Biyani's Think Tank

Concept based notes

Computer Architecture

(BCA Part-I)

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Preface

I am glad to present this book, especially designed to serve the needs of the students. The book has been written keeping in mind the general weakness in understanding the fundamental concepts of the topics. The book is self-explanatory and adopts the "Teach Yourself" style. It is based on question-answer pattern. The language of book is quite easy and understandable based on scientific approach.

Any further improvement in the contents of the book by making corrections, omission and inclusion is keen to be achieved based on suggestions from the readers for which the author shall be obliged.

I acknowledge special thanks to Mr. Rajeev Biyani, *Chairman* & Dr. Sanjay Biyani, *Director* (*Acad.*) Biyani Group of Colleges, who are the backbones and main concept provider and also have been constant source of motivation throughout this Endeavour. They played an active role in coordinating the various stages of this Endeavour and spearheaded the publishing work.

I look forward to receiving valuable suggestions from professors of various educational institutions, other faculty members and students for improvement of the quality of the book. The reader may feel free to send in their comments and suggestions to the under mentioned address.

Author

Syllabus
B.C.A. Part-I
Computer Architecture

Part-A (Informative only)

Anatomy of a Computer [Information only] : Mother Board (Special reference to Intel 810 Chipset motherboard). CISC Micro Processors (Special reference to Pentium, AMD, Cyrix). RISC processors (Motorola, Power PC, and 680x0 series), Memory (ROM, RAM, Flash, Cache, Virtual, Buffers, CMOS), types of RAM (FPM, EDO, BEDO, SDRAM), Types of memory modules (SIMM, DIMM), System clock, Bus (Data, Address, Control), Bus architecture (ISA, MCA, EISA, PCI, AGP), Expansion slots and cards (Network adapter cards, SCSI card, Soundcard, TV tuner card, PC card), Ports (Serial, Parallel, AGP, USB, Fire Wire), cables (RS 232, BIN), Input devices (keyboard, mouse, trackball, track pad, pen, touch screen, bar code reader, scanner, OMR, OCR, voice input, video input, digital camera) Output devices [Monitors (refresh rate, resolutions, standards-CGA, VGA, SVGA, XGA, SCGA; LCD monitors, Video controllers and VRAM), Printers (Dot-Matrix, Line, Label, Ink0Jet, laser, Color Laser, thermal wax, dye sublimation, fiery, IRIS), Plotters (Pen, Ink-jet, electrostatic), Voice output], Storage devices [Storage types (Magnetic, Optical, magneto-optical, Solid state), random versus sequential access, formatting, tracks and sectors, speed, storage capacity, Floppy Disk (5.25 inch, 3.5 inch; 2HD, Zip, Superdisk, HiFD) Hard Disk tracks, cylinders, sectors; Hard Drive Interfaces (IDE, EIDE, Fast SCSI, Fast/wide, SCSI, Ultra SCSI; Hard Disk Cartridges, RAID); Optical Disks [pits and lands, CD (ROM, R, RW), DVD (ROM, R, RAM)], Magnetic tape (reels, streamers, DAT, DLT, stripe, Smart card), Modem (Fax/Data/Voice).

Part-B (Beginners level only)

Computer System History and Architecture development(the mechanical era, electronic computers, and later generations); von Neumann machine.

Logic gates; basic combinatorial logic, multiplexers, decoders, encorders, comparators, adder and subtracters, BCD to 7 segment decoder; sequential circuits, RS,JK, D and T flip flops, counter and shift registers, programmable logic array (PLA), programmable array of logic (PAL), programmable logic device (PLD).

Addressing methods and machine program sequencing-memory locations addresses, encoding of information, instructions and instructions sequencing, addressing modes, paging, relative, indirect and indexed addressing.

Basics of Computer organization; system buses and instruction cycles, memory subsystem organizations and interfacing, I/O subsystem organizations and interfacing, Register transfer languages.

CPU design : specifying a CPU, design and implementation of a simple CPU (fetching instructions from memory, decoding and executing instructions, establishing required data paths, design of ALU, design of the control unit and design verification), design and implementation of a simple micro sequencer, Features of Pentium microprocessors.

Memory systems, storage media; virtual and cache memory; programmed I/O. Interrupts (types, processing of interrupts, implementing interrupts inside CPU), Direct memory access, I/O processors, serial communication.

Reduced Instruction Set computing (RISC) RISC rationale, RISC instructions sets, instructions pipelines and register windows, RISC vs. CISC.

Content

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Chapter-1

Anatomy of a Computer

Q.1. What is CISC Microprocessor?

Ans.: CISC stands for complex instruction set computer. It was developed by Intel. CISC is a type of design for the computers. CISC based computer will have shorter programs which are made up of symbolic machine language. The number of instructions on a CISC processor is more.

Q.2. What is RISC Microprocessor?

Ans.: RISC stands for reduced instruction set computer architecture. The properties of this design are :

(i) A large number of general purpose registers and use of computers to optimize register usage.

(ii) A limited & simple instruction set.

(iii) An emphasis on optimizing the instruction pyre line.

Q.3. What are the different types of Memory?

Ans.: The memory in a computer is made up of semi-conductions. Semi-conduction memories are of two types :

(1) **RAM :** Random Access Memory

(2) **ROM :** Read Only Memory

(1) **RAM :** The Read and write (R/W) memory of a computer is called RAM. The User can write information to it and read information from it. In Random Access, any memory location can be accessed in a random memory without going through any other memory location. The RAM is a volatile memory, it means information written to it can be accessed as long

as power is on. As soon as the power is off, it can not be accessed. There are two basic types of RAM :

(i) Static RAM

(ii) Dynamic Ram

(i) **S-RAM** retains stored information only as long as the power supply is on. Static RAM's are costlier and consume more power. They have higher speed than D-RAMs. They store information in Hip-Hope.

(ii) **D-RAM** loses its stored information in a very short time (for milli sec.) even when power supply is on. In a DRAM, a binary static is stored on the gate to source stray capacitor of a transfer the presence of charge on the stray capacitor shows 1 & absence 0.

D-RAM's are cheaper & lower.

Some other RAMS are :

(a) **EDO (Extended Data Output) RAM :** In an EDO RAMs, any memory location can be accessed. Stores 256 bytes of data information into latches. The latches hold next 256 bytes of information so that in most programs, which are sequentially executed, the data are available without wait states.

(b) **SDRAM (Synchronous DRAMS), SGRAMs (Synchronous Graphic RAMs) :** These RAM chips use the same clock rate as CPU uses. They transfer data when the CPU expects them to be ready.

(c) **DDR-SDRAM (Double Data Rate – SDRAM) :** This RAM transfers data on both edges of the clock. Therefore the transfer rate of the data becomes doubles.

(2) **ROM :** Read only memory: Its non volatile memory, ie, the information stored in it, is not lost even if the power supply goes off. It's used for the permanent storage of information. It also posses random access property. Information can not be written into a ROM by the users/programmers. In other words the contents of ROMs are decided by the manufactures. The following types of ROMs an listed below :

(i) **PROM :** It's programmable ROM. Its contents are decided by the user. The user can store permanent programs, data etc in a PROM. The data is fed into it using a PROM programs.

(ii) **EPROM :** An EPROM is an erasable PROM. The stored data in EPROM's can be erased by exposing it to UV light for about 20 min. It's not easy to erase it because the EPROM IC has to be removed from the computer and exposed to UV light. The entire data is erased and not selected portions by the user. EPROM's are cheap and reliable.

(iii) **EEPROM (Electrically Erasable PROM) :** The chip can be erased & reprogrammed on the board easily byte by byte. It can be erased with in a few milliseconds. There is a limit on the number of times the EEPROM's can be reprogrammed, i.e.; usually around 10,000 times.

Flash Memory : Its an electrically erasable & programmable permanent type memory. It uses one transistor memory all resulting in high packing density, low power consumption, lower cost & higher reliability.

It's used in all power, digital cameras, MP3 players etc.

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Chapter-2

Basic Computer Architecture

Q.1. Explain the different types of Memory Modules.

Ans.: There are two types of memory modules :

(i) **SIMM :** Single Inline Memory Modules

(ii) **DIMM :** Double Inline Memory Modules

These are small printed circuit cards (PCC) on which several DRAMS memory chips are placed. Such cards are plugged into the system board of the computer. The SIMM Circuit cards contain several memory chips with contacts placed on only one edge of this PCC whereas in DIMM, it's on both sides of the PCC.

Q.2. Explain about the System Clock.

Ans.: Every computer has got a system clock. It's located in the microprocessor. The clock is design by a piece of quartz crystal. The system clock keeps the computer system coordinated. It's an electronic system which keeps oscillating at specified times intervals, between 0 & 1. The speed at which this oscillation takes place is called the cycle of the clock. The time taken to reach from '0' to '1' and back is called clock cycle the speed of the system clock is measured in terms of Hz.

Q.3. Explain about the System Bus.

Ans.: Bus means the electronic path between various components Bus refers to particular types of a cable. Each cable of a bus carries information of one bit. Buses are of 3 types :

(1) Address Bus

(2) Data Bus

(3) Control Bus

(1) **Address Bus :** It carries the address of memory location of required instructions and data. The address Bus is unidirectional, i.e., data flows in one direction from CPU to memory. The address bus data determines the maximum number of memory addresses. This capacity is measured in binary form. E.g. A 2 –bit address bus will provide 2^2 addresses.

