COMPUTER SCIENCE SSC–I (2nd Set Solution)
SECTION – A (Marks 12)
Time allowed: 15 Minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. **Do not use lead pencil.**

Q.1   Fill the relevant bubble for each part. Each part carries one mark.

(1)   Which computer professional has the skills to edit and manipulate audio/video files?
A.   Programmer   ○   **B.   Multimedia designer**   ●
C.   Web designer   ○   D.   Software engineer   ○

(2)   Software that is used to detect and remove the viruses from the computer is called:
A.   pirated software   ○   **B.   antivirus**   ●
C.   spyware   ○   D.   virus   ○

(3)   An operating system is a/an:
A.   System software   ●
B.   Utility program   ○
C.   Application software   ○
D.   Language processor   ○

(4)   Which one of the following is an absolute cell reference in MS Excel?
A.   A1   ○   B.   A1$.   ○
C.   A1 ○   **D. A1**   ●

(5)   The communication over telephone line is an example of the following transmission mode:
A.   Simplex mode   ○   B.   Half duplex mode.   ○
C.   Full duplex mode.   ●   D.   Synchronous   ○

(6)   Which one of the following operating system is suitable for tasks where large amount of data has to be collected and processed on regular basis:
A.   Real time operating system   ○
B.   Time sharing operating system   ○
C.   Batch operating system   ●
D.   Single user operating system   ○

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(7)   The default MS Word document window name is:

      A.   **Document1** ●   B.   File1 ○

      C.   WPD1 ○   D.   Word1 ○

(8)   Which one of the following medium transmits data using light waves?

      A.   Twisted pair cable ○

      B.   Coaxial cable ○

      C.   **Fibre optic cable** ●

      D.   Telephone cable ○

(9)   Which one of the following provides high speed internet connection?

      A.   Dial up connection ○   **B.**   **DSL connection.** ●

      C.   CDMA connection. ○   D.   ISDN connection ○

(10)   Security threats are transferred from one system to another due to:

      A.   **Exchange of data and program** ●

      B.   Exchange of display screen ○

      C.   Dust in room ○

      D.   High temperature of room ○

(11)   Which one of the following is a communication device?

      A.   **NIC** ●   B.   GPS ○

      C.   ALU ○   D.   RAM ○

(12)   Which one of the following refers to the setting of margins, tab positions and line spacing in MS Word?

      A.   Tool. ○   B.   Layout ○

      C.   **Format** ●   D.   Set up ○

_____

Time allowed: 2.45 hours   Total Marks: 43

Note: Answer any nine parts from Section 'B' and attempt any two questions from Section 'C'
        on the separately provided answer book. Write your answers neatly and legibly.

SECTION – B (Marks 27)

Q.2   Attempt any NINE parts from the following. All parts carry equal marks.(9× 3 = 27)

i.   Write down any three applications of Mainframe computers?

Answer:

Three applications of Mainframe computers:

Three applications of Mainframe computers are:

1. **Education**

Higher education became possible due to the mainframe computers because teachers upload their topics and thousands of students can access them simultaneously.

2. **Bank**

In the banking sector, all the branches access the server from different remote locations. Many types of requests come together on the server; all these requests are resolved within seconds.

3. **Airline Reservation System**

Airlines use mainframes to power their ticket-reservations system because the reservation information will be needed by many people at the same time.

(Students can write any other three valid applications also).

ii.   How accuracy and delivery are the important characteristics of good communication system? Justify with one example of each.

Answer:

Delivery:

Data communication system must deliver the message to the correct destination. Message must be received by only the device or user to whom it is sent.

For example when email is sent to a person it is received only by the person to whom it is addressed, this is managed by the protocol used in the data communication system.

Accuracy:

System must deliver the message accurately without any change if incorrect data is transmitted by the system, it may not be usable by the receiver.

For example, when data is transmitted over a long distance it may get corrupted due to

transmission errors. The data that is not correctly received at the destination is retransmitted from the source this is ensured by the protocol used in the data communication system.

iii. Compare authorized and unauthorized access with one example of each.

