Content of Lab Experiments

Problem 1:

Every student should identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor. Every student should disassemble and assemble the PC back to working condition.

i). AIM: To Identify the peripherals of a computer, components in a CPU and its functions and to draw the block diagram of the CPU along with the configuration of each peripheral.To assemble an disassemble the PC back to working condition..

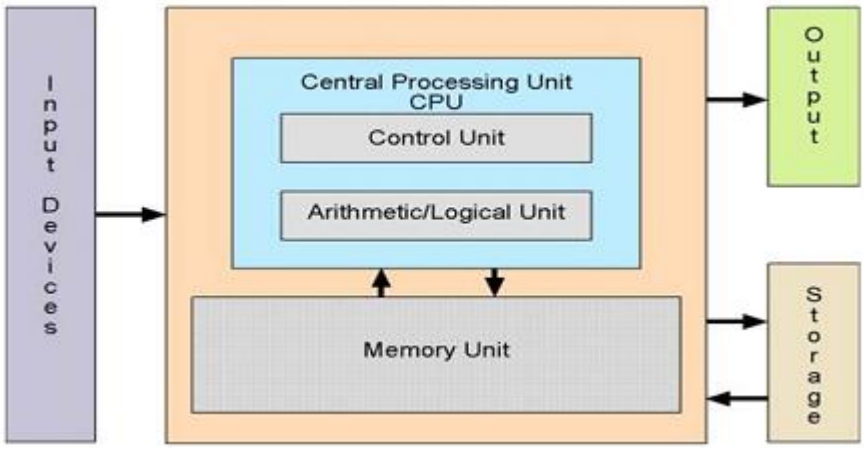
Hardware Requirements: Cabinet, Hard Disk, CD/DVD Drive, Floppy Drive, Monitor, Mouse, Keyboard, Mother Board, Socket 478, Processor, Heat Sink Fan, RAM Slots, PCI Slot, AGP Slots, CMOS Battery, BIOS, North Bridge, South Bridge, IDE Slots, SMPS, ATX power Connector.

Software Requirements: Not Required

INTRODUCTION TO COMPUTER:

A computer is a programmable machine or computer is an electronic device which takes the input information from the input device, process or executes the input in Processor or CPU and generates the output information through output devices. Computer enables arithmetic computations, data processing, information management (storage) and knowledge reasoning in an efficient manner.

BLOCK DIAGRAM OF COMPUTER



Basically the computer system has three major components. These are

1. Central Processing Unit (Processor)
2. Input and Output Unit.
3. Memory Unit (Main Memory and Auxiliary storage).

1. CENTRAL PROCESSING UNIT:

The Central Processing Unit takes the input data from the input devices and processes it according to the set of instructions. After that generate the output and sends the output to the output devices. The CPU is composed three parts. These are

a) ALU:

Arithmetic Logical Unit (ALU) is used to do the arithmetic operations on data by adding, subtracting, dividing, multiplying and incrementing and decrementing.

It is also used for Logical operations like AND, OR, NOT and X-OR.

b) CU:

Control unit is mainly used for generating the electronic control & timing signals for program execution. It controls all the operations of the computer.

c) Registers:

CPU also possesses the memory to hold the data temporarily during the execution of an instruction. These are small memory locations in CPU.

2. INPUT AND OUTPUT UNIT:

INPUT DEVICE:

Input devices accept the data and instructions from the user.

Ex: Mouse, Scanner, Keyboard, joysticks, digital cameras, microphones, etc…

OUTPUT DEVICE:

Output devices return the processed data back to the user.

Ex: Monitor, Printer, etc…

3. MEMORY UNIT:

Memory is like an electronic scratch pad inside the computer. It is a storage unit to hold the data.

In the computer the data will be stored and retrieved in the form of bits and bytes. The byte will store a single character such as a letter of the alphabet or a numeral.

a) 8 BITS = 1 BYTE

b) 1024 BYTES = 1 KB

c) 1024 KB = 1 MB

d) 1024 MB = 1 GB

e) 1024 GB = 1 TB.

The memory can be classified into two categories. These are

I. primary or main memory

II. Secondary or auxiliary memory

I. PRIMARY OR MAIN MEMORY:

Primary memory is the fastest memory in a computer. This memory is primarily (temporarily) used to store the data and programs during the execution of a program.