(2) **Data Bus :** Data bus is an electronic path that connects CPU, memory & other h/w devices. Data bus carries the data from CPU to memory or I/P–O/P devices and vice versa. It's a directional bus because it can transmit data in either direction. The processing speed of a computer increases if the data bus is large as it takes more data at one time.

(3) **Control Bus :** Control Bus controls the memory and I/O devices. This bus is bidirectional. The CPU sends signals on the control bus to enable the O/P of the addressed memory devices.

Data Bus Standard : Bus standard represents the architecture of a bus. Following are important data bus standards :

(i) **Industry Standard Architecture (ISA) :** This bus standard was the first standard released by IBM. It has 24 address lines & 16 data lines. It can be used only in a single user system. ISA bus is a low cost bus. It has a low data transfer rate. It could not take the full advantage of the 32-bit micro processor.

(ii) **Micro Channel Architecture (MCA) :** IBM developed MCA bus standard. With this, bus speed was elevated from 8.33 MH_z to 10MHz which was further increased to 20 MH_z & bandwidth increased from 16 bits to 32 bits.

(iii) **Enhanced Industry Standard Architecture (EISA) :** These buses are of 32 bit & helpful in multiprogramming. Due to low data transfer speed, ISA cannot be used for multi tasking & multi-user-systems. EISA is appropriate for multi user systems. The data transfer rate of EISA is double of that of ISA. The size of EISA is same as that of ISA, so both EISA & ISA cards can be fixed in EISA connector slot. EISA connectors are quite expenses.

(iv) **Peripheral Component Interconnect (PCI) :** This bus standard was developed by Intel. It's a 64 bit bus & works on 66 MHz. Earlier, a 32 bit PCI bus was developed having a speed of 33 MHz. PCI bus has greater

speed and has 4 interrupt channels. It also has a PCI bridge through which the bus can be connected to various other devices.

Q.4 Explain the role of Expansion Slots.

Ans.: The main function of the mother board is to enable connectivity between various parts of a computer with processor & memory. Various hardware cards can be fixed on the mother board to save different purposes. Mother boards have slots to fix the various cards-like video card, modem, sound cards etc, expansion slots on the motherboard can be used fro the following purposes:

(i) To connect the internal devices of a computer eg. Hard disk etc. to the computer bus.

(ii) To connect the computer to the external devices like mouse, printer etc.

The above functions are carried out with the help of adapters.

Q.5. List out various Cards and elaborate about them?

Ans.: (1) **Sound Card** : This card is used for I/P& O/P sound. Microphone is used to I/P& speaker is used to O/P the sound. The sound card converts the sound into computer language & vice versa. All sound cards are based on MIDI (Musical Instrument Digital Interface) which represents the music in electronic form. The main part of sound card is DSP (Digital signal processor) which uses arithmetic logic to bring out sound effects. Sound card comes with 16-bit computers. DAC (Digital to Analog) and ADC (Analog to Digital) sound card uses DMA (Direct memory Access) channel is to read & write the digital audio data.

(2) **SCSI (Small Compute System Interface)** : This technology is used in high speed hard disk. It's often used in servers where high volume of data is used. At present different versions of SCSI are used. The capacity of the SCSI is determined by the bus width and speed of the interface. Through SCSI the computers bus is extended by means of the cable. It's an extension of the computer bus.

(3) **Network Cards** : N/W card is a versatile device because it performs a number of tasks that contribute to the entire process of transmitting and receiving data between

Application
Presentation
Session
Transport
Network
Data Link
Physical

OSI Model

computers. It links a computer to another computer of the n/w through cable wires. A seven-layer model of OSI (Open System Interface) is used in the Internet for receiving and transmitting of data. The information passes through there seven layers. N/W card implements the physical layer and half of the data link layer.

Q.6. Describe briefly about different types of Ports.

Ans.: Computers have an interface called ports. Peripheral devices are interfaced to the computers through these ports. Data flows in & out through these ports. Ports are of 2 types, Parallel & Serial.

A parallel port allows the transfer of all the bits of a word simultaneously. In parallel interface there are multiple lines to connect the peripherals to the port. A parallel interface is used to transfer data at a faster rate for higher speed peripherals such as disk and tapes.

A Serial port allows serial data transfer. In serial data transfer, one bit of data is transmitted at a time. In serial interface, only one line or a pair of line is used to transmit data. It's used for slow speed peripherals such as terminal. Printers employ either serial interface or parallel interface. The disadvantage of a serial/ parallel port is that only one device can be connected to a port.

Q.7. Explain about RS 232 C.

Ans.: The RS 232 C is a standard for serial data transfer. It specifies standard for 25 signals & hand shake signals which are used between DCE & DTE. The voltage levels, maximum capacitance for there signal lines are also described in this standard. The standard RS-232 C interface is usually provided in computers for serial data transfer. A voltage between -3 V & -15 V under load is used for high logic or mark. A voltage between +3 V & +15 V under load is used for low logic or space. The voltage levels are not TTL compatible.

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Chapter-3

Input Output Devices

Q.1. Give short notes on various Input and Output Devices.

Ans.: The devices which are used to input the data and the programs in the computer are known as "Input Devices'. These devices convert what we input, into a form that is understandable by a computer. It provides man to machine communication. Some of the I/O devices are explained below:

(1) **Keyboard** : The data and instructions are input by typing on the keyboard. The message typed on the keyboard reaches the memory unit of a computer. It's connected to a computer via a cable. Apart from alphabet and numeral keys, it has other function keys for performing different functions.

(2) **Mouse** : It's a pointing device. The mouse is rolled over the mouse pad, which in turn controls the movement of the cursor in the screen. We can click, double click or drag the mouse. Most of the mouse's have a ball beneath them, which rotates when the mouse in moved. The ball has 2 wheels of the sides, which in turn mousse with the movement of the ball. The sensor notifies the speed of its movements to the computer, which in turn moves the cursor/pointer on the screen.

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

(4) **Track Ball** : Track ball is similar to the upside- down design of the mouse. The user moves the ball directly, while the device itself remains stationary. The user spins the ball in various directions to effect the screen movements.

(5) **Light Pen** : This is an input device which is used to draw lines or figures on a computer screen. It's touched to the CRT screen where it can detect **raster** on the screen as it passes.

(6) **Optical Character Rader** : It's a device which detects alpha numeric characters printed or written on a paper. The text which is to be scanned is illuminated by a low frequency light source. The light is absorbed by the dark areas but reflected from the bright areas. The reflected light is received by the photocells.

(7) **Bar Code Reader :** This device reads bar codes and coverts them into electric pulses to be processed by a computer. A bar code is nothing but data coded in form of light and dark bars.

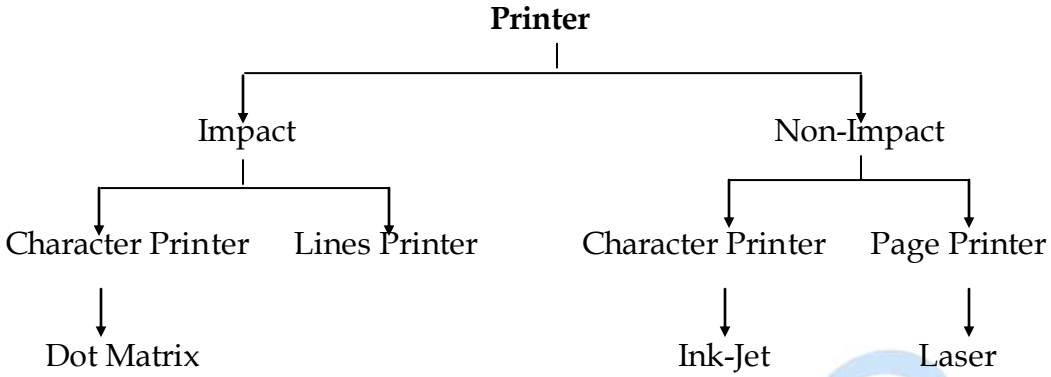
(8) **Voice Input Systems :** This devices converts spoken words to M/C language form. A micro phone is used to convert human speech into electric signals. The signal pattern is then transmitted to a computer when it's compared to a dictionary of patterns that have been previously placed in a storage unit of computer. When a close match is found, the word is recognized.

(9) **Plotter :** Plotter is an O/P device that is used to produce graphical O/P on papers. It uses single color or multi color pens to draw pictures as blue print etc.

(10) **Digital Camera :** It converts graphics directly into digital form. It looks like an ordinary camera, but no film is used therein, instead a CCD (changed coupled Divide) Electronic chip in used. When light falls, on the chip though the lens, it converts light waves into electrical waves.

Q.2. What is a Printer and what are the different types of Printers?

Ans.: Printers are O/P devices used to prepare permanent O/P on paper. Printers can be divided into two main categories :



(1) **Impact Printers** : In this hammers or pins strike against a ribbon and paper to print the text. This mechanism is known as electro-mechanical mechanism. They are of two types.

(i) Character Printer

(ii) Line Printer

(i) **Character Printer :** It prints only one character at a time. It has relatively slower speed. Eg. Of them are Dot matrix printers.

Dot Matrix Printer : It prints characters as combination of dots. Dot matrix printers are the most popular among serial printers. These have a matrix of pins on the print head of the printer which form the character. The computer memory sends one character at a time to be printed by the printer. There is a carbon between the pins & the paper. The words get printed on the paper when the pin strikes the carbon. There are generally 24 pins.