Answer:

When a person's identity is approved by entering information such as username and password or PIN (Personal Identification Number), he has an authorized access to a computer or computer network. If a person gains access to a computer system without identity approval, then he has unauthorized access which is a crime

For example, a person uses ATM card to withdraw cash from ATM machine after user inserts the card in the ATM machine, he is asked to enter the PIN if the PIN is correct the user's identity is approved and he has authorized access to machine to withdraw cash. When a hacker breaks into a computer system to steal, change or destroy information he has unauthorized access to the computer system.

iv. How is peer to peer network different from client server network? Give any three differences.

Answer:

	PEER TO PEER NETWORK	CLIENT SERVER NETWORK
1	In **peer-to-peer** network all computers have the same status, every computer is capable of playing the role of client server or both at the same time.	In **client server** network all computers do not have the same status each computer on the network acts as either a server or a client. Servers are not used as client computers and client computers are not used as servers.
2	Peer-to-peer networks are suitable for a small number of users ranging between two to ten computers.	Client server network can be as small as two computers and it can have hundred computers and even thousands of computers as well.
3	It provides centralized security to ensure that resources are not accessed by an authorized user.	It does not provide centralized security no single person is a signed administrator resources of network individual users have complete control over resources of their computers.

v. Write down any six characteristics of 4th generation of computers?

Answer:

CHARACTERISTICS OF 4TH GENERATION OF COMPUTERS:

The following are the characteristics of fourth generation of computers.

1. Microprocessor was developed which resulted in the development of microcomputers.

2. Fourth generation computers are very fast, have large storage capacity and use advanced input/output devices.

3. Microcomputers are very small in size, very reliable, consume less power and are affordable.

4. Large variety of software is available for use in microcomputers.

5. Operating system having Graphical User Interface (GUI) was developed in this generation.

6. These computers support modern programming languages such as Visual Basic, C++, Java and Python for developing powerful software.

vi.   Compare GUI and CLI?

Answer:

	GUI	CLI
1.	GUI is easy to use as it is graphical interface, uses pointing devices for selecting and choosing items	CLI is difficult to use as it is text based/ command line interface, donot use any pointing device.
2.	In GUI, input can be entered anywhere on the screen.	In CLI, input is entered only at command prompt.
3.	The speed of GUI is slower than CLI and consumes more memory.	CLI is faster than GUI and consumes low memory.

(Students can write any three valid comparisons.)

vii.   What is real time processing system? Write down any two applications of Real time processing system.

Answer:

Real time operating systems must process information and produce a response within a specified time. These operating systems are developed for special applications. These are used to control industrial processes such as oil refining. Real time operating systems are used to supply immediate response within limited time.

Applications of Real Time Processing System:

1. Real-time operating system is used to monitor the position of rocket in the space.

2. Many cities are installing real-time traffic control systems to facilitate smooth flow of traffic at busy intersections.

(Students can write any other two valid applications also)

viii.   Identify the type of physical media used to develop a network of three computers at home. Justify your answer with two reasons.

Answer:

Twisted pair cable is used as a physical media to develop a network of three computers at home because of the following reasons.

- It is relatively easy to implement and terminate.
- It is the least expensive media of transmission for brief distances.

ix.   Write down the use of following features in MS Word.

a.   Header   b.   Equation Editor   c.   Section Break

Answer:

a.   Header:

A header is the top margin of each page. Header is useful for including material that you want to appear on every page of a document such as your name, the title of the document, or page numbers.

b.   Equation Editor:

The Equation Editor is used to build complex equations by picking symbols from a toolbar and typing variables and numbers.

c.   Section Break:

Section breaks are used to divide the document into sections. Once section breaks are inserted, you can format each section separately.

x.   What is computer ethics? Write down any four moral guidelines for ethical use of computer technology?

Answer:

Computer ethics means an acceptable behavior for using computer technology. It is a code of behavior for moral and social issues while using computer technology particularly internet.

