Std XII

Comprehensive Text Book series

BIFOCAL SCIENCE

ELECTRONICS

Paper-II : Digital Electronics

Std. XII (SYJC) Science

(Course Code : C-2)

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BIFOCAL SCIENCE

Strictly As per HSC Board Syllabus of Higher Secondary Education

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Electronics (Paper-II) Digital Electronics

Std. XII : Science (S.Y.J.C.)

Preface

Dear Student,

We are extremely happy to present the book of "**Digital Electronics (Paper - II)**" for you. The topics within the chapters have been arranged in a proper sequence to ensure smooth flow of the subject.

Salient Features of the Book are as follows :

1. Selective Board Examination till March 2023 have been fully solved in this edition.

2. Theory is accompanied with neat & clean figures.

3. MCQ's with explanation are also included at the end of each chapter. The latest trend in education is the teaching through multiple choice questions. The MCQ's are intended to enable students to prioritise and plan their learning through regular practice. The book contains large number of multiple choice questions on the subject.

4. Each chapter is divided into various sections and sub-sections. Entire syllabus is divided into Chapters, sections and headings. Each paragraph has been given a unique section/subsection number which is used to explain that particular section for the students as a cross reference to enable them to refer to the related paragraph.

5. Through this book, the author has made an effort to provide rationale for the solutions. The book, therefore, meets the expectations of the students as it answers the demand and the quest in their mind. It would give rise to real learning which would stand in good stead for the student's career and his life.

6. The book is user-friendly and provides information in a well structured manner. It provides comprehensive and critical study of the various concepts of the subject matter. It is felt that the contents should be crystal clear.

A word or suggestion from your side may help us add another feather to the cap of the subject matter of the book. The author looks forward to the comments, suggestions and criticism from the readers. Constructive suggestions and feedback from users would be highly appreciated, acknowledged and suitably incorporated.

We are thankful to team of Target Publications and Tech Neo Publications for the encouragement and support that they have extended to us.

- Authors

Syllabus

STD. XII - S.Y.J.C. (Science)

Electronics-Paper II : Digital Electronics

1. **Number Systems**

   Decimal, Binary and Hexadecimal number system, BCD code, Binary to decimal and decimal to binary conversion, Hex to Binary and Binary to Hex conversion, Hex to Decimal and Decimal to Hex conversion, ASCII code Binary Arithmetic. **(Refer Chapter 1)**

2. **Logic Gates**

   Study of NOT, OR, AND gates, Symbols and truth tables, Boolean algebra, NAND, NOR as universal building blocks, De-Morgan's theorem, EX-OR gate, Half Adder, Full Adder. **(Refer Chapter 2)**

3. **Semiconductor Digital ICs**

   Introduction to logic families, Bipolar logic families and unipolar logic families, Characteristics of Digital ICs, TTL NAND gate, CMOS, NAND, NOT, NOR gates, Open collector TTL NAND gate, Tristate concept, Tristate TTL NAND gate. **(Refer Chapter 3)**

4. **Combinational Logic Circuits**

   Multiplexers and their use in combinational logic design, Combinational logic design using Multiplexers, De-multiplexer and its use in combinational logic design, Encoder-Priority encoders, Decoder-decoder and drivers for display devices. **(Refer Chapter 4)**

5. **Electronic Counters**

   S-R Flip-flop, Clock, Clocked S-R flip-flop, D flip-flop, T flip-flop, J-k flip flop, Edge triggered flip-flop, Master slave concept, Ripple or Asynchronous counters, Decade Counter, Synchronous counters, Register, Shift registers. **(Refer Chapter 5)**

6. **A/D and D/A Converters**

   Introduction, Digital to Analog converter, Weighted resistor ladder, R-2R ladder, Analog to digital converter, Counter type ADC, Successive approximation A/D converter. **(Refer Chapter 6)**

7. **Computer Fundamentals**

   Block diagram of computer, Concepts of bus, Study of Input Output devices like Keyboard, Mouse, Light pen, Digitizer, Printer and its types, Plotter, Study of memory devices like hard disk, Floppy drives, Semiconductor memory, Magnetic tape, Specification of Computer. **(Refer Chapter 7)**

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               │ 200 Marks Distribution │
               └───────────┬────────────┘
              ┌────────────┴─────────────┐
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│ Paper - I │  │ Paper - II │ │ Paper - II │ │ Paper - I  │
│(50 Marks) │  │ (50 Marks) │ │ (50 Marks) │ │ (50 Marks) │
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Chapter Name	Marks
Number Systems	15 Marks
Logic Gates	15 Marks
Semiconductor Families	10 Marks
Combinational Logic Circuits	20 Marks
Electronic Counters	20 Marks
A/D and D/A Converters	12 Marks
Computer Fundamentals	08 Marks

Question Paper Format

Each Question Paper will have Five Main Questions

Q. 1(A)	4 MCQs - 1 Mark each (Compulsory)			4 Marks
Q. 1(B)	(a) - 3 Marks *(Attempt any Two)*	(b) - 3 Marks	(c) - 3 Marks	6 Marks
Q. 2(A)	(a) - 3 Marks *(Attempt any Two)*	(b) - 3 Marks	(c) - 3 Marks	6 Marks
Q. 2(B)	(a) - 4 Marks *(Attempt any One)*	(b) - 4 Marks		4 Marks
Q. 3(A)	(a) - 3 Marks *(Attempt any Two)*	(b) - 3 Marks	(c) - 3 Marks	6 Marks
Q. 3(B)	(a) - 4 Marks *(Attempt any One)*	(b) - 4 Marks		4 Marks
Q. 4(A)	(a) - 3 Marks *(Attempt any Two)*	(b) - 3 Marks	(c) - 3 Marks	6 Marks
Q. 4(B)	(a) - 4 Marks *(Attempt any One)*	(b) - 4 Marks		4 Marks
Q. 5	(a) - 5 Marks *(Attempt any Two)*	(b) - 5 Marks	(c) - 5 Marks	10 Marks
		OR		
Q. 5	(a) - 5 Marks *(Attempt any Two)*	(b) - 5 Marks	(c) - 5 Marks	10 Marks
			Total :	**50 Marks**

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Chapter 7 : Computer Fundamentals   7-1 to 7-14

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CHAPTER 7

Computer Fundamentals

▶▶ 7.1 WHAT IS COMPUTER?

Q. What is computer?

i. Computer is the most powerful tool man has ever created. Computers have made a great impact on our everyday life.

ii. Their presence is felt at almost every working place, i.e., homes, schools, colleges, offices, industries, hospitals, banks, retail stores, railways, research and design organizations and so on.

iii. Computer, large and small, are used now a days by all kinds of people for a variety of tasks in a modern and industrialized society.

iv. We can define a computer as an electronic device that operates upon data.

v. Data comes in various shapes and sizes depending upon the type of computer application.

vi. A computer can store, process, and retrieve data as and when desired.