(ii) **Line Printer** : It prints one line of text at a time. They have higher speed compared to character printers. These printers have a poor quality of O/P. Chain printers and Drum printers are examples of line printers.

(2) **Non-Impact Printers** : There printers use non-Impact technology such as ink-jet or laser technology. There printers provide better quality of O/P at higher speed. These printers are of two types :

(i) **Ink-Jet Printer :** It prints characters by spraying patterns of ink on the paper from a nozzle or jet. It prints from nozzles having very fine holes,

from which a specially made ink is pumped out to create various letters and shapes. The ink comes out of the nozzle in a form of vapors. After passing through a reflecting plate, it forms the desired letter/shape at the desired place.

(ii) **Laser Printer :** It prints the entire page in one go. These printers have photo sensitive drum made of silicon. This drum is coated with recharge photoconductive, which is extremely sensitive to light. This drum is exposed to the laser rays reflected from the shapes to be printed. The area where there rays fall gets discharged. This drum while rotating comes in contact with toner and the toner gets attached to the discharged area on the drum. Then when the drum comes in contact with paper, the toner that has got attached to the drum in the original shape gets attached to the paper & hence printing takes place. The paper is slightly heated and the toner gets permanently attached to it.

Q.3. What is the Refresh Rate?

Ans.: The refresh rate is the number of times in a second that display the data it's being given. This is distinct from the measure of from rate in that the refresh rate includes the repeated drawing of identical while trans rate measures how a video source can lead an entire frame of new data to a display.

Q.4. What are the different kinds of Resolutions in the Monitor?

Ans.: Resolution refers to the sharpness, or detail of the usual image. It's a primary function of the monitor & it's determined by the beam size & dot pitch. The screen is made up of a number of pixels. A completes screen image consists of thousand of pixels & the screen resolution in the maximum no. of displayable pixels. Higher the resolution, the more pixels can be displayed. Resolutions are of different for different video standards as listed below :

(a) **VGA :** 1640 x 480

(b) **SVGA :** 800 x 600

(c) **XGA :** 1024 x 768

(d) **SXGA :** 1400 x 1050

Q.5. Explain about LCD Monitors.

Ans.: LCD stands for Liquid Crystal Display. Each pixel of an LCD typically consists of a layer of molecules aligned between 2 transparent electrodes, & 2 polarizing filters, the axis of transmission of which are perpendicular to each other. The surface of the electrodes that are in contact with the liquid crystal material are treated so as to align the liquid crystal molecules in a particular direction.

Q.6. Explain about Video Controller.

Ans.: A video display controller or VDC is an IC which is the main component in a video signal generator, a device responsible for the production of a TV video signal in a compulsory or games system.

Q.7. Explain the different types of Printer:

Ans.: **Thermal Wax Printer** : It uses wax coated ribbon & heated pairs. As the magenta, yellow & black ribbon passes in front of the print head, heated pins melt the wax on to the paper where it hardens.

Thermal wax printers produce vibrant colors but require very smooth or specially coated paper for best O/P.

Dye Sublimation : It's a printer which employs a printing process that user heat to transfer dye to a medium such as plastic card, Printed paper, Poster paper or fabric. The process is usually to lay one color at a times using a ribbon that has color panels.

IRIS Printer : It's a large format color inkjet printer which is used for digital prepress proofing. It uses a continuous inkjet technology to produce continuous-tone O/P on various media including paper canvas etc. They have low costs.

Q.8. What is Magnet-Optical Storage Media?

Ans.: There are used for erasable disks. MO system includes basic principles of both magnetic & optical storage systems. MO systems write magnetically & read optically. It has two standard forms : **5.25 inches & 3.5 inches.**

Q.9. Explain thee following terms -

Ans.: (i) **IDE** : DE stands for Integrated Drive Electronic, It's a high speed, intelligent pathway to connect peripheral to the computers. IDE is a standard according to which IDE interface is made.

(ii) **EIDE** : Its stands for Enhanced IDE. It can interface hard disks, floppy disks optical disk & tape drives. It provides 4 channels. Two EIDE devices can be connected to each channel. Thus a total of 8 EIDE devices can be interfaced to a PC. A motherboard has 2 connectors for EIDE interface.

(iii) **Fast SCSI** : It has increased the maximum SCSI data through put from 5 MBPS to 10 MBPS. Wide SCSI increased speed from 10 MBPS to 20 MBPS.

(iv) **Ultra SCSI** : Also called "Fast 20" the enhancement of SCSI that results in doubling the fast SCSI data throughput speeds to 20 MBPS for 8 bit & 40MBPS for 16 bit processor.

Q.10. What are RAID Levels?

Ans.: In Redundant Arrays of Independent Disks (RAID) system, multiple disks operate in parallel to store the same information. It improves storage reliability. It eliminates the risk of data loss when one of the disk fails. Also, a large file is stored in several disk units by breaking the file up into a number of smaller pieces and storing these pieces on different disks. This is called data stripping.

Q.11. Explain about the Power PC Processes.

Ans.: Power PC Microprocessors were jointly developed by IBM, Motorola and Apple. They are high performances RISC processors. The term superscalar is used for the architecture which uses more than one pipe line for the execution of instructions. Power PC is designed to work in multiprocessor systems. All power PC contain floating –point math, processor & memory management unit on the chip. It's a 32 bit, 66 MHz microprocessor.

Q.12. Describe in brief about Motorola Process Microprocessors.

Ans.: Motorola introduced its first 8-bit microprocessor 6800 in 1974. It was widely used in industry for controlling equipment.

In 1979, Motorola introduced an advanced 16 bit MP 68000. Though its data bus is 16 bit wide, its intended architecture was of 32 bits. It could directly address up to 16 MB memory.

The Motorola 680X0 series of MP's were similar from a programming point of view. An improved m/c of this series can run the software of its predecessor of the series. In 1980s, the 680X0 series were used in desktops and serves computers. They are also used in embedded applications.

Q.13. What are Pits and Lands in CD's.

Ans.: To write 1' & 0's on CD, a laser beam is used. To write 1, the laser beam is turned on, which turns a pit up to the reflecting layer. To write 0, the laser beam is not turned on & hence, no pit is burned. The surface when there is no pit is called land.

Q.14. What are the features of Pentium Microprocessor?

Ans.: The Pentium is Intel 32 bit superscalar CISC microprocessor. The term superscalar is used for the processor which contains multiple ALU's to execute more than one instruction simultaneously in parallel per clock cycle. The Pentium contains 2 ALU's & can execute 2 instructions per clock cycle. Besides 2 ALU's, it also contains one on-chip FPU & 28 KB cache memory (one for instruction & other for data). The Pentium has 32-bit address bus and 64 bit data bus. The data bus used is of 64 bit with a view to supply data at faster rates. It has got 4 varieties Pentium II, Pentium III & Pentium IV.

Q.15. What is PLD & PLA.

Ans.: To implement combinational & sequential circuits, we have to interconnect serial SSI & MSI chips by making connection external to the IC package. Logic circuits can also be designed using Programmable Logic Devices (PLDs) that have all the gates necessary for a logic circuit design in a single package. In such devices, there are provisions to perform the inter connections of the gates internally so that the desired logic can be implemented.

Programmable Logic Array (PLA) is a type of fixed architecture logic device with programmable AND gates followed by programmable OR gates. The PLA is used

to implement a complex combinational circuit. In VLSI design, PLAs are used because the area required by the regular AND & OR arrays is less than the area required by randomly inter connected gates.

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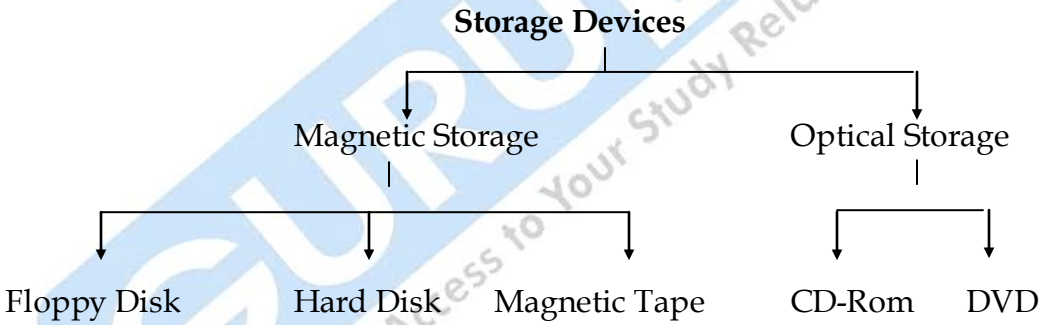
Chapter-4

Storage Devices

Q.1. How can you classify Storage Devices? What are its different types elaborate?

Ans.: Storage devices or secondary storage devices are used to store data and instruction permanently. They are used in computers to supplement the limited storage capacity of RAM.

Storage devices can be categorized in two parts :



Floppy Disk : It's a circular disk coated with magnetic oxide and enclosed within square plastic cover (Jacket). It's available in different size, but the most commonly used floppy is 3½. Data up to 1.44 MB can be stored in it. Data is written as tiny magnetic spots on the dish surface creating new data or a disk surface eraser data previously stored at that location. Floppies are available in 2 sizes, 3.5 inch & 5.25 inch. The 3.5 inch size floppy is mostly used. The 5.25 inch floppy is kept in a flexible cover & it's not safe. It can store about 1.2 MB data.