The following are some important moral guidelines for ethical use of Computer technology:

1. Computer should not be used to harm other people.
2. Computer users should not break into others computer system to steal, change and destroy information.
3. Computer users should not read documents and emails of other users without their consent.
4. People should not make illegal copies of copyright software and sell it for financial benefit.

xi.   Write down any three differences between LAN and WAN.

Answer:

	LAN	WAN
1.	LAN is a computer network that covers a small geographic area, like a home, office, or group of buildings	WAN is a computer network that covers a broader area, it connects computers between cities and countries.
2.	The speed of data transmission in LAN is high as it connects less number of computers.	The speed of data transmission in WAN is slower than LAN as number of computers in WAN are more.
3.	Debugging the network errors is easier in LAN.	Debugging the network errors is not easy in LAN.

(Students can write any three valid differences.)

xii.   Write down any three differences between RAM and ROM.
Answer:

	RAM	ROM
1.	RAM stands for Random Access Memory, it is considered as Read/Write memory.	ROM stands for Read Only memory, it can read data only.
2.	It is volatile memory which means information stored in it, is lost when the computer is turned off.	It is non-volatile memory which means information stored in it, is not lost when the computer is turned off.
3.	Instruction or data are written at the time of execution of a program.	Instruction or data are written at the time of manufacturing and called firmware.
4.	There are two types of RAM i.e., SRAM and DRAM.	There are three types of ROM i.e., PROM, EPROM and EEPROM.

(Students can write any three valid differences.)

xiii.   Why plotter is preferable over printer? Justify with two reasons.

Answer:

Plotter is an output device used for printing engineering drawings, machine parts, building designs, maps, charts and panaflexes etc. on large size papers/sheets. Such large size printing is not possible on printers. Their printing quality is also good as compare to printer that's why plotter is preferable over printer.

(Students can write any other two valid reasons.)

SECTION – C(Marks 16)

**Note: Attempt any TWO questions.** (8 × 2 = 16)

Q.3 Write down characteristics of the following network topologies with the help of diagrams. **(4+4)**

    a.   **Star**   **b.**   **Ring**

Answer:

a.   Star

Star topology is a network topology in which each network component is physically connected to a central node such as a router, hub or switch. A star topology takes more cable than e.g. a bus, but the benefit is that if a cable fails, only one node will be brought down. A switch can connect 4, 8, 16, 24 or 32 nodes.
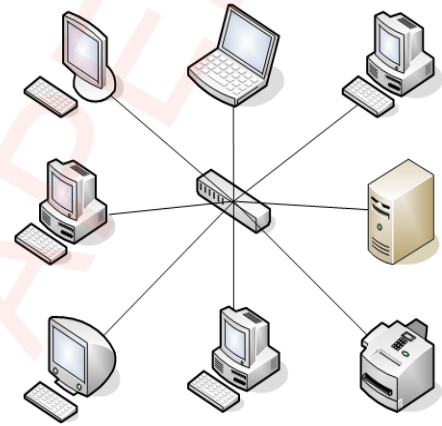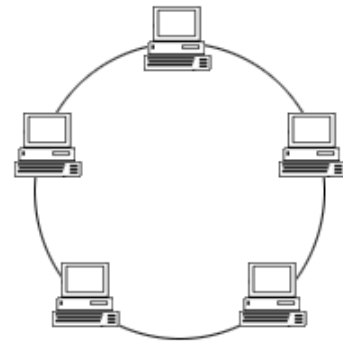
Advantages of star topology:

1. Provides fast communication between computers.
2. Easy to connect new devices to the network.
3. Easy to detect and fix faults.
4. Failure of one computer does not stop functioning of the entire network.

Limitations of star topology:

1. Lengthy cable is required to connect all the computers to the switch.
2. Costly to implement.

b. Ring

The ring topology network topology is shaped just like a ring. It is like a bus with both ends connected together. All the messages travel in the same direction. Message from one node is sent to the next node. It is received by it if it is addressed to it otherwise it is ignored and passed on to the next until the destination is reached.

Advantages of ring topology:

1. High network performance
2. Server and switch is not required to manage the network.
3. All the computers have equal opportunity to transmit data.

