

STD: XI

Time: 3.00 Hrs.

**JUNE MONTHLY TEST
COMPUTER SCIENCE
PART-I**

Lessons: 1 - 3

Marks: 70

Note: i) Answer all the questions.

ii) Choose the most suitable answer and write the code with corresponding answer. 15 X 1 = 15

1. Pick the odd one out.

- a) IBM 1401 b) IBM 1620 c) IBM 340 d) IBM 360

2. The laser printers available resolution range around ___ dpi

- a) 1120 b) 1220 c) 1200 d) 1240

3. What is the 1's complement of 11010110?

- a) 00101001 b) 00101101 c) 11001101 d) 00101100

4. Which one of the following is the main memory?

- a) ROM b) RAM c) Flash Drive d) Hard disk

5. The left most bit in MSB is called _____

- a) Sign bit b) un sign bit c) Binary d) both sign and un sign

6. 2^{50} is referred as

- a) Kilo b) Tetra c) Peta d) Zetta

7. Which amongst this is not an octal number

- a) 645 b) 234 c) 876 d) 123

8. The ___ memory is a non-volatile memory

- a) primary b) cache c) secondary d) None of these

9. output device is used for printing building plan.

- a) thermal printer b) plotter c) dot matrix d) inkjet printer

10. $B+B=?$

- a) B b) O c) 1 d) AA

11. Which gate is called as the logical inverter?

- a) CNOR b) OR c) NOT d) AND

12. What is the value of $C=(1.1)=1=?$

- a) 01 b) 0 c) 1 d) 10

13. The Microprocessor were first introduced in early ___

- a) 1970s b) 1980s c) 1950s d) 1940s

14. Which is the fastest memory?

- a) Hard disk b) Main memory c) Cache memory d) Blue-Ray disc

15. What is the smallest size of data represented in a CD?

- a) blocks b) Sectors c) tracks d) pits

PART-II

Note: Answer any six Questions. Q. No. 24 is compulsory.

6 X 2 = 12

16. What is the function of memory?

17. Define program counter.

18. Write about father mouse and its types of mouse.

19. Write short note on octal number with an example.

20. Convert the following Decimal numbers to its equivalent binary, Octal, Hexadecimal.
i) 255 ii) 127
21. $(1111010110)_2 = (?)_{16}$
22. Write the 1st complement procedure?
23. Write the Truth table of NAND gate.
24. Draw the logic circuit of Bubbled OR Gate.

PART- III

Note: Answer any six Questions. Q. No. 33 is compulsory.

6 X 3 = 18

25. Write short note on nonimpact printer.
26. Write the significant features of monitor. And its types of monitor.
27. Write short note about :
i) Light pen ii) Digital camera iii) Track Ball.
28. Classify the microprocessor based on the size of data
29. Write about the flash memory Devices with an example.
30. Convert $(150)_{10}$ into Binary, then convert that Binary number to Octal
31. Reason out why the NAND and NOR are called universal gates?
32. How will you differentiate a flash memory and EEPROM?
33. Draw the Logic Circuit of XOR Gate with Truth Table .

PART- IV

IV. Answer the following questions:

5 X 5 = 25

34. a) Short answer on the following
i) Data ii) Hardware iii) Natural Language processing
iv) Types of Memory v) Bit
(OR)
- b) i) $(65)_{10} = ()_2$ ii) $(5AF)_{16} = ()_2$ iii) $(12.29)_{10} = ()_2$ iv) $(455)_{10} = ()_2$
35. a) To write Theorems of i) Commutative ii) Associative iii) Demorgans iv) Null Element .
(OR)
- b) Explain the fundamental gate and truth table.
36. a) Explain detail about booting of computer and its types.
(OR)
- b) List out the various input devices with its each one short note on them.
37. a) Explain detail about conversion of fractional Decimal to binary with its an example.
(OR)
- b) Arrange the memory devices in ascending order based on the access time.
38. a) Explain the following i) Inkjet printer ii) Multimedia projector iii) QR code Reader.
(OR)
- b) List out the various secondary storage device with its each one short note.