Hard Disk : Hard disks are made of aluminum or other metal alloys which are coated on both sides with magnetic material. Unlike floppy disks, hark disks are not removable from the computer. To remain the storing capacity several disks

are packed together & mounted on a common drive to form a disk pack. A disk is also called a platter.

Magnetic Tape : Magnetic tape is a mass storage device. It's used as a back up storage. It's a serial access type of storage device. Its main advantage is that it stores data sequentially. Standard sizes are ½ inch or ¼ inch or 8mm & 3mm wide. Some Head names of tapes are: DAT (Digital Audio tape) & DLT (Digital Liner Tape) etc.

Optical Memory : Information is written to or read from an optical disk or tape using laser beam. Optical disks are not suitable memory storage units because their access time is more than that of hard disks. Their advantage is that they have very high storage capacity. Types of optical memory are: CD –ROM, CD-R, CD-RW, DVD-ROM, DVD-R and DVD-RW. Information on a CD-ROM is written at the time of manufacture.

CD-R/W of 700 MB are available.

A DVD-ROM is similar to CD-ROM. It uses shorter wave length of laser beam and hence, stores more data than CD-ROM.

Q.2. Explain about Modem.

Ans.: Modem is abbreviation for Modulator – Demodulator. Modems are used for data transfer from one computer to another through telephone lines. The computer works in digital mode, while analog technology is used for carrying massages across phone lines. Modem converts information from digital mode to analog mode at the transmitting end and converts the same from analog to digital at receiving end. Modems are two types :

(i) Internal Modem

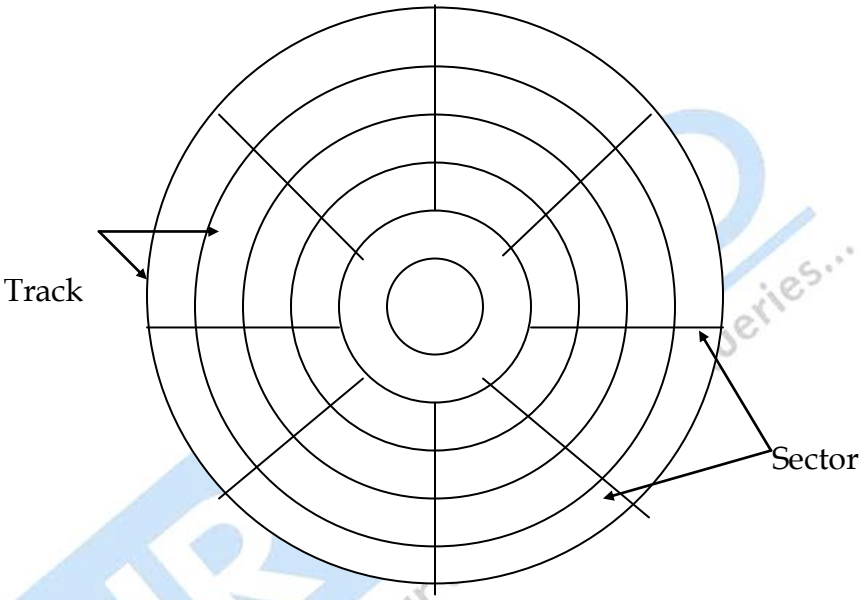
(ii) External Modem

Q.3. What is Formatting?

Ans.: The process of magnetically mapping of a floppy is called formatting. Before storing the data on a floppy, it needs to be magnetically mapped, so that data can be stored in the right place. Every new floppy needs to be formatted before use. Formatting means, creating tracks & sectors on the floppy. Tracks are in the

shape of circles on the floppy which divide it into various segments. The number of tracks depends upon the density of the floppy. In a high density floppy, up to 80 tracks can be created.

If a floppy has 80 tracks with each track having 20 sectors, then the number of sector would be 1600.



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Chapter-5

History of Computers

Q.1. Explain about the evolution of Digital Computers.

Ans.: The successful general purpose mechanical computers were developed. In 1930, mechanical calculations were built for automatic addition, subtraction, multiplication & division. A calculator is not a programmable device. The different eras of the evolution of the computer are listed below:

(1) **Mechanical Era :** There were many attempts to create a m/c that could help to perform various calculations. In 1823, Charles Babbage tried to build a mechanical as computing m/c capable of performing automatic mathematical calculations. This was designed to compute tables of functions such as logs functions etc. In 1830's Babbage made a more powerful mechanical computer. This m/c was designed to perform any mathematical calculation automatically. It could perform addition etc. It had a memory unit. Its capacity was 1000 numbers, each no. consisting of 50 digits. The m/c was a programmable m/c. It had mechanism for enabling a program to change the sequence of its operations automatically. In the late 19^{th} century punched cards were commercially used. Soon IBM was formed in 1924. Konand Zuse developed a mechanical computer, the Z1, in 1938 in Germany.

(2) **The Electronic Era :** The first electronic computer using. Valves were developed by John V. Atanas off in the late 1930's. It contained add-subtract unit. It was relatively a small computer and used about 300 valves. Its memory unit consisted of capacitors mounted on a rotating drum. It used a no. of I/O devices including a card punch and a card reader. The first popular general electronic digital computer was the ENIAC

(Electronic Numerical Interpreter and calculator). John von Neumann was the consultant of the ENIAC project. The ENIAC used a high speed memory to store both programs as well as data during program execution. Neumann and his colleagues designed and build the IAS Computers. It used RAM consisting of a cathode ray tube. The transistors were invented in 1948 at AT&T bell laboratories. Slowly they replaced Vacuum tubes. IC's were first introduced, ie, designed and fabricated in 1958-59. The examples of computers using IC's are-: IBM – 370 & PDP-8. In 1970 LSI chips were introduced is form of memory units. Computers built in 1970's & onwards used micro process and other LSI, VLSI and ULSI components.

Q.2. What were the different Computer Generations?

Ans.: The various generations of the computers an listed below :

(i) **First Generation (1946-1954) :** The digital computes using electronic values (Vacuum tubes) are known as first generation computers. The high cost of vacuum tubes prevented their use for main memory. They stored information in the form of propagating sound waves.

(ii) **Second Generation (1955-1964) :** The second-generation computer used transistors for CPU components & ferrite cores for main memory & magnetic disks & tapes for secondary memory. They used high-level languages such as FORTRAN (1956), ALGOL (1960) & COBOL (1960). I/O processor was included to control I/O operations.

(iii) **Third Generation (1965-1974) :** The third-generation computers used IC's (SSI& MSI) for CPU components. Semiconductor memories were LSI chips, Magnetic disk & tapes were used as secondary memory. Cache memory was also incorporated in the computers of 3rd generation. Micro programming, parallel memory multiprogramming etc were introduced. E.g. Of third generation computers are PDP II etc.

(iv) **Fourth Generation :** In 4th generation computers microprocessors were used as CPU's VLSI chips were used for CPU memory & supporting chips.

Computer of this generation were very fast. 8, 16 & 32 bit microprocessors were developed during this period. Main memory used fast semiconductors chips up to 4 M bits size. Hard disks were used as secondary memory. Keyboards, dot matrix printers etc. were developed. OS-such as MS-DOS, UNIX, Apple's Macintosh were available. Object oriented language, C++ etc were developed.

(v) **Fifth Generation (1991- continued) :** 5th generation computers use ULSI (Ultra-Large Scale Integration) chips. Millions of transistors are placed in a single IC in ULSI chips. 64 bit microprocessors have been developed during this period. Data flow & EPIC architecture of these processors have been developed. RISC & CISC, both types of designs are used in modern processors. Memory chips and flash memory up to 1 GB, hard disks up to 600 GB & optical disks up to 50 GB have been developed.

Q.3. Explain about the Von-Neumann Architectures.

Ans.: In this type of architecture, the computer consisted of a CPU, memory and I/O devices. The program is stored in the memory. The CPU fetches an instruction from the memory at a time and executes it. Thus, the instructions are executed sequentially which is a slow process. Neumann m/c are called control flow computer because instruction are executed sequentially as controlled by a program counter. To increase the speed, parallel processing of computer have been developed in which serial CPU's are connected in parallel to solve a problem.

Even in parallel computers, the basic building blocks are Neumann processors.

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Chapter-6

Logic Gates & Flip Flops

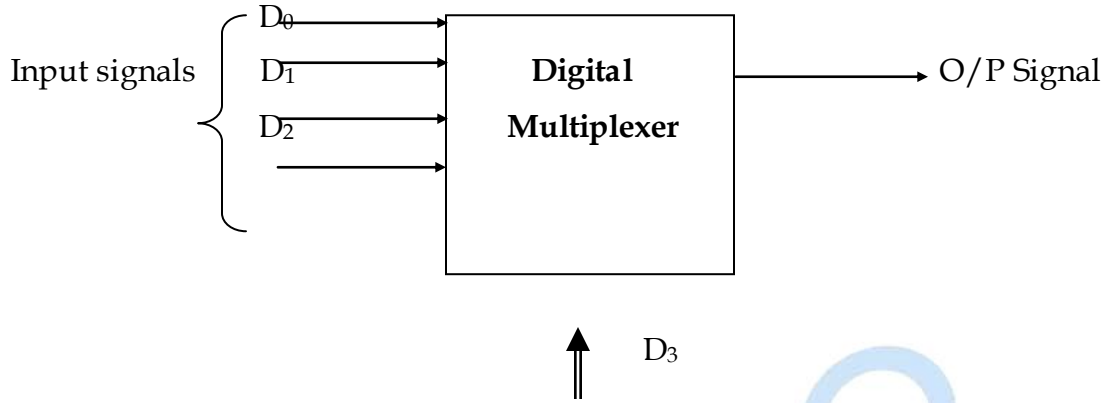
Q.1. What are Logic Gates?