Limitations of ring topology

1. If ring is broken at any point the entire network stops functioning.
2. Detection of fault is difficult.
3. If any computer in the ring is not working the whole network is affected.

4. Expensive than star and bus topology.

Q.4 Explain any four functions of Operating System. (2+2+2+2)
Answer:

The following are the main functions of operating system.

- Process Management
- Memory Management
- Input/Output Management
- File Management
- Resource Management
- User Management

1. Process Management:

Process management is an essential part of operating system (OS). A process is a program in execution. In computer system multiple processes are executing concurrently or waiting for their turn to be executed. A process in execution needs resources like processing resource, memory and I/O resources. The OS must allocate resources to processes, enable processes to share and exchange information, and protect the resources of each process from other processes.

2. Memory Management:

Memory management is the process of allocating memory space for user programs in main memory. When programs are run by users, the operating system allocates portions of free memory to programs. When a program is closed, operating system will free the memory portion used by that program for reuse. The operating system automatically loads user programs in available memory space and executes them.

3. Input/Output Management:

Input/output management is the process of controlling the operation of all the input/output devices attached to computer. User communicates with computer through various input/output devices such as keyboard, mouse, monitor printer, etc. Management of these devices is the responsibility of operating system. Operating system uses Input/Output controller to manage and coordinate the operation of all the input/output devices.

4. File Management:

File management system is part of operating system that organizes stores and keeps track of computer files and folders. Computer files can be documents, programs, images, videos, etc. Operating system controls the common operations performed on files. These operations include creating, opening, editing, renaming, moving, copying, deleting and searching files.

Q.5 **Use appropriate formulae for the following to determine the characteristics of a communication channel:** **(8)**
- **Data rate**
- **Baud rate**
- **Bandwidth**
- **Signal to Noise Ratio**

Answer:

Data Rate:

The formula for calculating data rate is:

r=b/t

where,

r= data rate

t=time

b=bits

Example: The following example calculates the data rate for a file of 108 MB that takes 16.6 seconds to transfer from one location to other.

Step 1:

Convert Megabytes into bits

108 MB =108 x 10^6x 8   (where 10^6bytes= 1MB)

$\qquad$ = 864x10^6bits

$\qquad$ =8.64x10^8 bits

Step 2:

Calculate data rate

$$r = \frac{b}{t}$$

=8.64x10^8 / 16.6

=51.7x 10^6bits/sec

BaudRate:

The formula for calculating baud rate is:

$$S = \frac{N}{r}$$

Where

S= Baud rate

N=bit rate

r=number of data elements carried by each signal

Example:

The following example calculates the baud rate of an electrical signal that has four states to represent 00, 01, 10 and 11 with bit rate of 56kbps.

$$S = \frac{56}{2} \quad = \quad 28\ kbps$$

Bandwidth:

The formula for bandwidth is:

Bandwidth = Highest frequency (fh) – Lowest frequency (fl)

Example:

The following example calculates the bandwidth of a composite signal that is the decomposed into five sine waves with frequencies of 100, 500, 500, 700, and 900Hz.

Let **fh** be highest frequency, fl be the lowest frequency and **B** be the bandwidth.

B= fh- fl

$= 900 - 100$

$= 800$ Hz

Signal to Noise Ratio:

SNR is defined as follows:

$$SNR = \frac{average\ signal\ power}{average\ noise\ power} \qquad\qquad SNR = \frac{P(signal)}{P(noise)}$$

SNR is commonly expressed in a logarithmic basis using decibels units as follows:

$SNR_{db} = 10 \log_{10} SNR$

Example:

The following example calculates the values of SNR and SNR_{db} where signal power is 10 milli W and noise power is $1\mu W$.

10 milli W $= 10000\ \mu W$

$$SNR = \frac{10000}{1} = 10000$$

$= 10 \log_{10} 10000 = 10(4)$

$SNR_{db} = 40$

NOTE:

This is suggested (proposed) solution to the questions given in Section B and C. Students can write any valid alternate answers.