Primary memory is classified into two categories called

a) Random Access Memory (RAM)

b) Read Only Memory (ROM)\

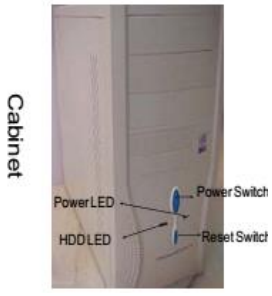
II. SECONDARY OR AUXILIARY MEMORY:

Secondary memory used to store the data permanently. The data will be stored in storage devices. Storage devices are like Magnetic disks, Hard disks, Floppy disks, Compact disks

IDENTIFICATION OF PERIPHERALS:

1. **Cabinet:**

It is used to install all hardware devices like (Mother Board, SMPS, HDD, CD ROM, and FDD). It has Start, Restart Button, Led's, Audio and USB Connecters are available at front side.



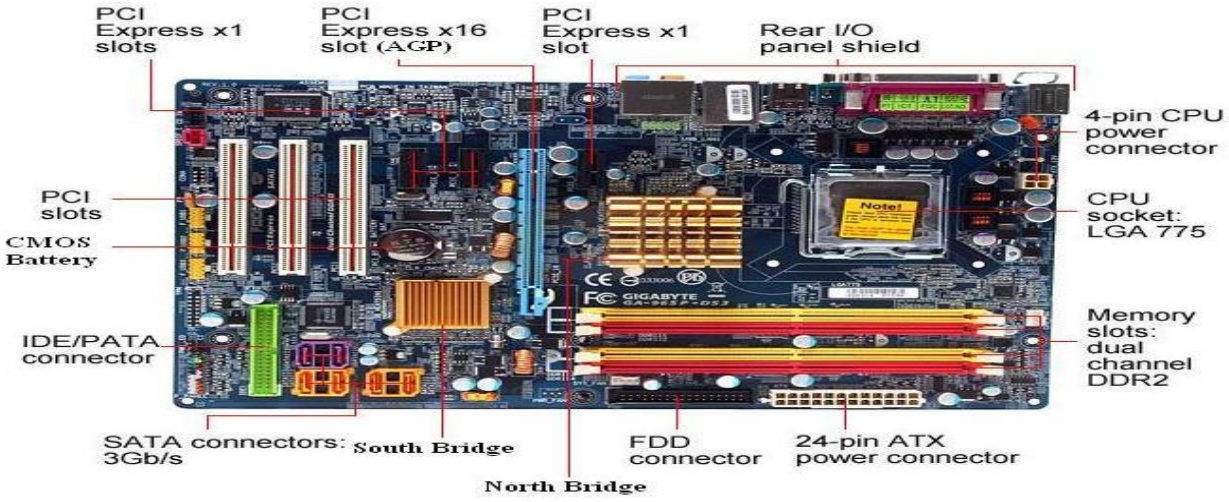
2. The Mother Board/ System Board

In Personal Computers, a **Mother Board** is the central printed circuit Board (PCB) in many modern computers and holds many of the crucial components of the system, providing connectors for other peripherals. It is also called as main board or system board.

Classification of Mother Boards:

1) **Integrated Mother Boards** have all the peripheral device slots, input output ports, serial and parallel ports are mounted on the board.
2) **Non-Integrated Mother Boards** have all peripheral device slots and input output ports,, serial and parallel ports are connected using expansion Boards.

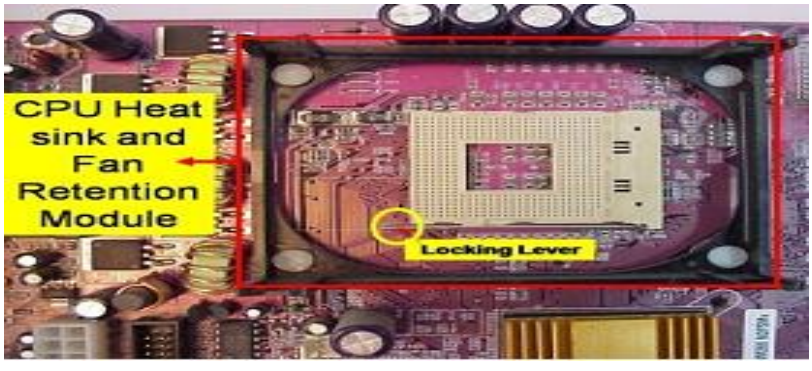
List of Mother Board Manufactures are: Intel, Zebronics, Acer Inc.,VIA Technologies, etc.