Ans.: A digital computer uses binary number system for its operation. In the binary system there are only 2 digits, 0 and 1. The manipulation of binary information is done by logic circuit known as logic gates. The important logical operations which are frequently performed in the design of a digital system are: (1) AND (2) OR (3) NOT (4) NAND (5) NOR and EXCLUSIVE OR.

An electronic circuit which performs a logical operation is called a logic gate.

Q.2. Explain design of digital multiplexer.

Ans.: A digital multiplexer has N inputs & only one output. By applying control signals any one input can be made, available at the output terminal. It's called data sector. The design is shown below:



The control signals are applied to the select during the select the desired input.

Q.3. What are Combinational & Sequential Circuits?

Ans.: There are two types of logic circuits, Combinational & Sequential. A combinational circuit is one in which the state of the O/P at any instant is entirely determined by the states of the I/P's at that time. Combinational circuits are those logic circuits whose operation can be completely described by a truth table.

A sequential circuit consists of a combinational logic & storage elements. The O/P of a sequential circuit is not only a function of the present I/P's but also of past I/P's. The state of the storage elements depends upon this preceding I/Ps and the preceding states of the elements.

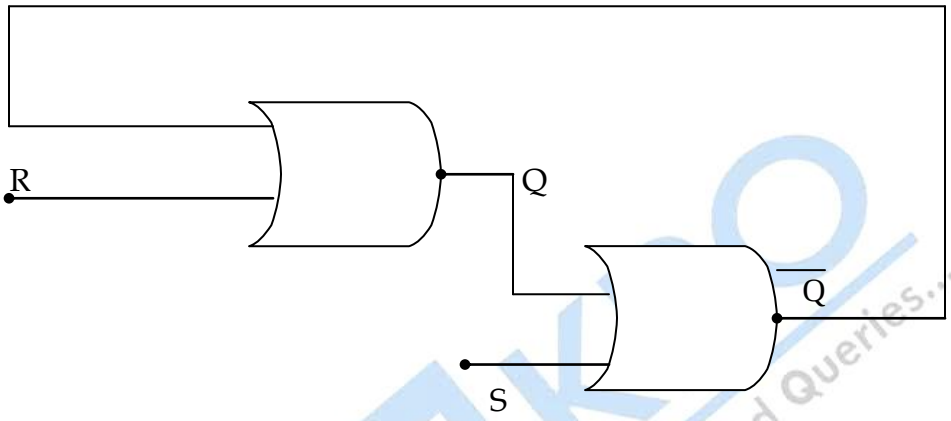
Q.4. What are Flip Flops?

Ans.: A device is said to be bi-stable if it has 2 stable elements. A flip-flop is a bi-stable device. It has 2 stable stales. Its O/P remains either high or low. The high stable state is called SET. The other stable state is called RESET. It can store binary bit, rather 0 or 1. Thus, it has storing capability, i.e., memory.

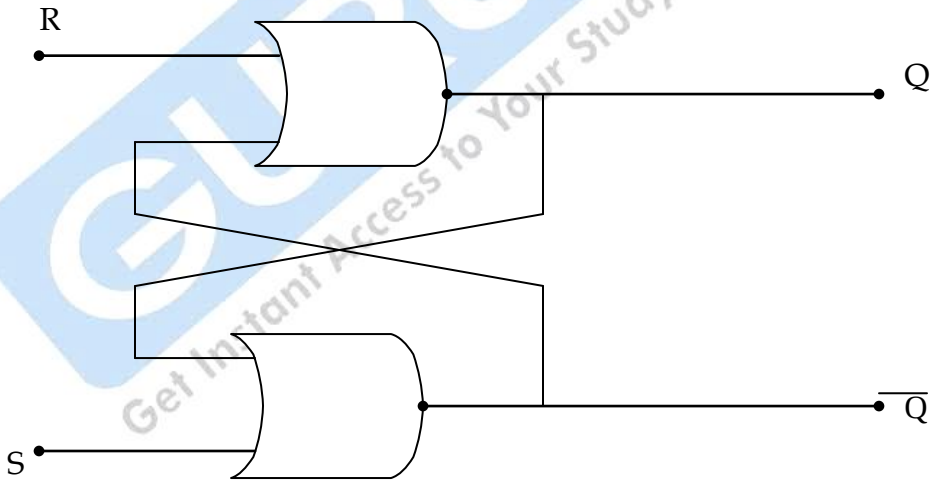
Q.5. What are the different types of Flip-Flops?

Ans.: The following types of flip-flops are listed below :

(i) **S-R Flip-Flop :** A SR flip flop can be realized by connecting 2 NOR gates as shown below :



It can also drawn as :



Q is O/P of the flip-flop; Q is the complement of the O/P. Thus a high on S (keeping R = 0) I/P will make Q = 0. Q' is one of the I/Ps to the upper NOR gate. As both I/P(R & Q') of the upper NOR gate an now low, its output Q with be high. Then the flop-flop stores binary bit 1 when S is made high. Even if the set

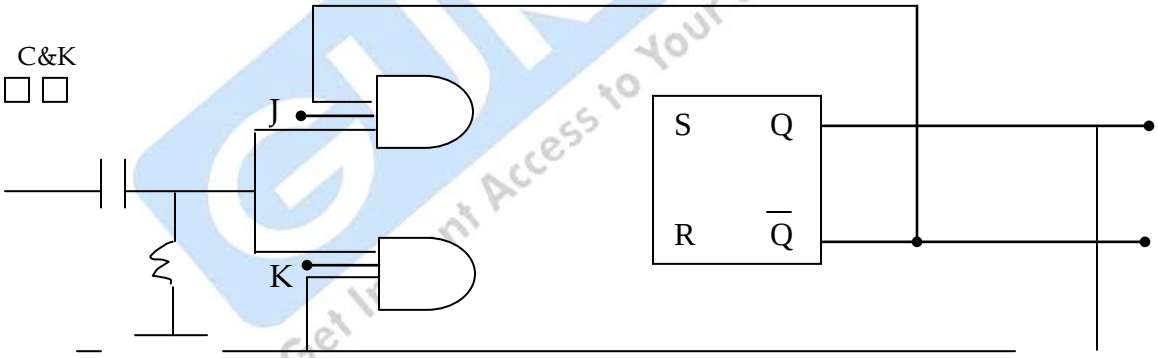
I/P S is removed, this O/P Q will remain 1 because Q is one of the I/Ps of the lower NOR gate. Similarly when reset input R is made, high, keeping S = 0, Q will become low.

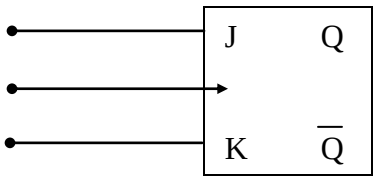
Truth Table for S-R flip flop

R	S	Q	Action
0	0	Last value	No change
0	1	1	Set
1	0	0	Reset
1	1	-	Invalid condition

When both S & R are made high simultaneously, it will make the O/P's of both NOR gates low which is against basic definition of a flip flop.

(ii) **J-K Flip-Flops :** In an S-R flip flop, the state of the O/P is unpredictable when S-R =1. A J–K Flip flop allows inputs J=K = 1. In this situation, the state of the O/P is changed. The complement of the previous state is available at the output terminal.



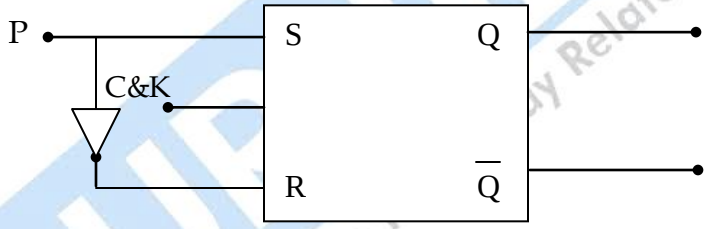


When J and K both are 0, the O/P's of the AND gates will be low, ie, S & R are both low. When S & R are both low, there will be no change in the O/P state. When J= 0 & K = 1; the O/P of the upper AND gate, i.e., S becomes low. Therefore, its not possible to set the flip flop. As K=1, the of O/P of the lower & AND gate, ie, R will be high if the other input of the gate Q is high.

The truth table in shown below :

	Inputs		Outputs
C& K	J	K	Q_n+1
X	0	0	Q_n (No change remain in last table)
1	1	0	1
1	0	1	0
1	1	1	Q_n (toggle)

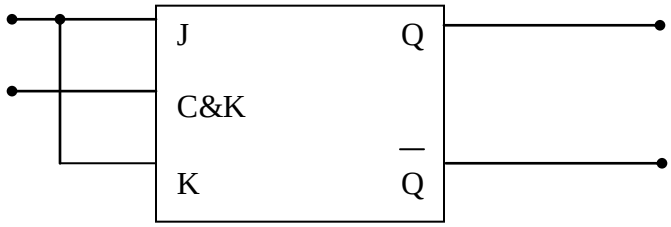
(iii) **D-Flip Flops :** An S-R flip flop has 2 inputs S& R. To store 1, a high S and low R an required. To store 0, a high R & low S are needed. Thus, 2 signals are to be generated to drive a S-R flip flop. A D-flip flop cab be realized using an S-R flip-flop as shown.