Block Diagram of Digital Computer

The basic organization of a computer system is shown in the Fig. 7.1.1.
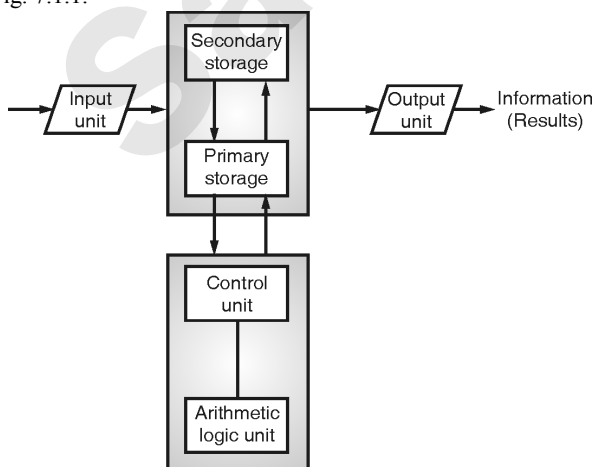
Fig. 7.1.1

Different Computer Elements:

i. **Input unit :** Data and instructions must enter a computer system before the computer can perform any computation on the supplied data. The input unit that links a computer with its external environment performs this task. Data and instructions enter a computer through an input unit in a form that depends upon the input device used.

ii. **Output unit :** An output unit performs the reverse operation of that of an input unit. It supplies information obtained from data processing to outside world. It links a computer with its external environment. As computer works with binary code, results produced are also in binary form, therefore, before supplying the results to outside world, the system most convert them to human eye acceptable or readable form.

iii. **Storage unit** : Data and instructions entered into a computer system through input units have to be stored inside the computer before actual processing starts.

Similarly, results produced by processing have to be kept somewhere inside the computer system before being send, on an output unit. Computer also preserves intermediate results for ongoing processing storage unit of all computers is comprised of two types of storage.

a. **Primary storage** : Also known as its main memory, is used to hold pieces of program instructions and data, intermediate results of processing and recently produced results of those job on which the computer is currently working.

b. **Secondary storage :** Also known as auxiliary storage, is used to take care of the limitations of primary storage that is, it supplements the limited storage capacity and volatile characteristic of primary storage.

iv. **Arithmetic logic unit :** (ALU) Arithmetic Logic Unit of a computer system is the place where actual execution of instructions takes place during processing operation. Calculations are performed and comparisons (decisions) are made in the ALU. Data and instructions stored in primary storage before processing are transferred as and when needed to the ALU.

v. **Control unit :** The Control Unit acts as a central nervous system for other components of a computer system. It manages and coordinates the entire computer system. It obtains instructions for the program stored in main memory, interprets the instructions, and issues signals causing other units of the system to execute them.

vi. Central processing unit (CPU) : Control unit and arithmetic logic unit (ALU) of a computer system are together known as the central processing unit (CPU). The CPU is the brain of a computer system. In a computer system, all major calculations and comparisons take place inside the CPU and the CPU is responsible for activating and controlling the operations of other units of the computer system.

Characteristics of Computer

Q.　What are the characteristics of computer?

i. Speed : A computer is a very fast device. It can carry out instructions at a very high speed obediently, uncritically and without exhibiting any emotions. It can perform in a few seconds the amount of work that a human being can do in an entire year – if he works day and night. Some calculation that would have taken hours and days to complete otherwise, can be competed in a few seconds using the computer. The speed of computer is calculated in MHz, that is one million instructions per second.

ii. Accuracy : Accuracy of a computer is consistently high and the degree of accuracy of a particular computer depends on the instructions and the type of processor. But for a particular computer, each and every calculation is performed.

For example, the computer accurately gives the result of division of any number up to 10 decimal points.

iii. Versatility : Versatility is one of the most wonderful things about computer. Multi-processing features of computer makes it quiet versatile in nature. One moment, it is preparing the results of particular examination, the next moment it is busy preparing electricity bills, and in between it may be helping an office secretary to trace an important letter in seconds. It can perform different types of tasks with same ease. All that is required to change its talent is to slip in a new program into it. Briefly, a computer is capable of performing almost any task provided that the task can be reduced to a series of logical steps.

iv. Reliability : Computer provides very high speed accompanied by an equality high level for reliability. Thus computers never make mistakes of their own accord.

v. Power of remembering : A computer can store and recall any amount of information because of its secondary storage capability. Every piece of information can be retain as long as desired by the user and it can be recalled information almost instantaneously. Even after several years, the information recalled will be as accurate as on the day when it was fed to the computer.

vi. No I.Q. : A computer is a magical device. It can only perform tasks that a human being can. The difference is that it performs these tasks with unthinkable speed and accuracy. It possesses no intelligence of its own. Its I.Q is zero at least till today. It can only perform what is programmed to do. Hence, only the user can determine what tasks a computer will perform. Computers have no sense of meaning, cannot perceive and are only able to make simple robotic decision about the data they receive.

vii. Common data used : One item can be involved in several different procedures or accessed, update and inspected by a number of different users. This can hinder the work of those who need access to data. As the time is changing, more and more facilities are being added to the computers they can perform but in practical life many tasks are limited to these basic operations.

viii. Diligence : The computer is a machine, does not suffer from the human traits of tiredness nor does it loses concentration even after working continuously for a long time. This characteristic is especially useful for those jobs where same tasks is done again and again. It can perform long and complex calculations with same speed and accuracy from the start till the end.

ix. Storage : The computers have a lot of a storage devices which can store a tremendous amount of data. Data storage is essential function of the computer. Second storage devices like floppy disk can store a large amount of data permanently.

▶▶ 7.2　BUS STRUCTURE

Board Exam Questions

Q. What is a bus? Explain different types of buses used in digital computer. **(Oct. 07, 15, 4 Marks)**

Q. Explain concept of
i.　Address bus　　ii.　Data bus
iii.　Control bus
(March 11, 3 Marks)

Q. State use of data bus, address bus and control bus in a computer. **(March 12, 3 Marks)**

Q. Explain Data bus, Address bus and Control bus in Computer. **(March 23, 3 Marks)**

System bus

i. A system bus consists, typically, of about 50 to hundreds of separate lines. Each line is assigned a particular meaning or function.

ii. Although there are many different bus designs, on any bus the lines based on the functionality provided by the bus can be classified into three groups : data, address, and control lines.

a. Data bus:

1. The data lines provide a path for moving data among system modules. These lines, collectively, are called the data bus.

2. The data bus may consist of 32, 64, 128, or even more separate lines, the number of lines being referred to as the *width* of the data bus. Because each line can carry only 1 bit at a time, the number of lines determines how many bits can be transferred at a time.

3. The width of the data bus is a key performance factor for the faster communication, the more the width of the bus is faster its communication gets determining the overall system performance.

4. For example, if the data bus is 32 bits wide and each instruction is 64 bits long, then the processor must access the memory module twice during each instruction cycle.

5. The address lines are used to designate the source or destination of the data on the data bus.

b. Address bus:

1. This bus is used to address the memory. In order for a CPU to read and write to a particular memory location it needs address bus to do so.

2. For example, if the processor wishes to read a word (8, 16, or 32 bits) of data from memory, it puts the address of the desired word on the address lines. Clearly, the width of the address bus determines the maximum possible memory capacity of the system.

3. Furthermore, the address lines are generally also used to address I/O ports. Typically, the higher-order bits are used to select a particular module on the bus, and the lower-order bits select a memory location or I/O port within the module.

4. For example, on an 8-bit address bus, address 01111111 and below might reference locations in a memory module (module 0) with 128 words of memory, and address 10000000 and above refer to devices attached to an I/O module (module 1).

c. Control Bus:

1. The control lines are used to control the access to and the use of the data and address lines. Because the data and address lines are shared by all components, there must be a means of controlling their use.

2. Control signals transmit both command and timing information among system modules.

3. Timing signals indicate the validity of data and address information. Command signals specify operations to be performed.