Mother Board

Mother Board Parts:

a) Socket 478: It has 478 pin slots to place the CPU in it and above the CPU place the Heat Sink Fan to cool the processor when it generates the heat and we can fix the fan with locks.



b) CPU or Processor

CPU The central processing unit contains the heart of any computer, the processor. The processor is fitted on to a Mother Board. The Mother Board contains various components, which support the functioning of a PC. **Clock Speed** measures how fast a processor completes operations, usually measured in megahertz and gigahertz. A 1.8GHz processor runs at 1,800,000,000 cycles per second. List of CPU Manufacturers are: AMD, INTEL, Samsung, IBM, Transmeta, etc

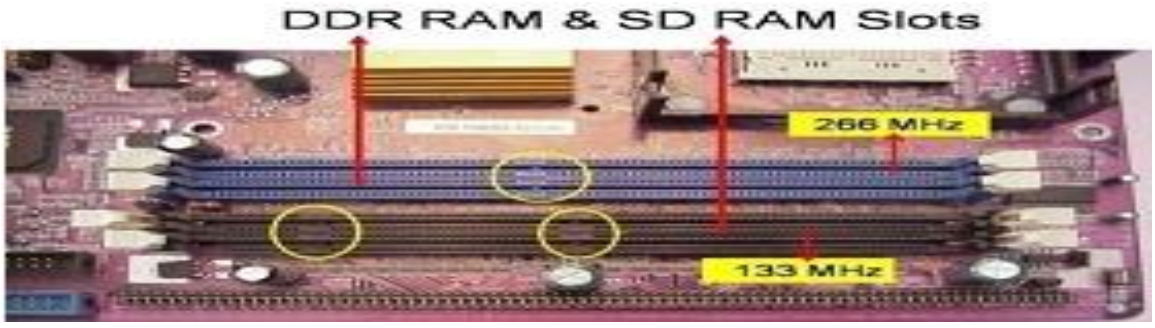
Heat Sink Fan

c) RAM Slots and RAMs

RAM Slots are used to place the RAM Cards. RAMs are used to increase the processing speed the system to run application more effectively, and it has temporary memory. We have two types of RAMs

i) SD RAM (Synchronous Dynamic), it has two Gaps/Notche

ii) DDR RAM (Double Data Rate), it has one Gap/Notch



DDR RAM

SD RAM

Manufactures of RAM's are Transcend, Kingston, Micron, Hynix, etc.

d) North Bridge:

It is also called as controller. It converts electronic signals to binary values and binary values to electronic signals.

e) South Bridge:

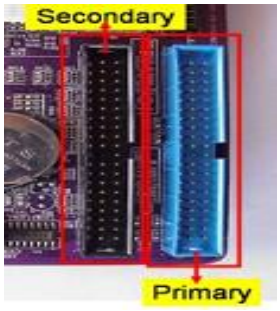
It is controls major components of mother board and it is a back bone of the input out devices. It is communicates PCI slots, IDE-1, IDE-2, floppy connecter, BIOS chip.

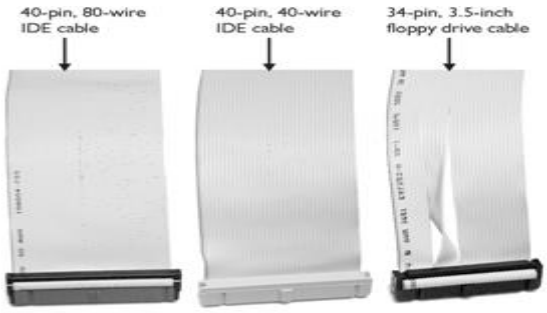
f) CMOS (Complementary Metal Oxide Semiconductor) Battery

Computer is using a coin shape battery. It generates the clock signal and it manages system time continuously.

g) Primary & Secondary(IDE-1 & IDE-2) :