MOUNT CARMEL MISSION MATRIC. HR. SEC. SCHOOL – KALLAKURICHI
JUNE MONTHLY TEST – 2023 – 2024

STD: XI

COMPUTER SCIENCE

LESSON: 1 – 3

TIME: 3 : 00 Hrs

MARKS: 70

PART – I

I. CHOOSE THE CORRECT ANSWER:

15 X 1 = 15

- | | |
|-----------------|---------------------|
| 1. c) IBM 340 | 10. a) B |
| 2. c) 1200 | 11. c) NOT |
| 3. a) 00101001 | 12. c) 1 |
| 4. b) RAM | 13. b) 1980s |
| 5. a) Sign bit | 14. c) Cache memory |
| 6. c) Peta | 15. d) pits |
| 7. c) 876 | |
| 8. c) secondary | |
| 9. b) plotter | |

PART – II

II. ANSWER THE FOLLOWING QUESTIONS [Any 6] Q. No: 24 IS COMPULSORY: 6 X 2 = 12

16. What is the function of memory?

Ans: The memory stores everything that a computer works with.

The memory unit is of two types namely

- i) Primary memory
- ii) Secondary memory

17. Define Program Counter.

Ans: The Program Counter (PC) is a special register in the CPU which always keeps the address of the next instruction to be executed.

18. Write about the father of Mouse and its types of mouse.

Ans: Mouse was invented and developed by Douglas Engelbart, with the assistance of Bill English, during the 1960's.

- Types of mouse are Mechanical mouse, Optical mouse, Laser mouse, Air mouse, 3D mouse, Tactile mouse, Ergonomic mouse and Gaming mouse.

19. Write short note on octal number with an example.

Ans: Octal number system uses digits 0, 1, 2, 3, 4, 5, 6 and 7 (8 digits). Each octal digit has its own positional value or weight as a power of 8.

Example:

The octal sequence $(547)_8$ has the decimal equivalent:

$$\begin{aligned} (547)_8 &= 5 \times 8^2 + 4 \times 8^1 + 7 \times 8^0 \\ &= 5 \times 64 + 4 \times 8 + 7 \times 1 \\ &= 320 + 32 + 7 \\ &= (359)_{10} \end{aligned}$$

20. Convert the following Decimal numbers to its equivalent Binary, Octal, Hexadecimal.

i) 255

ii) 127

Ans: i) 255

2	255	
2	127	- 1
2	63	- 1
2	31	- 1
2	15	- 1
2	7	- 1
2	3	- 1
	1	- 1

• Binary value for $(255)_{10} = (11111111)_2$

Octal value for $(255)_{10} = (11111111)_2$

$$= \begin{array}{c} \underline{011} \quad \underline{111} \quad \underline{111} \\ \cup \quad \cup \quad \cup \\ 3 \quad 7 \quad 7 \end{array}$$

▪ Octal value for $(255)_{10} = (377)_8$

Hexadecimal value for $(255)_{10} = (11111111)_2$

$$= \begin{array}{c} \underline{1111} \quad \underline{1111} \\ \cup \quad \cup \\ F \quad F \end{array}$$

▪ Hexadecimal value for $(255)_{10} = (FF)_{16}$

ii) 127

2	127	
2	63	- 1
2	31	- 1
2	15	- 1
2	7	- 1
2	3	- 1
	1	- 1

• Binary value for $(127)_{10} = (11111111)_2$

Octal value for $(127)_{10} = (11111111)_2$

$$= \begin{array}{c} \underline{001} \quad \underline{111} \quad \underline{111} \\ \cup \quad \cup \quad \cup \\ 1 \quad 7 \quad 7 \end{array}$$

▪ Octal value for $(127)_{10} = (177)_8$

Hexadecimal value for $(127)_{10} = 01111111$

$$= \begin{array}{c} \underline{0111} \quad \underline{1111} \\ \cup \quad \cup \\ 7 \quad F \end{array}$$

▪ Hexadecimal value for $(127)_{10} = (7F)_{16}$

21. $(1111010110)_2 = (?)_{16}$

Ans: i) Group the given number into 4 bits from right to left.

$$\underline{0011} \quad \underline{1101} \quad \underline{0110}$$

Note: 0's added to left most group to make it a group of 4 bits.

$$\begin{array}{c} \underline{0011} \quad \underline{1101} \quad \underline{0110} \\ \cup \quad \cup \quad \cup \\ 3 \quad D \quad 6 \end{array}$$

• $(1111010110)_2 = (3D6)_{16}$

22. Write the 1's Complement procedure.

Ans: The steps to be followed to find 1's complement of a number:

- i. Convert the given Decimal number into Binary.
- ii. Check if the binary number contains 8 bits, if less add 0 at the left most bit, to make it as 8 bits.
- iii. Invert all bits (i.e. Change 1 as 0 and 0 as 1)

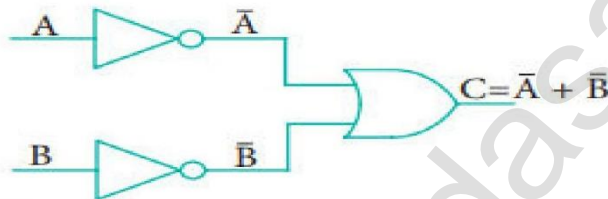
23. Write the Truth Table of NAND gate.

Ans:

A	B	$C = \overline{A B}$
0	0	1
0	1	1
1	0	1
1	1	0

24. Draw the logic circuit of Bubbled OR Gate.

Ans:



Logic Circuit of Bubbled OR Gate

The output of this circuit can be written as $C = \overline{A} + \overline{B}$

PART – III**III. ANSWER THE FOLLOWING QUESTIONS [Any 6] Q. No: 33 IS COMPULSORY: 6 X 3 = 18****25. Write short note on non-impact printer.**

Ans: These printers do not use striking mechanism for printing. They use electronic or laser technology. Quality and speed of these printers are better than Impact printer. For example, Laser printers and Inkjet printers are non-impact printers.

i) Laser printer:

Laser printers mostly work with similar technology used by photocopiers. It makes a laser beam scan back and forth across drum inside the printer, building up a pattern. It can produce very good quality of graphic images. The available resolution range around 1200 dpi. Approximately it can print 100 pages per minute (PPM).

**ii) Inkjet printer:**

Inkjet printers use color cartridges which combined Magenta, Yellow and Cyan inks to create color tones. A black cartridge is also used for monochrome output. Inkjet printers work by spraying ionized ink at a sheet of paper. The speed of Inkjet printers generally range from 1-20 Pages Per Minute (PPM).

They use the technology of firing ink by heating it so that it explodes towards the paper in bubbles or by using piezoelectricity in which tiny electric currents controlled by electronic circuits are used inside the printer. It can spread millions of dots of ink at the paper every single second.

**26. Write the significant features of monitor and its types of monitor.**

Ans: i) Monitor is the most commonly used output device to display the information.

ii) Pictures on a monitor are formed with picture elements called PIXELS.

iii) Monitors may either be Monochrome which display text or images in Black and white or can be color, which display results in multiple colors.

iv) There are many types of monitors available such as CRT (Cathode Ray Tube), LCD (Liquid Crystal Display) and LED (Light Emitting Diodes).

v) The Monitor works with VGA (Video Graphics Array) card. The video graphics card helps the keyboard to communicate with screen. It acts as an interface between the computer and display monitor.

27. Write short note about: i) Light pen ii) Digital camera iii) Track ball**Ans: i) Light pen:**

A Light pen is a pointing device shaped like a pen and is connected to a monitor. The tip of the light pen contains a light-sensitive element which detects the light from the screen enabling the computer to identify the location of the pen on the screen. It has the advantage of 'drawing' directly onto the screen, but this becomes hard to use, and is also not accurate.

ii) Digital camera:

It captures images / videos directly in the digital form. It uses a CCD (Charge Coupled Device) electronic chip. When light falls on the chip through the lens, it converts light rays into digital format.

iii) Track ball:

Track ball is similar to the upside-down of the mouse. The user moves the ball directly, while the device itself remains stationary. The user pins the ball in various directions to navigate the screen movement.

28. Classify the microprocessor based on the size of data.

Ans: The number of bits that can be processed by a processor in a single instruction is called its word size. Word size determines the amount of RAM that can be accessed by a microprocessor. The microprocessors can be classified as follows:

- i. 8-bit microprocessor
- ii. 16-bit microprocessor
- iii. 32-bit microprocessor
- iv. 64-bit microprocessor

29. Write about the flash memory devices with an example.

Ans: Flash memory is an electronic non-volatile computer storage medium that can be electrically erased and reprogrammed. Examples for Flash memories are pen drives, memory cards etc. Flash memories can be used in personal computers, personal digital assistants (PDA), digital audio players, digital cameras and mobile phones. Flash memory offers fast access time. The capacity of the flash memories vary from 1 Gigabyte (GB) to 2 Terabytes (TB).