▶▶ 7.3 INPUT AND OUTPUT (IO) DEVICE

Board Exam Questions

Q. Classify the following devices as input and output devices and state their use. (COM, Plotter, Optical scanner, MICR)   **(March 16, Oct. 07, 4 Marks)**

Q. Name various input and output devices used in computer.
(March 08, 4 Marks, Oct. 15, 11, 3 Marks)

Q. List four input devices and explain key-board used with personal digital computer.
(March 11, 4 Marks)

Q. Enlist any four output devices used in computer and explain only one in brief.
(March 13, 17, 3 Marks)
(Oct. 15, 4 Marks)

Q. Enlist the input and output devices from the following:
(Keyboard, Mouse, MICR, Plotter, Scanner, Monitor)
(Oct. 17, 4 Marks)

Q. Explain in brief:
  i. Keyboard   iii. Dot-matrix printer
  iii. Mouse   iv. Plotter
(March 10, Oct. 10, 4 Marks)

Q. List four input devices and explain key-board used with personal digital computer.
(March 11, 4 Marks)

Q. List any four input and output devices of computer with their uses.   **(Oct. 15, 4 Marks)**

Q. Enlist any four output devices used in computer and explain only one in brief.
(March 13, 17, 3 Marks)

Q. List output devices in digital computer, explain any two.   **(March 23, 4 Marks)**

What is an Input and Output (IO) device?

i. An input/output (I/O) device is any hardware used by a human operator or other systems to communicate with a computer.

ii. As the name suggests, input/output devices are capable of sending data (output) to a computer and receiving data from a computer (input).

iii. Input devices allow users to interact with a computer by providing data or commands. Some common input devices include keyboards, mice, microphones, webcams, and scanners.

iv. Output devices allow users to see, hear, or otherwise perceive the results of the computer's processing. Some common output devices include monitors, printers, speakers, and headphones.

v. I/O devices are essential for the operation of any computer system. They allow users to interact with the computer and provide the computer with the data it needs to function.
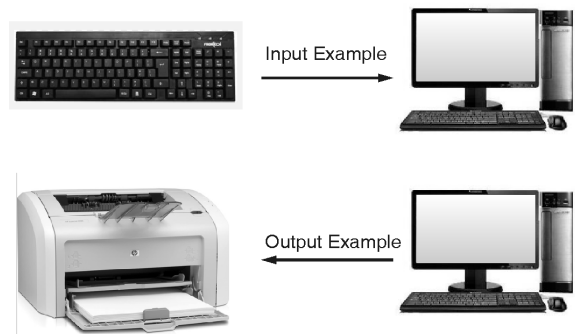
Fig. 7.3.1

Input Devices:

i. This part of the computer encapsulates devices with the help of which the user feeds data to the computer. It creates an interface between the user and the computer.

ii. The input devices transform the information into a form acceptable to the computer.

iii. An input device in a computer is any piece of hardware that sends data to the computer, allowing you to interact with and control it.

iv. The data may be in the form of text, commands, images, audio, or video.

Output Devices:

i.   This part of the computer encapsulates devices with the help of which the user receives the information from the computer.

ii. Output devices transform the output from the computer into a form understandable by the users.

iii. An output device is any piece of hardware that receives data from the computer. Usually, this data is used to display information to the user in some form.

7.3.1 Input Devices of Computer

A piece of hardware/equipment that enables the user to enter data into a computer is called an input device. Some of the commonly used input units used in a computer system are as follows:

i.   Keyboard   ii.   Mouse
iii. Joystick   iv.   Light pen
v.   Track Ball   vi.   Scanner
vii. Digitizer (Graphic Tablet) viii. Microphone
ix.   Magnetic Ink Card Reader (MICR)
x.   Optical Character Reader (OCR)
xi.   Barcode Reader
xii. Optical Mark Reader (OMR)
xiii. Webcam
xiv. Biometric Devices

Input devices

Fig. 7.3.2

i.   Keyboard:

a.   The most basic input device to enter data on the system or any other device with the help of the keys is a keyboard. They establish a connection with the computer either by WiFi or by a USB system. There are keys for everything – numbers, letters, characters, and functions.

b.   The typing keys are A – Z and number keys till 09. The numeric keypad has 17 keys allowing users to perform different calculations. Then there are function keys for special computer features at the top row.

c.   The control keys have arrow signs on them allowing users to scroll on the page and select. Then there are special-purpose keys like space, enter, shift, etc.

d.   There are several types of keyboards according to geographic location but the most popular one is QWERTY. The go-to keyboard of the modern-day, even the Latin-based countries use this type of keyboard very frequently. The top six letters of the keyboard are qwerty, giving us the name of the keyboard. Many people even think that this is the only keyboard that exists.

ii.   Mouse:

a.   It is the most commonly used **pointing device**. It is a very famous cursor-control device and the earlier versions of it were built over a small palm-size box with a round ball at its base, which tracks the movement of the mouse and feeds digital signals to the CPU when the mouse buttons are pressed. Currently, the mouse has a sensor at the bottom to detect cursor position.

b.   Basic versions, if it has two buttons called the left and the right-click button and a wheel is present between the buttons to provide a scroll function. The movement of the mouse on a flat surface is used to control the position of the cursor on the display, but it cannot be used to feed text into the system directly.

c.   **Advantages:**

1.   Easy to use
2.   Not very expensive
3.   The cursor movement is faster than the arrow keys of the keyboard.

iii. Joystick:

a.   Just like a mouse, a Joystick is also a pointing device, which is used to travel the cursor position on a display. It is a perpendicular stick having a spherical ball at both lower and upper ends. The spherical ball connected at the circuit having sensors moves in a socket. The joystick controller can be traversed in all directions.

b.   The functionality of the joystick is just like a mouse. Its applications are generally in Computer-Aided Designing (CAD) and playing computer games.

iv.   Light Pen:

a.   Just like a pen, a light pen is a digital pointing device. This device is used to select an item displayed in the menu or to draw anything on the display. It contains a photocell and an optical sensor placed in a small tube at the tip.

b.   When the light pen tip is travelled on the display, its photocell sensing element calculates the screen location and sends the digital signal to the CPU.

v.   Track Ball:

a.   The trackball is another type of input device similar to the mouse. It is most helpful with a notebook or laptop computer, instead of a mouse. It consists of a ball on the top which is half inserted and connected to the sensors. By moving fingers on the ball, the cursor can be moved.

b.   Because the whole device is not moved to move the cursor, a trackball requires less space as compared to the mouse. This device comes in different shapes like a ball, a square, or a button.

vi.   Scanner:

a.   A scanner is another input device, which works very much like a photocopy machine. It can be used when some information on paper is to be transferred to the hard disk of the computer in digital format for further manipulation.

b. The scanner captures high-resolution images from the source which are then converted into a digital format that can be saved on the disk and shared digitally. These digital images can be edited before they are printed.

vii. Digitizer (Graphic Tablet):

a. A digitizer is also an input device that is used to convert analog information into digital form. Using a digitizer, the signal from the television or camera can be transformed into a series of numbers that could be saved in a computer hard drive. They can be helpful with the computer to create a picture of whatever the camera has been pointed at.

b. Digitizer is also called Tablet or Graphics Tablet because it transforms graphics and pictorial data into binary inputs to the system. A special kind of graphic tablet as a digitizer is used for fine works of drawing and image-related applications.

viii. Microphone:

a. A microphone or mic is a very common input device used to input sound that is then stored in a digital form. Nowadays microphones are used in almost every industry and devices related to sound recording or transmission.