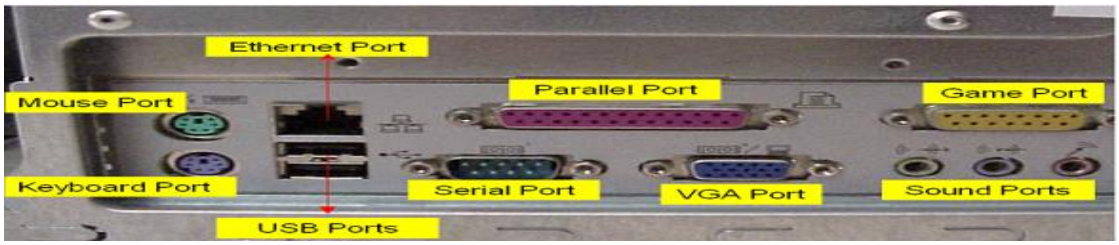
Mainly there are three IDE slots and cables i.e. IDE-1 (Primary) to connect Hard Disk Drive having 40 pin slot and 80 wire cable, IDE-2 (Secondary) to connect CD/DVD Drive having 40 pin slot and 40 wire cable, IDE-3 (Tertiary) to connect Floppy Drive having 35 pin slot 3.5inch wire with a cut in middle. But present mother boards does not have IDE-3 slot.





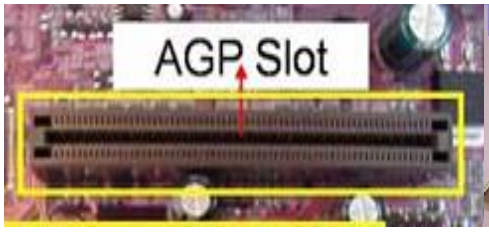
h) Input & Output ports :

I/O ports are used to connecting I/O device such as key boards, mouse, monitor, printer, scanner, speakers etc...



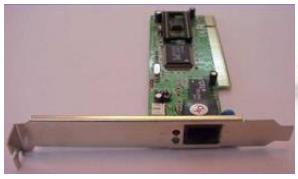
i) AGP Slot & AGP Card :

Accelerated Graphic Port (AGP) Slot is used install the AGP card. AGP back view same as VGA port (15-pins) and used to connecting the monitors.



j) PCI(Expansion) Cards, PCI Slots :

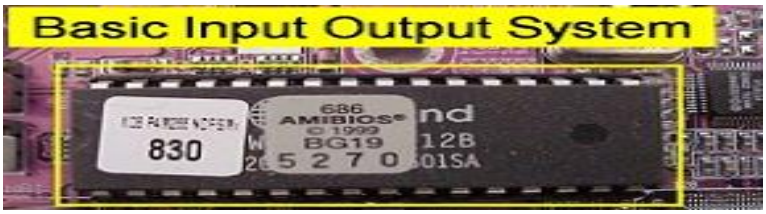
PCI (Peripheral Component Interconnect) slots are used to place the PCI cards such as LAN (Ethernet) Card, Sound Card, TV Tuner Card, etc.



LAN Card **Sound Card** **TV Tuner Card**

k) BIOS Chip :

BIOS (Basic Input Output System) controls how the operating system and hardware wok together and manages all the hardware devices installed in mother board.



l) ATX Power connecter Slot:

ATX (Advanced Technology Extended) power connector slot used to place the ATX power connector from SMPS to supply the power to motherboard.

3. SMPS (Switched mode Power Supply)

To supply the power to all the components inside the cabinet and it is a case that holds a transformer, voltage control and fan.

4. HDD (Hard Disk Drive)

HDD is a device for storing and retrieving digital information, primarily computer data. It consists of rotating discs (often referred to as platters), coated with magnetic material and with magnetic heads arranged to write data to the surfaces and read it from them.

List of Manufacturers of HDD Devices are: Hitachi, Samsung, Toshiba, Seagate Technology

5. CD-ROM Drive/ DVD ROM Drive

CD Drive the most common type of removable media.

The common types are: CD-ROM, CD-RW, CD-R, DVD, DVD-ROM., DVD-RW, DVD-R

6. Different Screws Used:

A Computer system has three kinds' screws

i) Mother Board Screws (Small Size)
ii) HDD, CD/DVD, FDD Drive Screws (Medium Size)
iii) Outer screws to fix sides of cabinet (Large Size)

Result: Introduction to computers and Identification peripherals task completed.