30. Convert $(150)_{10}$ into Binary, then convert that Binary number to Octal.**Ans:** $(150)_{10}$

2	150	
2	75	- 0
2	37	- 1
2	18	- 1
2	9	- 0
2	4	- 1
2	2	- 0
1	1	- 0

- Binary value for $(150)_{10} = (10010110)_2$

Octal value for $(150)_{10} = (10010110)_2$

$$= \underbrace{010}_2 \underbrace{010}_2 \underbrace{110}_6$$

- Octal value for $(150)_{10} = (226)_8$

31. Reason out why the NAND and NOR are called universal gates?

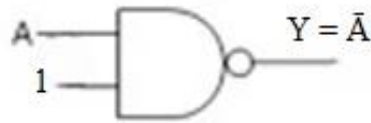
Ans: i) NAND and NOR gates are called Universal gates, because the fundamental logic gates AND, OR and NOT can be realized through them.

ii) We can realize AND, OR and NOT using only NAND gates.

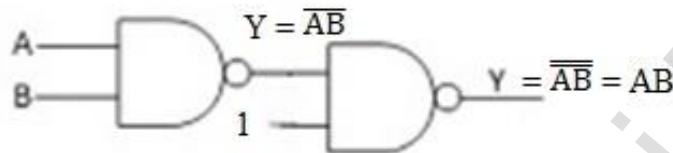
iii) Also we can realize AND, OR and NOT using only NOR gates.

Example:

- Realisation of NOT gate using NAND



- Realisation of AND using only NANDS



32. How will you differentiate a flash memory and EEPROM?

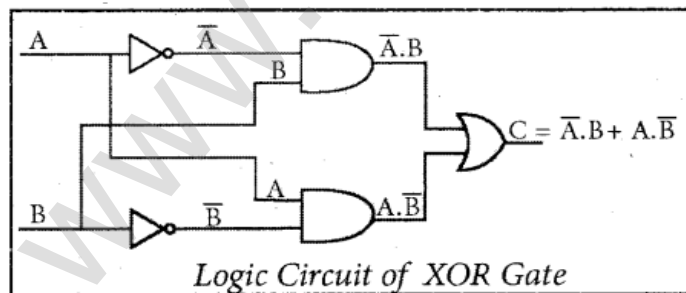
Ans:

Flash Memory	EEPROM
Flash memory is Read / Write memory.	EEPROM is read only memory.
Flash memory is faster.	Comparatively slower.
Flash memory is used in PDAs, Digital Cameras to store data.	Used to store critical programs.
Flash memory capacity vary from 4 GB to 2 TB.	EEPROM is lesser capacity in general.

33. Draw the Logic Circuit of XOR Gate with Truth Table.

Ans:

The Logic circuit of XOR Gate is



The Truth Table for XOR Gate is

A	B	$C = A \oplus B$
0	0	0
0	1	1
1	0	1
1	1	0

PART – IV

IV. ANSWER THE FOLLOWING QUESTIONS:

5 X 5 = 25

34. a) Short answer on the following

i) Data

ii) Hardware

iii) Natural language Processing

iv) Types of memory v) Bit

Ans: i) Data:

Data is defined as an unprocessed collection of raw facts, suitable for communication, interpretation or processing.

For example: 134, 16 'kavitha', 'C' are data. This will not give any meaningful message.

ii) Hardware:

Hardware is the physical component of a computer like motherboard, memory devices, monitor, keyboard etc.,

iii) Natural Language processing:

Natural language processing(NLP) is a component of Artificial Intelligence(AI). It provides the ability to develop the computer program to understand human language.

iv) Types of memory:

The memory unit of two types which are primary memory and secondary memory.

The primary memory is used to temporarily store the programs and data when the instructions are ready to execute.

The secondary memory is used to store the data permanently.

v) Bit:

A bit is the shortest form of Binary digit which can be '0' or '1'. It is the basic unit of data in computers.