b. The microphone is used for different applications like adding sound to a multimedia presentation or for mixing music, voice calling and recording, video conferencing, and more.

ix. Magnetic Ink Card Reader (MICR):

a. The MICR input device is commonly seen in banks as there are a huge amount of cheques to be processed every day. The important details like the bank's code number and cheque number are printed on the cheques with specially designed ink based on the particles of magnetic material that is readable by the sensors of the machine.

b. This method of reading is recognized as Magnetic Ink Character Recognition (MICR). The main benefits of using MICR are that it is comparatively fast and less prone to errors.

x. Optical Character Reader (OCR):

a. It is an input device that is used to read a printed text similar to the scanner, but the method of reading and the type of output generated is different. The format to be fed to the OCR is predefined and can't be used as an ordinary scanner.

b. OCR, unlike a scanner, scans the text optically, character by character, converts them into a machine-readable digital code instead of creating high-resolution images, and stores the text on the system memory.

xi. Bar Code Readers:

a. Bar Code Reader is an input device used to read special format barcoded data (data in the form of light and dark lines). Barcoded data is commonly used to create price tags, in labeling goods, numbering the books, etc. It can be a handheld scanner or can be embedded in a stationary scanner on the tabletop.

b. A flash of light from the device strikes the surface of the object and reflects the sensors present behind the source of light to collect the input. Bar Code Reader can only scan a bar code image, converts it into an alphanumeric value, which is then transferred to the computer that the bar code reader is connected to.

xii. Optical Mark Readers (OMR):

a. OMR is a special type of input machine. This sort of optical scanner is used to identify the type of mark made by pen or pencil.

b. It is used where one out of a predefined alternative is to be selected and marked.

c. The format to be fed to the OMR is predefined and can't be used as an ordinary scanner.

d. It is specially used for automation of the answer sheet analysis of examinations having multiple-choice questions.

xiii. Webcam:

a. A Webcam is a camera that is combined with a computer. Unlike a digital camera, they cannot function independently and should be connected to the computer/laptop for operation.

b. It functions as an input device that can take pictures and is mostly used for video streaming and video conferencing or chatting.

xiv. Biometric Devices:

a. Biometrics relates to a method in which a person is identified through his/her biological features such as fingerprints, facial structure, eye cornea, etc.

b. It is done by using biometric devices, which can be of different types based on their scanning features and abilities, such as Face Scanner, Hand Scanner, Fingerprint Scanner, Retina or Iris Scanner, Voice Scanner, etc.

7.3.2 Output Devices of Computer

i. A piece of hardware/equipment that presents the result of the entered input, once it is processed, is called an output device.

ii. Several output devices display output in various ways such as images, text, hard copies, and audio/video.

iii. Some of the Commonly used input units used in a computer system are as follows:

a. Monitor/Display Screen   b. Printer
c. Speakers   d. Headphones
e. Projector   f. Braille Reade
g. Plotter

Output devices

Monitor   Printer   Speaker   Headphone

Projector   Brail Reader   Plotter

Fig. 7.3.3

Monitors/Display Screen:

i. Monitors or Visual Display Unit (VDU), are the primary output devices of a computer system.

ii. It generates images from tiny dots, termed pixels that are arranged in a well-defined rectangular form.

iii. The depth and sharpness of the image depend upon the number and size of the pixels.

Printers:

i. A printer is a very commonly practiced output device, which is used to print information on paper.

ii. There are two types of printers :
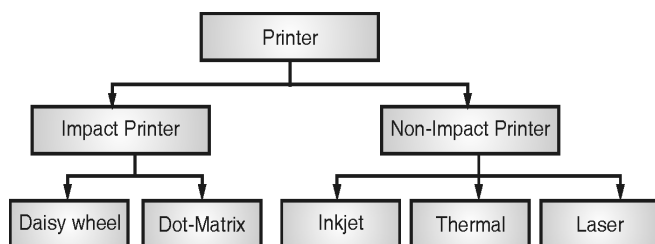
Fig. 7.3.4

a. Impact Printer

1. Impact printers function by creating a direct contact between the ink-ribbon and the paper. These printers are noisy, yet popular. Impact printers have mechanical moving parts to conduct printing.

2. Impact printers print characters and images by striking a print hammer or wheel against an inked ribbon that leaves an image on paper. Hence, the printing in impact printers is done by hammering a metal printing head or character dye on the ribbon.

3. Drawbacks of impact printers are:

i. They are slow speed printers and consume a lot of time to print a document.

ii. Impact printers have very high noise levels because they have several moving parts and also the printing head strikes on ribbon and paper.

iii. The quality of print produced by an impact printer is very poor than that of a non-impact printer.

iv. Impact printers use old printing technologies and they are less expensive. Examples include Dot-matrix printers, Daisy-wheel printers, and line printers.

b. Non-Impact Printer

1. Non-Impact Printers don't use any direct contact between ink ribbon and paper. They use laser, xerographic, electrostatic, and chemical or inkjet technology. These printers are less noisy and don't have mechanical moving parts to conduct printing.

2. Non-impact printers print images and characters without any direct physical contact between the printing mechanism and the paper. In non-impact printers, the printing is done by depositing the ink on a paper in any form.

3. Non-impact printers can operate at high speed and can print many pages per minute, and low noise level. The noise level of non-impact printers is very low or negligible because they do not use striking mechanism in which printing head strikes on ribbon and paper, instead they use a process of laying ink or toner onto a paper which is virtually silent.

4. Non-impact printers use laser, spray of special ink or heat and pressure to print graphics and characters onto the paper. The quality of print produced by a non-impact printer is higher than that of the impact printer. These types of printers use toner (dry ink) or liquid ink cartridge for printing on paper.

5. Non-impact printers use latest printing technologies and they are expensive as compared to impact printers. Examples include Inkjet printers and Laser printers.

Difference between Impact Printers and Non-Impact Printers:

Key	Impact Printers	Non-Impact Printers
Concept	Characters, graphics are printed on a paper by striking.	Characters, graphics are printed on a paper without striking.
Process	Printing is done by hammering a metal pin or character dye.	Printing is done by depositing ink on paper in any form.
Mechanical	Electro-mechanical devices are used for printing.	No electro-mechanical device is used for printing.
Speed	Slow	Fast
Noise	Noisy	Silent
Examples	Dot-matrix printers, Daisy-wheel printers, and line printers.	Inkjet printers and Laser printers.
Printing ink	Impact printers use an inked ribbon.	Non-impact printers use tonner or cartridge for printing.
Technology	Impact printers use old or traditional printing technologies.	Non-impact printers use modern printing technologies.
Cost	Impact printers are less expensive.	Non-impact printers are expensive.
Print quality	Impact printers produce low quality prints.	Non-impact printers produce high-quality prints.

Computer Output Microfilm (COM):

i. Computer Output Microfilm is the product of copying information from electronic media and stored data directly to the microfilms or microfiche.

ii. The first patent for microphotography in **1839** by **John Benjamin Dancer.** It is also says like this **COM** were used to take print image output from the computer either online or via tape or disk and create a film image of each page.

Fig. 7.3.5

Projector:

i. A projector is an optical output device that can take images produced by a computer and project or present them onto a screen or surface called a projector.

ii. In the older version of projectors, images were created by shining the light through a small transparent lens on the projector; however, the new version of projectors uses laser technology for the same.

iii. Projectors are most commonly used in offices, classrooms, auditoriums, theatres to watch presentations, videos, or pictures generated from a computer or laptop.