The truth table for D flip flop is shown below :

d K	D input	Q_n+1
0	x	Q_n (last state)
1	1	1
1	0	0
1	x	Q_n (last state)

(iv) **T-Flip Flop :** A T-flip flop acts a toggle switch. Toggle means to switch over to the opposite state. It can be realized using a J-K flip flop by making T= J = K = 1,as shown in the figure below :



Truth Table :

Input	Output
T	Q_n +1
0	Q_n
1	Q_n

Q.6. What are Shift Registers?

Ans.: In a shift register, the flip-flops are connected in series. The O/P of each flip-flop is connected to the I/P of the adjacent flip flop. The contents of a shift register can be shifted within the registers without changing the order of the bits. Data are shifted one position left or right at a time when 1 clock pulse is applied. Shift register are used for the temporary storage of data. They are suited for processing serial data; converting serial data to parallel data & vice versa. Then are 4 types of shift registers.

(ii) Serial In - Serial Out

(iii) Serial In - Parallel Out

(iv) Parallel In - Serial Out

(v) Parallel In - Parallel Out

Q.7. What is a Counter? Explain.

Ans.: A Digital counter consists of a number of flip flops. Their function is to count electrical pulses. To count certain events, electrical pulses proportional to the event are produced for the counting purpose. Counters can also be used to count time interval or frequency. For such purposes, clock pulses are applied to the

counter so the clock pulses occur at certain known intervals, the no. of pulses are proportional to time. Therefore, the time intervals can be easily measured. The frequency is inversely proportional to time. So, the frequency can also be measured.

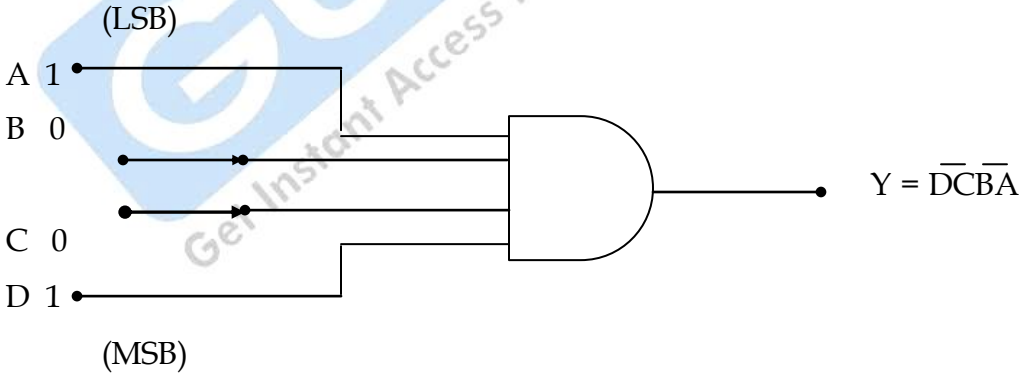
There are 2 types of counters, synchronous & asynchronous. In a synchronous counter, all flip-flops are clocked simultaneously. On the other hand, in asynchronous counter the flip flops are not clocked simultaneously. Each flip flop is triggered by the pervious flip flop.

Q.8. Explain about De-coders.

Ans.: A decoder is similar to demultiplexer without any data input. Most digital system require decoding of data. Decoding is necessary in applications such as data demultiplexing digital display, digital to analog converters etc. A decoder is a logic circuit that converts an n-bit binary input code (data) in 2^n O/P lines, such that each O/P lines will be activated for only one of the possible combinations of I/Ps.

In a decoder, the number of O/P is greater than the number of I/Ps.

The circuit for a basic binary decoder is shown below :



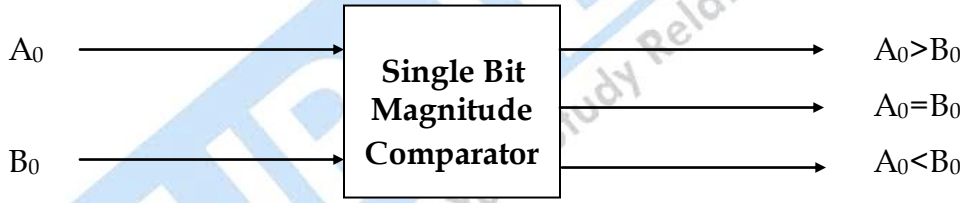
Q.9. What is an Encoder?

Ans.: An encoder is a digital circuit that performs the inverse operation of a decoder. Hence, the opposite of the decoding process is called encoding. An encoder is a combinational logic circuit that converts an active input signal into a coded O/P signal.

It has n I/P lines, only one of which is active at any time and m O/P lines. It encodes one of the active i/p's to a loaded binary O/P with m bits. In an encoder the number of O/Ps is less than the number of I/Ps.

Q.10. What are Comparators?

Ans.: A magnitude comparator is a combinational circuit that compares the magnitude of 2 No's (A&B) and generates our of the following O/Ps : A:B, A <B & A>B. The block diagram of a single bit magnitude comparator is shown below :



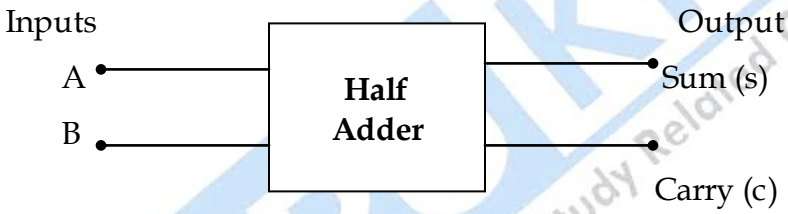
To implement a comparator, the Ex-NOR gates and AND gates are used. The property of the Ex-NOR gate can be used to find whether 2 binary digits are equal or not, and the AND gates are used to find whether a binary digit is less than or greater than the other digit.

Q.11. Explain about Adders.

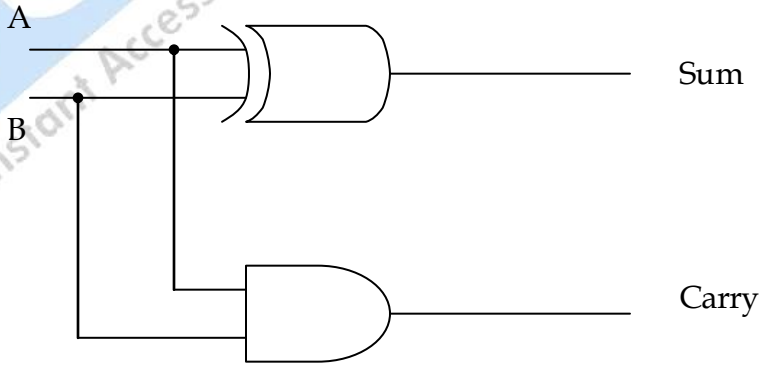
Ans.: **Half Adder** : It performs addition of 2 binary digits. The half address has 2 inputs and 2 O/P's. The 2 i/p's are the two 1 bit numbers A& B, & the two O/Ps are the sum (s) of A& B and the carry bit denoted by C. The truth table is given below :

Inputs		Outputs	
Augend	**Addend**	**Sum**	**Carry**
A	B	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

(i) Logic Symbol :

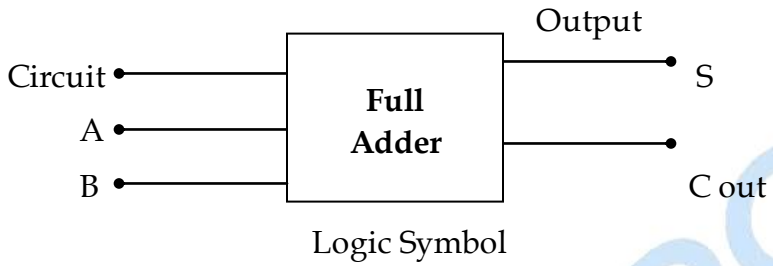


(ii) Logic Diagram :