(OR)

b) i) $(65)_{10} = ()_2$ ii) $(5AF)_{16} = ()_2$ iii) $(12.29)_{10} = ()_2$ iv) $(455)_{10} = ()_2$

Ans:

i) $(65)_{10} = (?)_2$

$$\begin{array}{r|l} 2 & 65 \\ \hline 2 & 32 \quad -1 \\ \hline 2 & 16 \quad -0 \\ \hline 2 & 8 \quad -0 \\ \hline 2 & 4 \quad -0 \\ \hline 2 & 2 \quad -0 \\ \hline 2 & 1 \quad -0 \end{array} \quad \bullet \quad (65)_{10} = (1000001)_2$$

ii) $(5AF)_{16} = (?)_2$

$$\begin{array}{ccc} 5 & A & F \\ \downarrow & \downarrow & \downarrow \\ 0101 & 1010 & 1111 \end{array} \quad \blacksquare \quad (5AF)_{16} = (010110101111)_2$$

Decimal	Binary	Octal	Hexadecimal
0	0000	000	0000
1	0001	001	0001
2	0010	002	0002
3	0011	003	0003
4	0100	004	0004
5	0101	005	0005
6	0110	006	0006
7	0111	007	0007
8	1000	010	0008
9	1001	011	0009
10	1010	012	A
11	1011	013	B
12	1100	014	C
13	1101	015	D
14	1110	016	E
15	1111	017	F

iii) $(12.29)_{10} = (?)_2$

$$\begin{array}{r|l} 2 & 12 \\ \hline 2 & 6 \quad -0 \\ \hline 2 & 3 \quad -0 \\ \hline & 1 \quad -1 \end{array}$$

• $(12)_{10} = (1100)_2$

$(0.29)_{10}$

$$\begin{array}{l} 0.29 \times 2 = 0 \quad .58 \\ 0.58 \times 2 = 1 \quad .16 \\ 0.16 \times 2 = 0 \quad .32 \\ 0.32 \times 2 = 0 \quad .64 \\ 0.64 \times 2 = 1 \quad .28 \\ 1.28 \times 2 = 0 \quad .56 \\ 0.56 \times 2 = 1 \quad .12 \\ 1.12 \times 2 = 0 \quad .24 \\ \cdot \\ \cdot \\ \cdot \\ \cdot \end{array}$$

$(0.29)_{10} = (0.01001010)_2$

Note: Fraction repeats, the product is the same as in the first step.

Write the integer parts from Top to Bottom to obtain the equivalent fractional Binary Number.

$(12)_{10} (0.29)_{10} = (1100)_2 (0.01001010)_2$

Here, we get to answer by combine as,

• $(12.29)_{10} = (1100.01001010\dots)_2$

iv) $(455)_{10} = (?)_2$

$$\begin{array}{r|l} 2 & 455 \\ \hline 2 & 227 \quad -1 \\ \hline 2 & 113 \quad -1 \\ \hline 2 & 56 \quad -1 \\ \hline 2 & 28 \quad -0 \\ \hline 2 & 14 \quad -0 \\ \hline 2 & 7 \quad -0 \\ \hline 2 & 3 \quad -1 \\ \hline & 1 \quad -1 \end{array}$$

• $(455)_{10} = (111000111)_2$

35. a) To write Theorems of i) Commutative ii) Associative iii) Demorgans iv) Null Element

Ans:

i) Commutative Theorem:

$$A + B = B + A$$

$$A \cdot B = B \cdot A$$

ii) Associative Theorem:

$$A + (B + C) = (A + B) + C$$

$$A \cdot (B \cdot C) = (A \cdot B) \cdot C$$

iii) De Morgan's Theorem:

$$\overline{A + B} = \bar{A} \cdot \bar{B}$$

$$\overline{(A \cdot B)} = \bar{A} + \bar{B}$$

iv) Null Element:

$$A + 1 = 1$$

$$A \cdot 0 = 0$$

(OR)

b) Explain the fundamental gate and truth table.

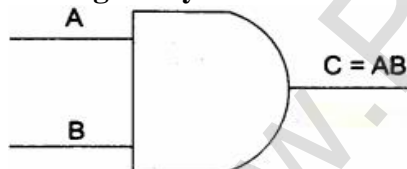
Ans: The Fundamental gates are AND, OR, NOT

i) AND gate:

The AND gate can have two or more input signals and produce an output signal.

The output is "true" only when both inputs are "true", otherwise, the output is "false".