Speakers:

i. Computer speakers are the most popular output devices used with a computer to listen to sound.

ii. These speakers receive audio as input either in analog or digital form and generate sound as an output. With the advancement of technology, speakers are now available with wireless and BlueTooth facilities as well.

Headphones:

i. The headphones or earphones or headsets are hardware output tools that are either plugged into the computer or can be wireless.

ii. They offer the same function as a speaker, the only difference is the frequency of sound. With speakers, the sound can be detected over a larger distance while utilizing headphones, the sound is only audible to the individual using them. Headphones are available in multiple shapes and sizes.

Plotters:

i. A plotter is a computer output device that is primarily used to produce high-quality drawings, designs, and graphics.

ii. It is different from other printers as it uses one or more pens or markers to draw continuous lines on paper or other suitable materials, rather than using dots or pixels to create images.

iii. **Applications:**

a. Architectural plan of the building.

b. CAD applications like the design of mechanical components of aircraft.

c. Many engineering applications.

iv. **Advantages:**

a. It can produce high-quality output on large sheets.

b. It is used to provide the high precision drawing.

c. It can produce graphics of various sizes.

d. The speed of producing output is high.

Braille reader:

A Braille reader is a computer output device designed for individuals with visual impairments, specifically those who read Braille. It enables them to access digital information by converting text into Braille characters that can be read by touch.

7.3.3 Difference between Input and Output Devices

Criteria	Input Devices	Output Devices
Function	Input devices are used to provide data and control signals to an information processing system like a computer.	Output devices are used to extract or retrieve data from the computer, usually after some processing.
Data Flow	Data flows from the device to the computer.	Data flows from the computer to the device.
Types	Keyboard, Mouse, Scanner, Microphone, Webcam, etc.	Monitor, Printer, Speakers, Headphones, Projector, etc.
Use Example	A keyboard is used to input text into a computer.	A printer is used to output text or images from a computer onto paper.
Interaction	They allow users to input data into the computer for processing.	They allow the computer to present the result of this processing to the user.
Processing Requirement	They usually do not need to process data themselves; they simply capture user input and send it to the computer.	They usually process data to some extent before presenting it; for example, a printer processes text and graphics data to produce physical prints.
User Involvement	Input devices require active user involvement; without user input, they do not generally send data to the computer.	Some output devices can operate without continuous user involvement; for example, a printer can complete a print job while the user does other tasks.

▶▶ 7.4 MEMORY IN COMPUTERS

Need of Memories

i. Memory is the most essential component of the normal functioning of any system. The computer system classifies the memory for different purposes and uses. Here we discuss the classification of memory in detail.

ii. We need computer memory to store various types of data like text, images, video, audio, documents etc. We can recollect it when the data is required.

iii. For example, when we write and execute any computer program, it is stored in primary memory. If the processor does not need it for a longer time, the program is saved into secondary memory.

iv. Then the data is called from secondary memory to main memory and perform the execution of codes

Semiconductor Memory

i. Semiconductors are materials which have a conductivity between conductors (generally metals) and insulators (such as most ceramics)

ii. Semiconductor can be pure elements, such as silicon or germanium or compounds such as gallium arsenide or cadmium Selenide.

iii. **Semiconductor memory** is a digital electronic semiconductor device used for digital data storage, such as computer memory. It refers to MOS memory, where data is stored within Metal Oxide Semiconductor (MOS) memory cells on a Silicon integrated circuit memory chip.

iv. Semiconductor memory is used in any electronics assembly that uses computer processing technology. Semiconductor memory is the essential electronics component. Semiconductor memory is a semiconductor device, tasked with storing data.

v. There are two electronic data storage medium that we can utilize, magnetic or optical.

a. Magnetic Storage:

1. Stores data in magnetic form,
2. Affected by magnetic fields,
3. Has high storage capacity,
4. Does not use a laser to read/write data,
5. Magnetic storage devices are hard disk, floppy disk, magnetic tape etc

b. Optical storage:

1. Stores data optically, uses laser to read/write,
2. Not affected by magnetic fields,
3. Has less storage than a hard disk,
4. Data accessing is high compared to a floppy disc.
5. Optical storage devices are CD-ROM, CD-R, CD-RW

(STD-12th)

vi There is also **volatile memory**. This is memory that loses its data once power is cut off, while **non-volatile** memory retains data even without power.

Advantages of Semiconductor Memories

The advantages of semiconductor memories are as follows :

i. High
ii. Low production cost
iii. Low power consumption
iv. Better system reliability
v. Memory size can be easily expanded.
vi. It provides high speed
vii. Its access time is less
viii. Small size.

Semiconductor Memory

Volatile memory   Non volatile memory

SRAM (Static RAM)   Fe RAM (Ferro electric RAM)
DRAM (Dynamic RAM)   Mask ROM
                              EPROM [UV-EPROM) Erasable
                                 Programmable ROM]
                              EEPROM [Electrically Erasable
                                 Programmable ROM]
                                      FLASH
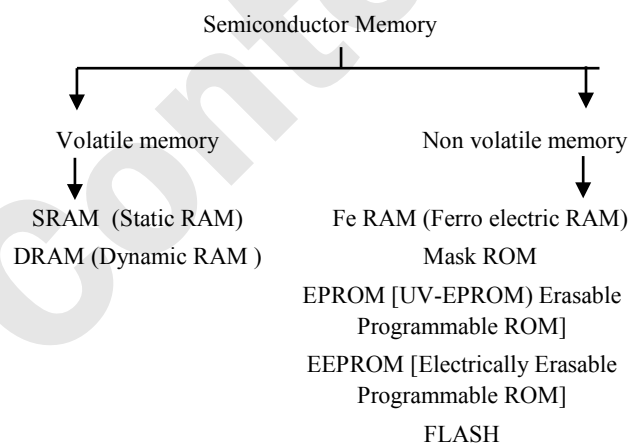
Fig. 7.4.1 : Types of Semiconductor Memory

▶▶ 7.5 CLASSIFICATION OF MEMORY

The classification of memory is represented by the Fig. 7.5.1.
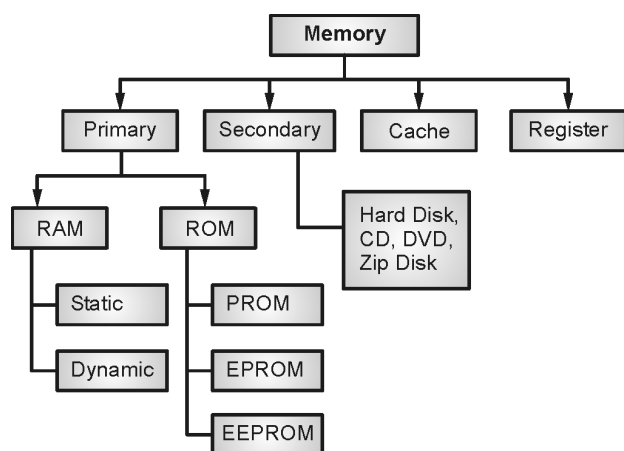
Fig. 7.5.1 : Classification of Memory

Primary or Main Memory (RAM & ROM)

i. Primary memory is the computer system's main memory that communicates directly to Auxillary memory and cache memory. Main memory is used to keep program or data when the processor is active to make its use. When a program or data is activated to execute, the processor first loads programs from secondary memory into main memory and then the processor starts executing it.

ii. Accessing or executing of data from primary memory is faster because it has a cache or register and that provides faster response.