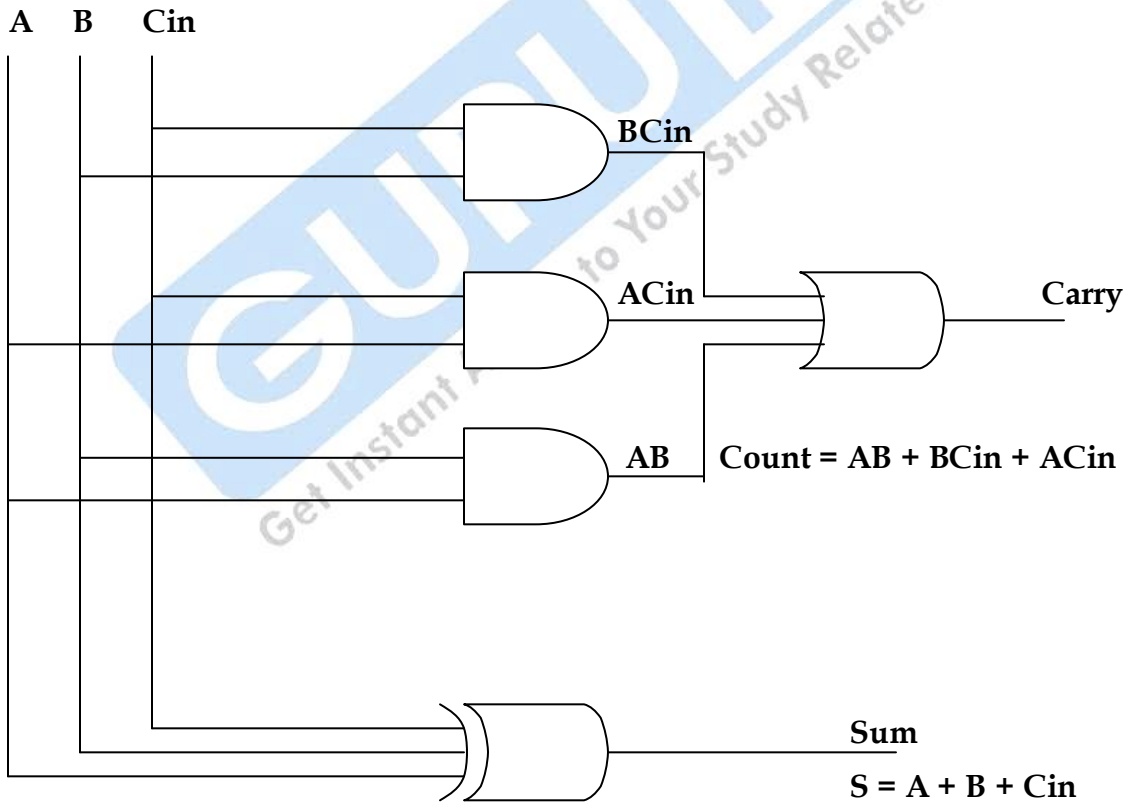
Full Adder : A half adder has only 2 I/Ps and there is no provision to add a carry coming from the lower order bits when multi bit addition is performed. For this

purpose, a full adder is designed. A full adder is a combinational circuit that performs the arithmetic sum of 3 inputs bits & produces a sum O/P and a carry.



Logic Symbol

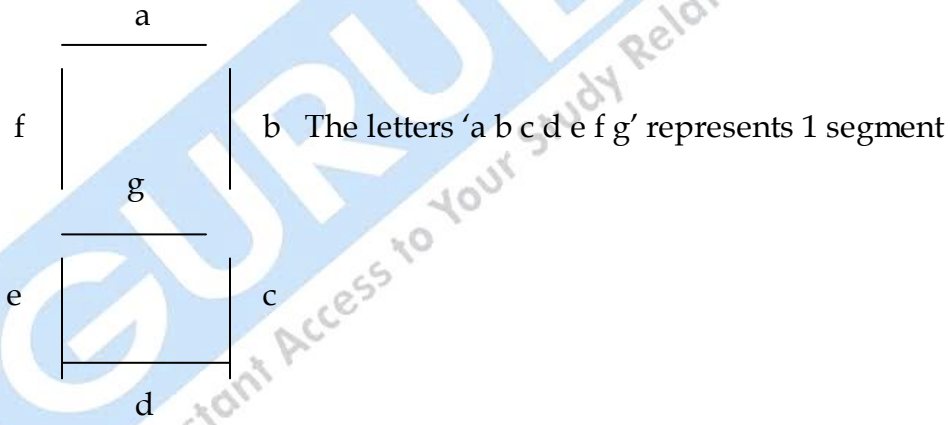
Logic Diagram :



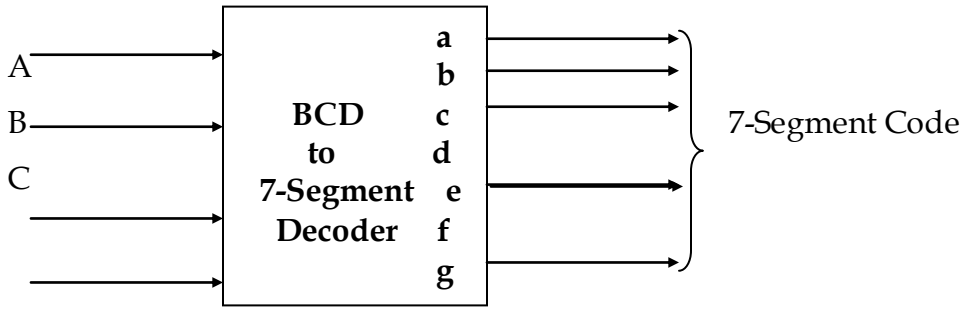
Q.12. Explain BCD to 7-Segment Decoder.

Ans.: A seven segment display is normally used for displaying any one of the decimal digits, 0 through 9. A BCD to 7-segment decoder accepts a decimal digit in BCD and generates the corresponding seven segment code.

Fig. below shows the seven-segment display composed of seven segments. Each segment is made up of a material that emits lights when current is passed through it.



The block diagram for the seven segment display is shown below :



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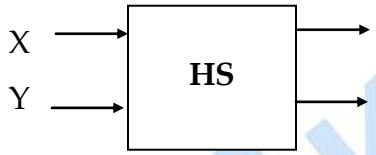
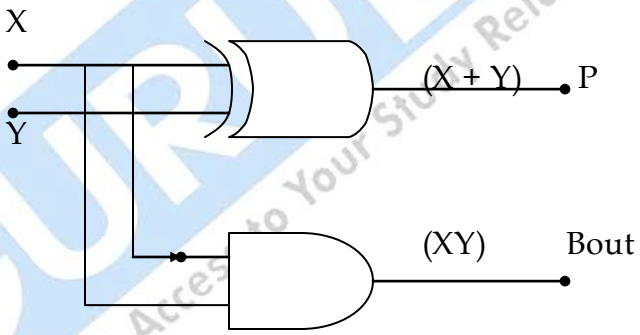
Q.13. Explain about Sub tractors.

Ans.: Subtractors are of two types :

(i) **Half Subtractor :** It's a combinational circuit which is used to perform subtraction of 2 bits. It has 2 inputs X (minuend) & Y (Subtrahend) & 2 O/Ps. The logic symbol is shown below :



The logic diagram is shown below :

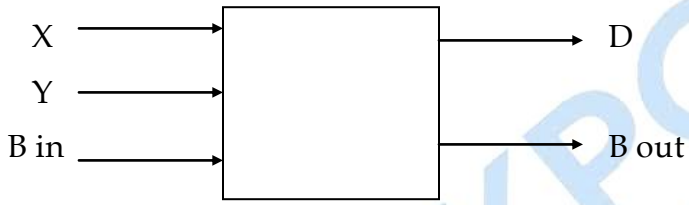


Logic Table :

I/P		**O/Ps**	
X	**y**	**D**	**Borrow**
0	0	0	0
0	1	1	1
1	0	1	0

1 1 0 0

Full Subtractor : A full sub tractor is a combinational circuit performing subtraction of 3 bits, namely minuend bit, Subtrahend bit & the borrow from the previous stage. The logical symbol is shown below :



The table is shown below :

I/P's			O/P's	
Minuend bit X	**Subtrahend Y**	**Borrow In Bin**	**Dullin D**	**Borrow Out Bout**
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

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Chapter-7

Addressing Concepts

Q.1. Explain in detail about the concept of Addressing in the Memory.

Ans.: Each instruction needs data on which it has to perform the specified operation. The data may be in the accumulator, GPR (general purpose registers) or in some specified memory location. The techniques of specifying the address of the data are known as addressing modes. The important addressing modes are as follows :

(i) Direct Addressing

(ii) Register Addressing

(iii) Register Indirect Addressing

(iv) Immediate Addressing

(v) Relation Addressing

(i) **Direct Addressing :** In this, the address of the data is specified within the instruction itself. Example of direct addressing is :

(a) **STA 2500H :** store the contents of accumulator in the memory location 2500H.

(ii) **Register Addressing :** In register addressing, the operands are located in the general purpose registers. In other words the contents of the register are the operands. Therefore only this name of the register is to be specified in the instruction. E.g. of register addressing are :

(a) **MOV A, B :** Transfer the contents of register B to register A.

(iii) **Register Indirect Addressing :** In this, the address of the operand is given directly. The contents of a register or a registers pairs are the address of the operand.

Example : LX1 H, 2400H--> load H-L pair with 2400 H.

(a) **MOV A, M :** Move the contents of the memory location whose address is in H-L pair to the accumulator.

(iv) **Immediate addressing :** In this the operand in given in the instruction itself. E.g.

(a) **MVI A, 06 :** Move 06 to accumulator.

(v) **Relation Addressing :** In this a signed displacement is added to the current value of the program counter to form the effective address. This is also known as PC relative addressing.

Q.2. Explain the concept of Paging in contest of Memory.

Ans.: In page oriented memory, the memory is divided into pages. A page has a fixed length, 4KB or 4MB length. The logical address is represented by the page address and the page offset. The page address points to a descriptor table. The function of a descriptor is same as that in the case of a memory Segment Scheme. When the demanded page is not present in the physical memory, a page fault is triggered. This informs the OS to swap the desired page. This type of memory management schemes is known as demand-paged virtual memory scheme.

Q.3. What is an Instruction Cycle?

Ans.: The main function of a CPU is to execute programs. A program converts of a sequence of instruction s to perform a particular task. Program as stored in a memory. The CPU fetcher one instruction at a time from the memory & executes it. Then it fetcher the vent instruction to execute it. The CPU repeats this process till it executes all the instruction of the program. Thereafter, it may take another program if any, to execute.