Logical Symbol



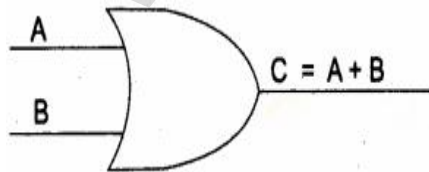
Truth Table

Input		Output
A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

ii) OR gate:

The OR gate gets its name from its behaviour like the logical inclusive "OR". The output is "true" if either or both of the inputs are "true".

Logical Symbol

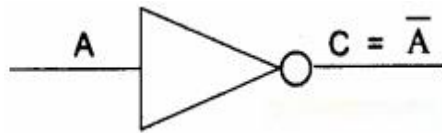


Truth Table

Input		Output
A	B	C
0	0	0
0	1	1
1	0	1
1	1	1

iii) NOT gate:

The NOT gate called a logical inverter, has only one input. It reverses the logical state.

Logical Symbol**Truth Table**

Input	Output
A	C
1	0
0	1

36. a) Explain detail about booting of computer and its types.

Ans: An Operating System (OS) is a basic software that makes the computer to work. When a computer is switched on, there is no information in its RAM. At the same time, in ROM, the pre-written program called POST (Power On Self Test) will be executed first. This program checks if the devices are ready to operate. If these devices are ready, then the BIOS (Basic Input Output System) gets executed. This process is called BOOTING. Booting process is of two types,

- i. Cold Booting
- ii. Warm Booting

i. Cold Booting: When the system starts from initial state i.e. it is switched on, we call it Cold Booting or Hard Booting. When the user press the Power Button, the instructions are read from the ROM to initiate the booting process.

ii. Warm Booting: When the system restarts or when Reset button is pressed, we call it Warm Booting or Soft Booting. The system does not start from initial state and so all diagnostic tests need not be carried out in this case. There are chances of data loss and system damage as data might not have been stored properly.

(OR)**b) List out the various input devices with its each one short note on them.**

Ans: i) Keyboard: keyboard (wired / wireless, virtual) is the most common input device used today. The individual keys for letters, numbers and special characters are collectively known as character key. This keyboard layout is derived from the keyboard of original typewriter. There different set of keys are available in the keyboard such as Character keys, modifier keys, system and GUI keys, enter and editing keys, function keys, navigation keys, numeric keypad and lock keys.

ii) Mouse: Mouse (wired/wireless) is a pointing device used to control the movement of the cursor on the display screen. It can be used to select icons, menus, command buttons or activate something on a computer. Some mouse actions are move, click, double click, right click, drag and drop. Different types of mouse available are: Mechanical Mouse, Optical, Laser Mouse, Air Mouse, 3D Mouse, Tactile Mouse, Ergonomic Mouse and Gaming Mouse.

iii) Scanner: Scanners are used to enter the information directly into the computer's memory. This device works like a Xerox machine. The scanner converts any type of printed or written information including photographs into a digital format, which can be manipulated by the computer.

iv) Fingerprint Scanner: Fingerprint Scanner is a fingerprint recognition device used for computer security, equipped with the fingerprint recognition feature that uses biometric technology. Fingerprint Reader / Scanner is a very safe and convenient device for security instead of using passwords, which is vulnerable to fraud and is hard to remember.

v) Retinal Scanner: This perform a retinal scan which is a biometric technique that uses unique patterns on a person's retinal blood vessels.

37. a) Explain detail about conversion of fractional Decimal to binary with its an example.

Ans: steps of conversion of fractional Decimal to binary:

1) Convert the integer part to binary by repeated division by 2.

- Suppose N be the integer part of the decimal number.

- Dividing N by 2 and obtain quotient N1 and a remainder R1, where R1 can have a value of either 0 or 1.

- The process is repeated until the quotient (N1) becomes 1.

- When the quotient is '1'. Write the final answer starting from final quotient value obtained to the first remainder value obtained.

2) Convert the Fractional part to Binary by repeated multiplication by 2.

Step 1: Multiply the decimal fraction by 2 and note the integer part. The integer part is either 0 or 1.

Step 2: Discard the integer part of the previous product. Multiply the fractional part of the previous product by 2. Repeat Step 1 until the same fraction repeats or terminates (0).

Step 3: The resulting integer part forms a sequence of 0s and 1s that become the binary equivalent of decimal fraction.