The primary memory is volatile. It means that the data in memory can be lost if it is not saved when a power failure occurs.

iii. It is costlier than secondary memory, and the main memory capacity is limited as compared to secondary memory.

iv. The primary memory is further divided into two parts :

a. RAM (Random Access Memory)

b. ROM (Read Only Memory)

RAM (Random Access Memory)

i. Random access memory (RAM) is one of the faster types of main memory. It is directly accessed by the Central Processing Unit (CPU).

ii. It is the hardware in a computer device to temporarily store data, programs or program-results.

iii. It is used to read/write data in memory till the machine is working.

iv. It is volatile. That means that if a power failure occurs or the computer is turned off, the information stored in RAM will be lost.

v. All data stored in computer memory can be read or accessed randomly at any time.

vi. There are two types of RAM:

a. SRAM **(Static Random-Access Memory):**

1. (SRAM) (Static Random Access Memory) is a type of RAM used to store static data in the memory. This means that stored data in SRAM remains active as long as the computer system has a power supply.

2. But if power-failure occurs, then data in SRAM is lost.

b. DRAM

Read Only Memory:

i. ROM is a memory device or storage medium. It is used to **permanently** store information inside a chip.

ii. It is a read-only memory that can only read stored information, data or programs, but we cannot write or modify anything.

iii. A ROM contains some important instructions or program data that are required to start or boot a computer.

iv. It is a non-volatile memory. It implies that the stored information cannot be lost even when the power is turned off or the system is shut down.

v. Types of Read Only Memory:

a. **MROM (Masked Read Only Memory) :**

1. MROM is the oldest types of read-only memory. Its program or data is designed by the integrated circuit manufacture at the time of manufacturing.

Therefore, a program or instruction stored within the MROM chip cannot be changed by the user.

2. Thus the information entered remains permanent. It is cheap with compared to the other types of ROMs when the cost per unit quantity is considered.

3. But the user has to place an order for a huge number at a time. Mask-programmed ROMs are compared to books that are printed in huge volumes.

b. **PROM (Programmable Read only Memory) :**

1. It is a type of digital read-only memory, in which user can write any type of information or program only once.

2. It means it is the empty PROM chip in which the user can write the desired content or program only once using the special PROM device. After that, the data or instruction cannot be changed or erased.

c. **EPROM (Erasable and Programmable Read only Memory) :**

1. It is the type of read only memory. Here, stored data can be erased and re-programmed only once in the EPROM memory. It is a non-volatile memory chip that holds data when there is no power-supply and can also store data.

2. In EPROM, if we want to erase any stored data and to re-program it, we have to pass ultraviolet light for 40 minutes to ease the data after that the data is re-created in EPROM.

d. **EEPROM (Electrically Erasable and Programmable Read only Memory):**

1. The EEROM is an electrically erasable and programmable read only memory. It is used to erase stored data using a high voltage electrical charge and re-program it.

2. It is also a non-volatile memory whose data cannot be erased or lost; even the power is turned off. In EEPROM, the stored data can be erased and reprogrammed it.

3. Information is written to this type of ROM by the user with the help of EPROM programmer equipment. The contents of the EEPROM can be erased selectively. It is costlier than the other types of ROMS and is gaining in popularity. The user can purchase even a single piece of EEPROM and read and write its content for several number of times.

e.   Flash ROM :

Flash memory is a non-volatile storage memory chip that can be programmed in small units called block or sector. Flash memory is an EEPROM form of computer memory, and the contents cannot be lost when the power source is turned off. It is also used to transfer data between the computer and digital devices.

f.   MROM (Mask ROM) :

Mask ROM is a kind of read-only memory, that is mask is to be removed at the time of production. Like other types of ROM, mask ROM cannot enable the user to change the data stored in it. If it can, the process would be difficult or slow.

▶▶ 7.6   VOLATILE MEMORY & NON VOLATILE MEMORY

Parameters	Volatile Memory	Non-Volatile Memory
Memory Type	Temporary. It stores the data only until the power is supplied.	Permanent. The data is stored even after the system is turned off.
Data Storage	Stores data that are currently in process by the CPU	Stores the system's information, BIOS, and all the other kind of data
Speed	Fastest type of memory.	Slower as compared to volatile memories.
CPU Access	CPU can access data stored in volatile memory.	CPU can access data if it is copied from non-volatile memory to volatile memory.
Location	Volatile memory chips are usually kept in memory slots.	Non-volatile memory chip is embedded in the motherboard.
Costs	Volatile memory is inefficient in terms of cost; thus higher costs are involved.	Less costly.

▶▶ 7.7   TYPES OF SECONDARY MEMORY

Board Exam Question

Q.   What do you mean by secondary storage device? Enlist few such devices and explain any one.

(Oct. 12, 3 Marks)

i.   Secondary memory is a **permanent storage** space to hold a large amount of data. Secondary memory is also called as external memory. It represents the various storage media (hard drives, USB, CDs, flash drives and DVDs) on which the computer data can be saved on a long term basis.

ii.   But is slower than the main memory. Unlike primary memory, secondary memory cannot be accessed directly by the CPU. Instead of that, secondary memory cannot be accessed directly by the CPU. Instead of that secondary memory data is first loaded into the RAM (Random Access Memory) and then sent to the processor to read and update the data.

iii.   Secondary memory devices also include magnetic disks like hard disks and floppy disks, an optical disk such as CDs and (DROMs, and magnetic tapes).

Features of Secondary Memory

i.   Its speed is slower than the primary/ main memory.

ii.   Stored data cannot be lost due to its non-volatile nature.

iii.   It can store large collections of different types, such as audio, video, pictures, text, software etc.

iv.   All the stored data in a secondary memory cannot be lost because it is a permanent storage area, even when the power is turned off.

v.   It has various optical and magnetic memories to store-data.

Types of Secondary Memory

i.   Hard disk :

Board Exam Question

Q.   Write a note on Hard Disk.

(Oct. 08, March 09, 2 Marks)

a.   A hard disk is a computer's permanent storage device. It is a non-volatile disk that permanently stores data, programs, and files, and does not loose stored data when the computer's power sources is switched off.

b.   It is a large storage device, found on every computer or laptop for permanently storing installed software, music, text documentation, videos, operating system, and data until the user does not delete it.

ii.   Floppy disk :

Board Exam Question

**Q.**   Write notes on: Floppy Disk

(Oct. 08, March 09, 2 Marks)

a.   A floppy disk is a secondary storage system that consists of thin, flexible magnetic coating disks for holding electronic data such as computer files.

b.   It is a portable storage device and can store data upto 1.44 MB.

Fig. 7.7.1

iii. CD (Compact Disc) :

a. It is a storage device used to store various data types like audio, videos, files, Back-up file, and any other information useful to a computer.

b. **Types of CDs:**

1. **CD-ROM (Compact-Disc Read Only Memory)**

Board Exam Question

Q. Write notes on: CD ROM   **(Oct. 08, 2 Marks)**

---

i. It is mainly used for bulk-size mass like audio CDs, software and computer games at the time of manufacture.

ii. Users can only read data, text, music, videos from the disc, but they cannot modify it.

2. **CD-R (Compact Disc Recordable) :** This is the type of compact disc used to write once by the user, after that, it cannot be modified or erased.

3. **CD-RW (Compact Disc Rewritable) :** It is a rewritable CD-disc, often used to write or delete the stored data.