AIM: TO assemble and disassemble the system

Hardware Requirements: Cabinet, Hard Disk, CD/DVD Drive, Floppy Drive, Monitor, Mouse, Keyboard, Mother Board, Processor, Heat Sink Fan, RAM Cards, PCI Cards, AGP Card, CMOS Battery, IDE cables, SMPS, ATX power Connector.

Software Requirements: Not Required

Safety Precautions:

1. Beware of electrostatic discharge (ESO)
2. Build computer on a hard surface, away from concepts.
3. Wear shoes and the short sleeved cotton wear.
4. Use Phillips, head screw driver.
5. Keep the components away from moisture.
6. Avoid using pressure while installing.

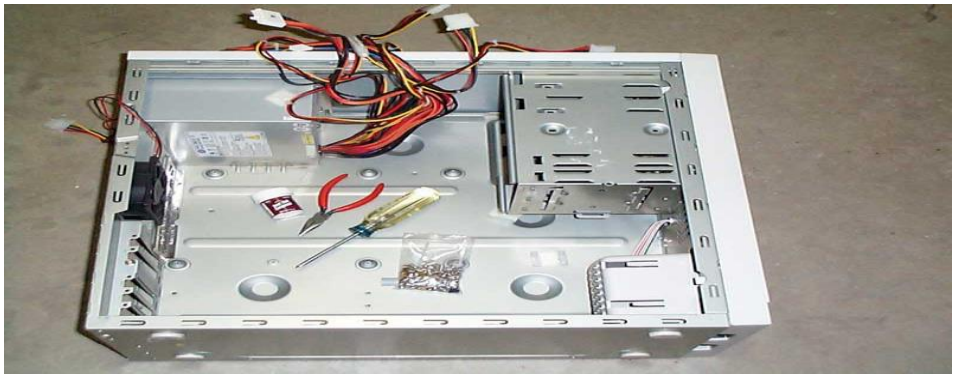
Steps for Assembling:

1. Setting the cabinet ready.
2. Preparing to fit the components.
3. Fitting the mother board.
4. Fitting the RAM, processor and cooler.
5. Installing PCI cards.
6. Fitting the hard disk and floppy drive.
7. Installing the CD ROM drives.
8. Connecting the ribbon cables.
9. Powering the drives and mother board.
10. Connecting the cables for the case front panel.
11. Final check.

Getting the Cabinet ready:-

1. Check how to open the cabinet and determine where to fix the components.
2. Determine if the case has the appropriate risers installed.

Preparing to fit the Components:



1. Network adapter drive.

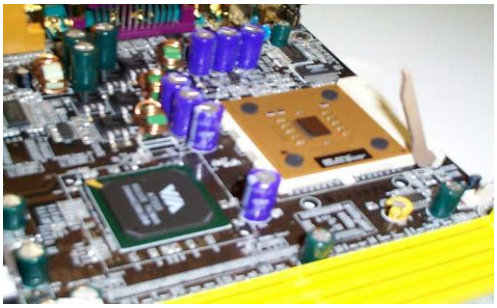
2. Floppy disk drive.
3. BUS cables.
4. Hard disk.
5. CD-ROM Drive.
6. RAM
7. CPU
8. Heat sink / cooler / fan.
9. Mother board.
10. Screws.

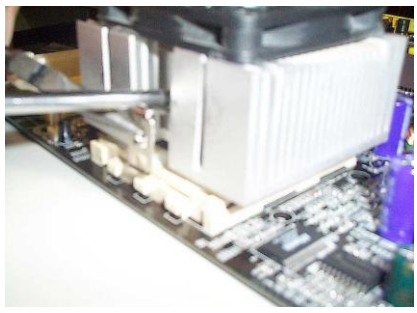
Fitting the Mother board:

1. Line up the patch on the motherboard with the appropriate holes in the block panel I/O shield of the case.
2. Check the points where you and to install
3. Install them and make the mother board sit on them and fix screws if required

Fitting the processor:

1. Raise the small lever at the side of the socket.
2. Notice that there is a pin missing at one corner, determine the direction to fit in the processor.
3. You should not force the CPU. When inserting it. All pins should slide smoothly into the socket.
4. Lock the lever back down.
5. Install the heat sink over it (Different type for each processor). Heat sink / CPU fan.