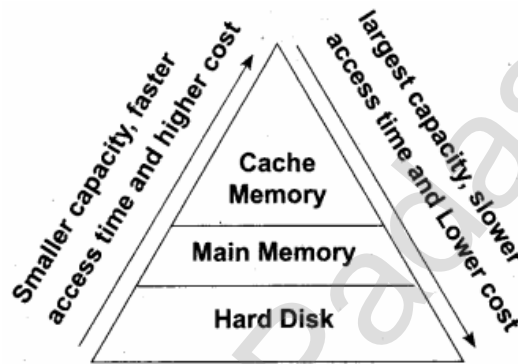
Step 4: The final answer is to be written from first integer part obtained till the last integer part obtained.

(OR)

b) Arrange the memory devices in ascending order based on the access time.

Ans: Access time (response time) refers to how quickly the memory can respond to read / write request.

The diagram shows different memory devices arranged according to access times.



i) Cache Memory:

- Extremely fast memory. (faster than main memory)
- Fast response time. (Access time)
- Used to store frequently used data by the CPU.



ii) Main Memory:

- The main memory is otherwise called as random Access Memory.
- Stores currently used Operating System files, Application Programs and the data.
- Computer's processor can access the main memory directly.

iii) Hard Disk:

- Hard disk is a magnetic disk on which you can store data.
- Stores data and programs permanently.
- Serves as a supportive storage to main memory.
- Non-volatile memory.

38. a) Explain the following: i) Inkjet printer ii) Multimedia projector iii) QR code reader.

Ans: i) Inkjet printer: Inkjet printer uses colour cartridges which combine Magenta, Yellow and cyan inks to create color tones. A black cartridge is also used for monochrome output. Inkjet printers work by spraying Ionised ink at a sheet of paper. The speed of inkjet printers generally range from 1-20 PPM (Pages Per Minute)

ii) Multimedia projector: Multimedia projectors are used to produce computer output on a big screen. These are used to display presentations in meeting halls or in classrooms.

iii) QR code reader: The QR code is a two dimension bar code which can be read by a camera and processed to interpret the image.

(OR)

b) List out the various secondary storage device with its each one short note.

Ans: A computer generally has limited amount of main memory which is expensive and volatile. To store data and programs permanently, secondary storage devices are used. Secondary storage devices serve as a supportive storage to main memory and they are non-volatile in nature, secondary storage is also called as Backup storage.

i) Hard Disks: Hard disk is a magnetic disk on which you can store data. The hard disk has the stacked arrangement of disks accessed by a pair of heads for each of the disks. The hard disks come with a single or double sided disk.

ii) Compact Disc (CD): A CD or CD-ROM is made from 1.2 millimeters thick, polycarbonate plastic material. A thin layer of aluminium or gold is applied to the surface. CD data is represented as tiny indentations known as "pits", encoded in a spiral track moulded into the top of the polycarbonate layer. The areas between pits are known as "lands". A motor within the CD player rotates the disk. The capacity of an ordinary CD-ROM is 700MB.

iii) Digital Versatile Disc (DVD): A DVD (Digital Versatile Disc or Digital Video Disc) is an optical disc capable of storing up to 4.7 GB of data, more than six times what a CD can hold. DVDs are often used to store movies at a better quality. Like CDs, DVDs are read with a laser. The disc can have one or two sides, and one or two layers of data per side; the number of sides and layers determines how much it can hold. Double-layered sides are usually gold-coloured, while single-layered sides are usually silver-coloured, like a CD.

iv) Flash Memory Devices: Flash memory is an electronic (solid-state) non-volatile computer storage medium that can be electrically erased and reprogrammed. They are either EEPROM or EPROM. Examples for Flash memories are pendrives, memory cards etc. Flash memories can be used in personal computers, Personal Digital Assistants (PDA), digital audio players, digital cameras and mobile phones. Flash memory offers fast access times. The time taken to read or write a character in memory is called access time. The capacity of the flash memories vary from 1 Gigabytes (GB) to 2 Terabytes (TB).

v) Blu-Ray Disc: Blu-Ray Disc is a high-density optical disc similar to DVD. Blu-ray is the type of disc used for PlayStation games and for playing High-Definition (HD) movies. A double-layer Blu-Ray disc can store up to 50GB (gigabytes) of data. DVD uses a red laser to read and write data. But, Blu-ray uses a blue-violet laser to write. Hence, it is called as Blu-Ray.

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