4. **DVD Drive/Disc :** DVD is an optical disc storage device, stands for Digital Video Display or Digital Versatile Disc. It has the same size as a CD but can store a large amount of data than a compact disc. It can store multiple data formats like audio, videos, images, software, operating system, etc.

5. **Blue Ray Disc (BD) :** Blue Ray is an Optical disc storage device used to store a large amount of data. It uses laser technology to read the stored data of the Blu-ray disk. DVDs provide upto 8 GB of storage capacity, while Blu-ray Discs provide 28 GB of space to store data.

6. **Pen drive :** A pen drive is a portable device used to store data permanently and is also known as a USB flash drive. It is commonly used to store and transfer the data connected to a computer using a USB port. The storing capacity of pen drive is from 64 MB to 128 GB or more.

7. **Magnetic storage system :** These are plastic tapes with a magnetic coating that are used for data storage. They are similar to normal recording tapes which can be used for storing audio and video. Data can be accessed sequentially.

Advantages:

i. Low cost and high storage

ii. Easily transportable

iii. Easy to handle and store

Disadvantages:

i. Low data transmission due to a sequential transmission,

ii. Low life duration

iii. Require protected environment for storage.

Features:

i. Inexpensive storage device

ii. Can store a large amount of data

iii. Easy to carry or transport

iv. Not suitable for random access data

v. Slow access device

vi. Needs just prevention, as dust can harm the tape

vii. Suitable for back-up storage

8. **Magnetic disks :** It is a flat disk covered with magnetic coating for holding information. It is used to store digital information in the form of small and magnetised needles. It is large in storage size and cheaper than RAM. It allows random access to data and provides the facility of erasing and recording data as many times as required.

Advantages:

i. High storage capacity and low cost.

ii. Easy and direct access to data.

iii. Less prone to corruption of data compared to magnetic tapes.

Disadvantages:

i. Prone to physical damage since it has a physical moving part.

ii. Slower than SSDS

Features:

i. Cheap storage device

ii. Can store a large amount of data

iii. Easy to carry or transport

iv. Suitable for frequently read/write data

v. Fast access device

vi. More reliable storage device.

vii. To be prevented from dust, as the read/write head flies over the disc. Any dust particle in between can corrupt the disc.

9. **Optical storage system :** This storage system uses the laser light as the optical medium to retrieve as well as record data.

Example : CD – ROM, DVD, CR – R, CD – RW, DVD – R, DVD – RW

These are non-volatile and reliable compared to magnetic tapes.

Advantages:

i. Large storage capacity,

ii. Longer life-span than magnetic tapes

iii. Low 'cost-per-bit' for storage

iv. Portable

Disadvantages:

Prone to scratches which could disturb or totally prevent the driver to perform R/W operations.

10. **Magneto-optical system :** It includes the features of both optical and magnetic discs. Its main objective is to store the data on personal computers for a longer period of time. It perform R/W operation by making use of laser and optical technology. It has ferromagnetic particles enclosed in a plastic coating. The laser beam used for R/W operation gets reflected due to magnetic surface of the disc. It is slower in speed but its manufacturing cost is high.

11. Solid state drive (SSD) : It is the device that contains all the properties of a hard drive to store the data and uses the solid-state memory which has no moving part. It uses semiconductors to store data. Its main principle is to process data electronically. Since it has no mechanical moving part, the data access time is faster than that in HDD.

Advantages:

i. Better performance

ii. High access speed, random access of data, faster R/W operation.

iii. Low power consumption

iv. highly reliable,

v. Small dimension/compact size

Disadvantages:

i. High cost,

ii. Lower capacity

iii. Low storage density

iv. Vulnerable – data loss, affected by power loss, electrostatic discharges and magnetic fields.

Comparison of Primary Memory & Secondary Memory

Comparison Parameters	Primary Memory	Secondary Memory
Storage validity	Primary memory is the main memory and stores data temporarily.	Secondary memory is the external memory and stores data permanently.
Access	The CPU can directly access the data.	The CPU cannot directly access the data.
Volatility	Primary memory is volatile. It loses data in case of a power outage.	Secondary memory is non-volatile; data is stored even during a power failure.
Storage	Data is stored inside costly semiconductor chips.	Data is stored on external hardware devices like hard drives, floppy disks, etc.
Division	It can be divided into RAM and ROM	They do not have such a classification. Secondary memories are permanent storage devices like CDs, DVDs, etc.
Speed	Faster	Slower
Stored data	It saves the data that the computer is currently using.	It can save various types of data in various formats and huge sizes.

(STD-12th)

MULTIPLE CHOICE QUESTIONS

1. What is the full form of CPU?
   (a) Control Processing Unit
   (b) Computer Principle Unit
   (c) Central Processing Unit
   (d) Computer Processing Unit   ✓**Ans. : (c)**
   Explanation : CPU stands for Central Processing Unit. CPU is the part of a computer system that is mainly referred as the brain of the computer.

2. Which of the following language does the computer understand?
   (a) Computer understands only Assembly Language
   (b) Computer understands only BASIC
   (c) Computer understands only Binary Language
   (d) Computer understands only C Language
                                        ✓**Ans. : (c)**
   Explanation : The Computer understands only binary language which is written in the form of 0s & 1s. A computer can understand assembly language but an assembler is required which convert the assembly language to binary language. Similarly, for understanding high level languages, compilers/interpreters are required.

3. _____ devices provide a means of communication between a computer and outer world.
   (a) I/O   (b) Drivers
   (c) Storage   (d) Compact
                                        ✓**Ans. : (a)**
   Explanation : The I/O i.e. the input/output devices provide a means of communication between the computer and the outer world. They are often referred to as the peripheral devices sometimes.

4. What does GUI stand for?
   (a) Ground User Interface
   (b) Graphical User Instruction
   (c) General User Instruction
   (d) Graphical User Interface   ✓**Ans. : (d)**
   Explanation : GUI stands for a graphical user interface. Graphical user interface basically provides a set of graphical elements on the screen to the users. Commonly used for point-and-draw devices.

5. Which of the following is not a point-and-draw device?
   (a) Keypad   (b) Touch screen
   (c) Mouse   (d) Trackball
                                        ✓**Ans. : (a)**
   Explanation : All except the keypad are point-and-draw devices. They are used to rapidly point to and select a graphic icon or menu item from multiple options displayed on the GUI of a screen.

6. A device used for video games, flight simulators, training simulators and for controlling industrial robots.
   (a) Keyboard   (b) Light pen
   (c) Joystick   (d) Mouse
                                        ✓**Ans. : (c)**
   Explanation : Joystick is the device used for the same. It is a point-and-draw device. It has a click button, a stick, a ball, a socket as well as a light indicator.

7. Which are the input devices that enable direct data entry into a computer system from source documents?
   (a) Data Scanning devices
   (b) System Access devices
   (c) Data retrieving devices
   (d) Data acquiring devices　　　✔**Ans. : (a)**

   Explanation : They are referred to as data scanning devices. They eliminate the need to key in text data into the computer. It demands the high quality of input documents.

8. Which of the following is a type of image scanner?
   (a) Compact　　　　(b) Flat-held
   (c) Flat-bed　　　　(d) Hand-led
   　　　　　　　　　　✔**Ans. : (c)**

   Explanation : Image scanners are the input devices that translate the paper documents into an electronic format for storage in a computer. Stored image can be altered or manipulated with image-processing software.

