.	Generation of crosstalk is also less.
Attenuation	Attenuation is high in comparison to STP.	Attenuation is low.
Speed	About 10 to up to 1000 Mbps.	About 10 to up to 100 Mbps.
Installation	Easy and inexpensive	Expensive than UTP and difficult to install.
Max nodes	1024	270
used for	Data transmission within short distance such as for home and office networks.	Connecting organizations over a long distance.

Parameter	UTP	STP
Electromagnetic Interference(EMI)	Electromagnetic interference is more in Unshielded Twisted Pair cable compared to Shielded Twisted Pair cable.	Shielded Twisted Pair cable reduces Electromagnetic interference because of the protective sheath.
Catagories	UTP cables categories as specified by EIA- Category-1, Category-2, Category-3, Category-4, Category-5, Category-5e,Category-6, Category-6a and Category-7.	Shielded cables have commonly these configurations- Foil Shielded and Braid Shielded.
Usage	Used for Telephone wiring, Local Area Networks (LAN) and more.	Used in frigid temperature,emplyoed under highg radiation etc

b) Discuss the major generations for a computer listing the major technologies used in each? [*5 Marks*]

Generation of Computers	Time Period	Evolved Hardware	Key Characteristics
First Generation	1940-1959	Vacuum tubes	Large size, high power consumption, limited memory
Second Generation	1950-1960	Transistors	Smaller size, increased reliability, reduced heat generation
Third Generation	1964-1971	Integrated circuits	Further size reduction, increased speed, improved efficiency
Fourth Generation	1972-present	Microprocessors	Personal computers, increased processing power, user-friendly interfaces
Fifth Generation	Present and beyond	AI hardware, neural networks	Machine learning capabilities, natural language processing
Sixth Generation	Emerging	Quantum processors,	Massive parallel processing, potential for solving complex problems

Generation of Computers	Time Period	Evolved Hardware	Key Characteristics
		molecular computing	

Question Four (10 Marks)

a) What are the requirements needed for one to be able to access internet? [*2 Marks*]

✓ NIC Network Interface Card: enables the computer to connect and be able to communicate.

✓ Internet Service Provider (ISP): is a company that supplies connections to the Internet, usually for a monthly fee. Examples of ISP's are Btopenworld, pipex, freeserve and AOL.

✓ A computer or any other device that a user will manipulate to use the service of Internet.

✓ An Operating System: required to configure the machine to accept all standards of using the Internet by itself and other computers connected.

✓ Modem: A modem is a device that converts your computer's digital signals into a format that can be sent over a regular phone line or for the computer to use.

✓ Browser: used to access pages on the Internet, examples include: Internet Explorer, Mozilla Firefox, Netscape navigator, e.t.c.

b) Explain the different services offered by the internet and how they work. [*4Marks*]
The World Wide Web: also called the Web consists of a worldwide collection of electronic documents. Each of these documents on the Web is called a Web page. o A Webpage can contain text, graphics, animations, audio, and video (i.e. multimedia elements), as well as built-in connections called hyperlinks, to other documents.
E-mail: is the transmission of messages via a computer network such as a local area network of the Internet using a communications link such as a modem and a telephone line.
Newsgroup: also called a discussion group, is an online area where users conduct written discussions about a particular subject.
Message boards of discussion board: is a Web-based type of discussion group that does not require a newsreader program.
Mailing lists: is a group of e-mail names and address given a single name. When a message is sent to mailing list, every person on the list will receive a copy of the message.
Chat rooms: is a location on an Internet server that permits users to chat with each other by typing lines of text on the computer.
FTP (File Transfer Protocol): is an Internet standard that allows users to upload and download files with other computers.
Instant messaging: is a real-time communications service that notifies a user when one

c) How is the internet of help to you as a student at Uganda Christian University. [*4 Marks]*

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