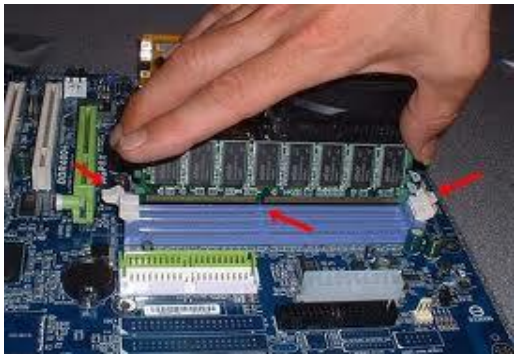




Fitting the RAM:

1. The RAM must be suitable for motherboard.

2. There are currently 2 types of RAM available.
    a) SD RAM.
    b) DDR RAM.
3. The mother board's chipset determines which type of RAM may be used.



Installing the PCI Cards:

1. Most of the cards are inbuilt these days.
2. Network Interface Cards, Sound Cards etc. are fitted into PCI slots.

Fitting the hard disk and Floppy disk:

1. Place the floppy and hard disks in their slots.
2. Leave some space above HDD to prevent heat building.
3. Check the jumper configuration.
4. Fix the screws.

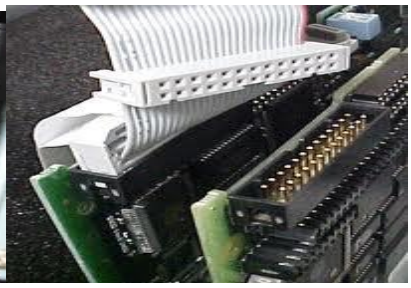
Installing the CD-

ROM Drives:

1. CD-ROM drive is similar to installing a hard disk.
2. 1ST check that the jumper configuration is correct.
3. Fix the screw.

Connecting the BUS Cables, power connectors:-

1. Attach the long end of the cable to the IDEU connector on the motherboard first.
2. The red stripe on the IDE cable should be facing the CD Power.

Final Check:-

1. Mother board jumper configurations are the settings for the processor operator.
2. Drive jumper settings, master/ slave correct?
3. Is the processor, RAM modules and plug in cards finally seated in their sockets?
4. Did you plug all the cables in? Do they all fit really?
5. Have you frightened all the screws in plug- in cards or fitted the clips?
6. Are the drive secure?
7. Have u connected the power cables to all driver?

Result: Introduction to computers and Identification peripherals task completed. Assembling and disassembling procedure is successfully completed.

Viva Questions:

1) What is a computer?

Ans: Computer is a electronic device which receive, stores ,process the data and gives output

2) What are the different functions of a computer?

Ans: A computer does the following functions;

a) Accepting data
b) Processing Data
c) Storing Data
d) Displaying Data

3) How a minicomputer different from a mainframe?

Ans: Minicomputer is a midsized multiprocessing and multi user computer. It is also called mid-range server. But mainframes are huge computers, most commonly occupying entire rooms or floor. It is highly costly.

4) What is Super computer?

Ans: The fastest type of computer. Supercomputers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations. For example, weather forecasting requires a supercomputer. Other uses of supercomputers include animated graphics, fluid dynamic calculations, nuclear energy research, and petroleum exploration.

5) Differentiate Input and Output device.

Ans: Input devices are used for giving input to the computer. But output devices are used to get the result back from the computer. The examples of input devices are keyboard, mouse, scanner, digital camera atc...whereas output devices include monitor, printer, projector etc....

6) What is a storage device? What is the common classification?

Ans:Storage devices are used to store data in the computer. The different types of storage devices are;

a) Magnetic Devices.
b) Optical Devices.
c) Solid-State Storage Devices.

7) What do you mean by a processing device? What are the various types of processing devices?

Ans:The main function of a computer is to process data. The various types of processing device in a computer are;

a) Microprocessor
b) Chipset
c) BIOS

8) Differentiates Serial and Parallel port.

Ans:Serial port and parallel port are used for transferring data in/out of the computer. In serial port transmission only 1 bit is transmitted at a time. Most serial ports on personal computers conform to the RS-232C or RS-422 standards. A parallel interface for connecting an external device such as a printer. On PCs, the parallel port uses a 25-pin connector (type DB-25) and is used to connect printers, computers and other devices that need relatively high bandwidth. It uses parallel transmission of data.

9) What is an interface?

Ans:These are the communication channel that enables your computer to exchange information with various devices.