9. Which of the following is capable of recognizing a pre-specified type of mark by pencil or pen?
   (a) OMR　　　　　(b) Image Scanner
   (c) Bar code reader　(d) Winchester
   　　　　　　　　　　✔**Ans. : (a)**

   Explanation : OMR stands for optical mark reader. These are very useful for grading tests with objective type questions or for any input data that is of choice or selection nature.

10. What does USB stand for?
    (a) Universal Serial Board
    (b) Universal Signal Board
    (c) Universal Serial Bus
    (d) Universal Signal Bus　　✔**Ans. : (c)**

11. A device similar to a flash drive _____
    (a) Memory card
    (b) Compact disk
    (c) Compact drive
    (d) Memory disk
    　　　　　　　　　　✔**Ans. : (a)**

    Explanation : Memory card serves a similar purpose as that of a flash drive. It is in the shape of a card. Useful in electronic devices like Camera, music player, etc.

12. A set of hard disk drives with a controller mounted in a single box, forming a single large storage unit is _____
    (a) Disk array
    (b) Compact drives
    (c) Multi-cores
    (d) Drives
    　　　　　　　　　　✔**Ans. : (a)**

    Explanation : The answer is disk array. It is commonly known as RAID. As a secondary storage device, provides enhanced performance, enhanced storage capacity and reliability.

13. The process in which a file is partitioned into smaller parts and different parts are stored in different disks is _____.
    (a) mirroring　　　(b) RAID
    (c) stripping　　　(d) RAID classification
    　　　　　　　　　　✔**Ans. : (c)**

    Explanation : Enhanced reliability is achieved by using techniques like mirroring and stripping in case of disk arrays. Stripping is the division of a large file into smaller parts and then storing them on different disks.

14. A plug and play storage device that simply plugs in the port of a computer is _____.
    (a) flash drive　　(b) CD
    (c) compact disk　　(d) hard disk
    　　　　　　　　　　✔**Ans. : (a)**

    Explanation : A flash drive often called as a pen drive enables easy transport of data from one computer to another. It comes in various shapes and sizes and may have different added features.

15. The main virtue for using single Bus structure is _____.
    (a) Slow data transfer
    (b) cost effective connectivity and speed
    (c) cost effective connectivity and ease of attaching peripheral devices
    (d) fast data transfers
    　　　　　　　　　　✔**Ans. : (c)**

    Explanation : By using a single BUS structure we can minimize the amount of hardware (wire) required and thereby reducing the cost.

16. In multiple Bus organisation, the registers are collectively placed and referred as _____.
    (a) Register Block　(b) Register file
    (c) Map registers　　(d) Set registers
    　　　　　　　　　　✔**Ans. : (b)**

17. The main advantage of multiple bus organisation over a single bus is _____.
    (a) Reduction in the number of cycles for execution
    (b) Better Connectivity
    (c) None of the mentioned
    (d) Increase in size of the registers　✔**Ans. : (a)**

18. The ISA standard Buses are used to connect _____.
    (a) GPU and processor
    (b) CD/DVD drives and Processor
    (c) Hard disk and Processor
    (d) RAM and processor　　✔**Ans. : (c)**

BOARD MULTIPLE CHOICE QUESTIONS

1. _____is a sequential access secondary storage device.
   (a) Hard disk　　　(b) Magnetic tape
   (c) Floppy disk　　(d) CD-ROM
   (May 01, May 07, 1 Mark)
   　　　　　　　　　　✔ **Ans. : (b)**

2. Address bus is _____
   (a) bi-directional   (b) unidirectional
   (c) omnidirectional   (d) none of these
   (Oct. 02, 1 Mark)
   ✓ **Ans. : (b)**

   Explanation: Unidirectional, as it can either write to or read the address from the memory.

3. The _____ is ultra-violet light erasable and electrically reprogrammable.
   (a) ROM   (b) EPROM
   (c) RAM   (d) EEPROM
   (Oct. 03, 1 Mark)
   ✓ **Ans. : (b)**

   Explanation: An EPROM (rarely EROM), or erasable programmable read-only memory, is a type of programmable read-only memory (PROM) chip that retains its data when its power supply is switched off.

4. In computers, the data bus uses _____ lines.
   (a) 16   (b) 8   (c) 4   (d) 2
   (May 05, 1 Mark)
   ✓ **Ans. : (b)**

5. When power is switched off, information stored in _____ is lost.
   (a) ROM   (b) Hard disk
   (c) RAM   (d) None of the above
   (Oct. 06, 1 Mark)
   ✓ **Ans. : (c)**

6. VDU is _____ device.
   (a) Memory   (b) Input
   (c) Output   (d) CPU
   (Oct. 10, 1 Mark)
   ✓ **Ans. : (c)**

   Explanation: Visual display unit displays images generated by a computer or other electronic device hence it is an output device.

7. EEPROM can be altered with the help of _____.
   (a) Magnetic signal   (b) Electrical signal
   (c) Ultraviolet light   (d) None of the above
   (Oct. 11, 1 Mark)
   ✓ **Ans. : (b)**

   Explanation: Electrically erasable programmable read-only memory and is a type of non-volatile memory used in computers, usually integrated in microcontrollers such as smart cards and remote keyless systems, or as a separate chip device to store relatively small amounts of data by allowing individual bytes to be erased and reprogrammed.

8. _____ light is used for erasing a memory.
   (a) Infrared   (b) Ultraviolet
   (c) Visible   (d) None of these
   (Oct. 12, 1 Mark)
   ✓ **Ans. : (b)**

9. In Computer the address bus is _____.
   (a) Bidirectional   (b) Parallel
   (c) Unidirectional   (d) serial
   (May 13, 1 Mark)
   ✓ **Ans. : (c)**

10. Cache memory is also called as _____ memory.
    (a) scratch pad   (b) secondary
    (c) magnetic   (d) non-volatile
    (Oct. 13, 1 Mark)
    ✓ **Ans. : (a)**

    Explanation: Scratch pad RAM or local store in computer terminology is an internal memory, usually high-speed, used for temporary storage of calculations, data, and other work in progress.

11. _____ decides the speed of digital computer.
    (a) Hard disk   (b) CD-ROM
    (c) Clock frequency   (d) Floppy disk
    (Oct. 14, 1 Mark)
    ✓ **Ans. : (c)**

    Explanation: Clock speed typically refers to the frequency at which the clock generator of a processor can generate pulses, which are used to synchronize the operations of its components, and is used as an indicator of the processor's speed.

12. Digitizer is _____ Device.
    (a) Output   (b) Memory
    (c) Serial Entry Input   (d) Direct Entry Input
    (May 15, 1 Mark)
    ✓ **Ans. : (d)**

    Explanation: Digitization is the process of converting information into a digital (i.e. computer-readable) format.

13. In _____ Ultraviolet light is used for erasing
    (a) RAM   (b) PROM
    (c) EPROM   (d) EEPROM
    (Oct. 17, May 10, 1 Mark)
    ✓ **Ans. : (c)**

    Explanation : In EPROM Ultraviolet light is used for erasing

14. Data bus in digital computer is always _____.
    (a) unidirectional   (b) bidirectional
    (c) in opposite direction   (d) None of these
    (May 03, Mar. 23, 1 Mark)
    ✓ **Ans. : (b)**

TRUE OR FALSE

1. The I/O devices are sometimes called the peripheral devices because they surround the CPU and memory of the computer system.
   (a) True   (b) False   ✓**Ans. : (a)**
   Explanation : The statement is true. The input devices are used to enter data from the outside world into primary storage. The output devices supply results of processing from primary storage to users.

…Chapter Ends

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