10) What is a microprocessor?
Ans:The most important electronic component on the computer. It is a programmable logical device for processing data. In the world of personal computers, the termsMICROPROCESSOR and CPU are used interchangeably.

11) What are the factors affecting the speed of the microprocessor?
Ans:The following are the factors affecting the speed of the microprocessor.
a) Number of instructions build in the processor.
b) Bandwidth
c) Clock Speed
d) Number of transistors inside the processor

12) What are the differences between Multitasking and Multiprocessing?
Ans: Multitasking- Enables the processor to do multiple programs simultaneously by fast switching through the programs. Here doesn't have the involvement of multiple processors.
Multiprocessing- Enables the processor to do multiple programs simultaneously by the use of multiple processors.

13) What the difference between FSB and BSB?
Ans:Front Side Bus. Another name for the system bus. The Front Side Bus connects the CPU to main memory. A microprocessor bus that connects the CPU to aLevel 2 cache is called Back Side Bus. Typically, a backside bus runs at a fasterclock speed than the Front Side Bus.

14) What is CISC and RISC?
Ans:Reduced Instruction Set Computer (RISC) and Complex Instruction Set Computer (CISC) are two philosophies by which computer chips are designed. RISC became a popular technology buzzword in the 1990s, and many processors used in the enterprise business segment were RISC-based.

15) What is full name of AMD?
Ans:Advanced Micro Devices.

16) What is Heat Sink? What is its use? If it is not in the system what will happen?
Ans:A heat sink is a component used to lower the temperature of a device.It is most commonly there on the microprocessor. If it is not properly fixed the system, the system will shutdown automatically to prevent further damage to the processor.

17) A CPU fan should be placed in system. Why?
Ans:To make the system cool and more functioning.

18) What is Upgrading a microprocessor? Why we have to do it?
Ans:Upgrading a microprocessor is just physically replacing a processor with a new one. Before doing so we have to make sure that the processor we want to use for your upgrade is physically compatible with the socket on your computer's motherboard. We also have to make sure that the motherboard has the internal logic to support the processor.

19) What is main memory in a computer?
Ans:The main memory in a computer is called Random Access Memory. It is also known as RAM. This is the part of the computer that stores operating system software, software applications and other information

for the central processing unit (CPU) to have fast and direct access when needed to perform tasks.

20)What is Cache memory? What is the advantage if a processor with more cache memory you are using?

Ans:Cache memory is the memory area between RAM and Processor. If cache memory increases the speed of the system will also improved.

21) What is the name of the printed circuit board?

Ans.Motherboard

22) Which Component of pc maintains data and time

Ans:CMOS

23) What is the name of the card that controls read,write head and motor in the hard disk

Disc Controller Card

24) Which of the following retains the information it's storing when the power to the system is turned off?

ROM

25) Acronym of HDD?

Hard Disk Drive

26) How many bytes a sector of hard disk holds?

512 Bytes

27) What does FDISK do?

creates partitions on the hard drive

28) What is BIOS an acronym for?

basic input output system

29) What does the acronym bits stand for?

Binart Digit

30) Today's PC use what type of RAM..?

DDR SDRAM

31) What is memory bank?

Ans: Sets of physical memory modules is referred to as memory banks. A memory bank serves as a repository for data, allowing data to be easily entered and retrieved.

32) What we need to consider before connecting a memory to the system?

Ans: a) Capacity of the RAM required
b) Check if installed memory is supported by motherboard and processor
c) Form factor of the RAM d) Type of RAM needed e) Warranty of the RAM

33)What is Upgrading the memory?

Ans: Adding a memory module to the existing bank on the available slot or replacing the previous one with the increased memory size is also called upgrading memory. This will surely increase the performance of the computer.

34) What is BIOS beep code? What it does mean?

Ans:BIOS beep codes are the signs of different issues of the computer. The beep code may vary depends on the manufacture of BIOS. For example in case of Award BIOS the beep code will be,

1 long beep- shows memory problem **1 long beep and 2 short beeps**- failure of DRAM parity

1 log beep and 3 short beeps- signifies Video error

Continuous beep- signifies failure in memory or Video memory.

35) What is RDRAM?

Ans:Short for **R**AMBUS **DRAM**, a type of memory (DRAM) developed by Rambus, Inc.

36) What is SIMM? Is it is using now?

Ans:Acronym for **S**ingle **I**n line **M**emory **M**odule, a small circuit board that can hold a group of memory chips. Typically, SIMMs hold up to eight (on Macintoshes) or nine (on PCs) RAM chips. On PCs, the ninth chip is often used for parity error checking. Unlike memory chips, SIMMs are measured in bytes rather than bits.

Now a days this memory module is not used.

37) Why do we call motherboard a motherboard?

Ans:Motherboard is the basic integrated board of the computer on which all other components are connected. So that usually we call motherboard a "motherboard".

38) What is motherboard? What are the different types of it?

Ans:Motherboard is the basic integrated board of the computer on which all other components are connected. This is classified mainly into three Desktop, Laptop and Server motherboard.

39) What is the difference between integrated and non-integrated motherboard?

Ans:In integrated motherboard all of the external ports will be present. But in case of non-integrated motherboard only some important ports will be available instead of all. The non-integrated motherboard is an old type of motherboard which now a day's not commonly available.

40) How a server motherboard different from a desktop?

Ans:A server motherboard is different from a desktop in features and performance. The number of processor support, RAM slots ,Expansion card slots etc...are more. For example the Intel® Server Board **S5000PSL** has the performance and features for growing businesses demand. It provides excellent data protection, and advanced data management. It support 64-bit Multi-Core Intel® Xeon® processor. Eight fully buffered 533/667 MHz DIMMs. Up to six SATA 3Gb/s ports.

41) What is form factor of motherboard?

Ans:The form factor of a motherboard determines the specifications for its general shape and size. It also specifies what type of case and power supply will be supported, the placement of mounting holes, and the physical layout and organization of the board. Form factor is especially important if you build your own computer systems and need to ensure that you purchase the correct case and components.

42) What is ATX? How it is different from AT? Which is using now?

Ans:AT is a short for advanced technology, the AT is an IBM PC model introduced in 1984. It includes an Intel 80286 microprocessor, a 1.2MB floppy drive, and an 84-key AT keyboard. The ATX form factor specified changes to the motherboard, along with the case and power supply. Some of the design

specification improvements of the ATX form factor included a single 20-pin connector for the power supply, a power supply to blow air into the case instead of out for better air flow, less overlap between the motherboard and drive bays, and integrated I/O Port connectors soldered directly onto the motherboard. The ATX form factor was an overall better design for upgrading.

43) What is the need of expansion slot in motherboard?

Ans:Alternatively referred to as an expansion port, an expansion slot is a slot located inside a computer on the motherboard or riser board that allows additional boards to be connected to it.

44) What is PCI slot? How is different from PCI Express (PCI-E)?

Ans:Short for **P**ERIPHERAL **C**OMPONENT **I**NTERCONNECT, a local bus standard developed by Intel Corporation. PCI Express (Peripheral Component Interconnect Express), officially abbreviated as PCIe, is a computer expansion card standard designed to replace the older PCI, PCI-X, and AGP bus standards.

45) What is AGP slot? What is its use?

The Accelerated Graphics Port (often shortened to AGP) is a high-speed point-to-point channel for attaching a video card to a computer's motherboard, primarily to assist in the acceleration of 3D computer graphics. Since 2004 AGP has been progressively phased out in favor of PCI Express (PCIe).

46) What is jumper? What is the need?

A metal bridge that closes an electrical circuit. Typically, a jumper consists of a plastic plug that fits over a pair of protruding pins. Jumpers are sometimes used toconfigure expansion boards. By placing a jumper plug over a different set of pins, you can change a board's parameters.

47) What CMOS and CMOS battery?

Short for complementary metal oxide semiconductor. Pronounced see-moss. The CMOS chip holds the date, time, and system setup parameters. This chip is powered by a 3Volt CMOS battery.

48) What is chipset?

A number of integrated circuits designed to perform one or more related functions. This is one of the processing device in a computer.

49) What is power supply unit?

A power supply unit (PSU) supplies direct current (DC) power to the other components in a computer. It converts general-purpose alternating current (AC) electric power from the mains to low-voltage (for a desktop computer: 12 V, 5 V, 5VSB, 3V3, −5 V, and −12 V) DC power for the internal components of the computer.

50) What are the different types of Form Factors of Power Supply?

AT , ATX, Flex ATX, Micro ATX etc…