The necessary steps that the processor has to carry out for fetching an instruction from the memory and executing an instruction from the memory and executing it, constitute an instruction cycle. An instruction cycle consists of 2 parts. Fetch cycle & a execute cycle. In fetch cycle the CPU fetcher the m/c code of this instruction from the memory. The necessary steps that are carried out to the fetch an opcode from the memory constitute a fetch cycle. In execute cycle an instruction is

executed. The necessary which are carried to execute an instruction constitute are execute cycle.

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Chapter-8

Instructions & I/O Subsystems

Q.1. What is an Instruction?

Ans.: An instruction is a command given to the computer to perform a specified operation on given data. Each instruction consists of 2 parts: an opcode and an operand. The first part of an instruction, which specifies the operation, to be performed is known as opcode. The second part of an instruction called operand is the data on which computer perform the specified operation.

As a computer understands instructions only in the form of 0 & 1, instruction and data are fed into the computer is a binary form. They are written in binary codes known as machine codes. For the convenience of this user the codes can be written in hexical form.

Instructions are classified into the following three types according to their word length :

(i) Single Byte Instruction

(ii) Two Byte Instruction

(iii) Three Byte Instruction

Q.2. Explain about the I/O Subsystem.

Ans.: The Input-Output devices and secondary units of a computer are called peripherals. The term peripheral is used in a under sense includes interfacing devices such as I/P port, programmable peripheral interface, DMA controller, communication interface, counter / internal timers etc.

(i) **I/P Devices :** Data & instruction are entered into a computer through I/P devices. An I/P device converts I/P data & instruction into suitable binary form which can be accepted by the computer. Examples of I/P devices are:

(a) keyboards

(b) Mouse

(c) Joystick

(d) Trackball

(e) Touch screen etc.

(ii) **O/P Devices :** The O/P devices receive information from the computer & provide them to the users. The computer sends information to the O/P devices in binary coded forms. The O/P devices count them into a form which can be used by users such as printed form or display on a screen.

Q.3. Explain CPU Organization.

Ans.: The CPU is the brain of the computer. Its main function is to execute programs. It has three main sections :

(i) Arithmetic & Logical Units (ALU)

(ii) Control Unit

(iii) Accumulator & General & Special Purpose Registers

(i) **ALU :** The function of an ALU is to perform basic arithmetic & logical operation take

(a) Addition

(b) Subtraction etc.

It cannot perform exponential, logarithmic, trigonometric operations.

(ii) **Control Unit :** The control units of a CPU controls the entire operation of the computer. It also controls all other devices such as memory input & output devices. It fetcher instruction from the memory, decodes the instruction, interprets the instruction to know what tasks are to be performed & sends suitable control signals to the other components to

perform further operation. It maintains the order & directs the operation of the entire system. It controls the data flow between CPU & peripherals.

Under the control of the CU the instructions are fetched from the memory one after another for execution until all the instructions are executed.

(iii) **Register :** A CPU contains a number of register to store data temporarily during the execution of a program. The number of registers differs from processor to processor. Register are classified as follows :

(a) **General Purpose Registers** : There registers store data & intermediate results during execution of a program. They are accessible to users through instructions if the users are working in assembly language.

(b) **Accumulator** : Its the most important GPR having multiple functions. It's most efficient in data movement, arithmetic and logical operation. It has some special features that the other GPR do not have. After the execution of arithmetic and logical instruction the result is placed in the accumulator.

(iii) **Special Purpose Register :** A CPU contains a number of special purpose register for different purposes. There are :

(a) Program Counter (PC)

(b) Stack Pointer (SP)

(c) Instruction Register (IR)

(d) Index Register

(e) Memory Address Register (MAR)

(f) Memory Buffer Register (MBR)

(a) **PC :** The PC keeps track of the address of the instruction which is to be executed next. So it holds the address of this memory location, which contains the rent instruction to be fetched from the memory.

(b) **Stack Pointer (SP) :** The stack is a sequence of memory location defined by the user. It's used to save the contents of a register if it's required during the execution of a program. The SP holds the address of the last occupied memory location of the stack.

(c) **Status Register (Flag Register) :** A flag register contains a number of flags either to indicate certain conditions arising after ALU operation or to control certain operations. The flags which indicate a condition are called control flags. The flags which are used to control certain operation are called control flags.

A single micro processor contains the following condition flags :

(1) **Carry Flag :** Indicates whether there is a carry not.

(2) **Zero Flag :** Indicates whether the result is zero or non zero.

(3) **Sign Flag :** Indicates whether the result is positive or negative.

(4) **Parity Flag :** Indicates whether the result contains odd number of 1's or even number of 1's.

(d) **Instruction Register :** It holds the instruction to be decoded.

(e) **Index Register :** They are used for addressing. One or more registers are designated as index register. The address of an operand is the sum of the contents of the index registers and a constant. Instruction involving index register contain constants. This constant is added to the contents of index register to form the effective address.

(f) **Memory Address Register (MAR) :** It holds the address of the instruction or data to be fetched from the memory. The CPU transfers the address of the next instruction from the PC to MAR. From MAR it's sent to be memory through the address bus.

(g) **Memory Buffer Register (MBR) :** It holds the instruction code or data received from on sent to the memory. It's connected to data bus. The data, which are written into the memory are held in this register until the next operation is completed.

Q.4. What is System Bus and what are its different architecture and standards?

Ans.: Memory & peripheral devices are connected to the processor through a group of lines called a **Bus.** Three types of buses namely : **Address Bus, Data Bus & Control Bus** have already been discussed. Important bus standards are :

(i) ISA Bus (ii) PCI Bus

(iii) AGP (iv) EISA □ □ □

BACHELOR OF COMPTER APPLICATIONS
(PART0I) EXAMINATION
COMPUTER ARCHITECTURE
Paper-116

OBJECTIVE PART- I

Year - 2011

Time allowed : One Hour **Maximum Marks : 20**

The question paper contains 40 multiple choice questions with four choices and student will have to pick the correct one (each carrying ½ mark).

1. What is the example of motherboard?
   (a) CYRI X
   (b) ADM
   (c) 810chipset
   (d) None of the above ( )

2. CISC machines :
   (a) have fewer instructions than RISC machine
   (b) use more RAM than RISC machine
   (c) have medium clock speed
   (d) use variable size instructions ( )

3. Power PC Microprocessor design is based on :
   (a) RISC architecture
   (b) CISC architecture
   (c) Both (a) and (b)
   (d) None of the above ( )

4. CMOS stands for:
   (a) Complete-Metal-Oxide-Semiconductor
   (b) Complementary-Metal-Oxide-Semiconductor
   (c) Cyrix-Metal-Oxide-Semiconductor
   (d) None of the above ( )

5. VRAM stands for:
   (a) Video Random Access Memory
   (b) Video Random Only Memory
   (c) Video Controller Memory
   (d) None of the above ( )

6. Cache memory is used in computer system to:
   (a) Ensure fast booting (b) Replace static memory
   (c) Replace hard disk (d) Speed up memory access ( )

7. Which one is the group of the system buses?
   (a) Address bus, Cycle bus, Control bus
   (b) Data bus, Address bus, Control bus
   (c) Data bus, Control bus, System Clock bus
   (d) None of the above ( )

8. Which one is the component of video card?
   (a) Graphics Processing Unit
   (b) Random Access Memory Digital to Analog converter
   (c) Motherboard interface
   (d) All of the above ( )

9. USB stands for:
   (a) Uniform serial bus
   (b) Universal serial bus
   (c) Unique serial bus
   (d) None of the above ( )

10. Which one is the touch screen technology?
    (a) Resistive technology
    (b) Surface acoustic wave
    (c) Projected capacitance
    (d) All of the above ( )

11. Which one is the video input device?
    (a) Mouse
    (b) Keyboard
    (c) Webcams
    (d) None of the above ( )

12. Which combination is true?
(a) Keyboard → Output Device (b) Mouse → Output Device
(c) Printer → Output Device (d) OMR → Output Device ( )

13. Off-line storage is also known as:
(a) disconnected storage
(b) dynamic storage
(c) parallel storage
(d) none of the above ( )

14. The capacity of CD-ROM is around:
(a) 100 MB (b) 650 MB
(c) 1 GB (d) 4 GB ( )

15. A virtual memory is:
(a) a form of ROM
(b) related to virtual reality
(c) a form of RAM
(d) none of the above ( )

16. Which is the largest unit of storage among the following?
(a) Terabyte (b) Kilobyte
(c) Megabyte (d) Gigabyte ( )

17. Which of the following based on stored program concept?
(a) ENIAC (b) EDSAC
(c) EDVAC (d) UNIVAC ( )

18. Vacuum tube was used in……generation of computer.
(a) I (b) II
(c) III (d) IV ( )

19. Which of the following gates is known as universal gate?
(a) AND gate (b) NAND gate
(c) OR gate (d) NOT gate ( )

20. D-flip-flop is :
(a) Data/Delay flip-flop
(b) Demux
(c) Data communication flip-flop

(d) None of the above ( )

21. Which device has one input and many output?
(a) Flip-flop (b) Multiplexer
(c) Demultiplexer (d) Counter ( )

22. A process is a……. .
(a) Single thread of execution (b) Program in execution
(c) Program in memory (d) Task ( )

23. Opecode field specifies the …….. .
(a) Operation code field
(b) Operand field
(c) Both (a) and (b)
(d) None of the above ( )

24. In register addressing mode, operand present in:
(a) Register
(b) Instruction
(c) Program counter
(d) None of the above ( )

25. BTB stands for :
(a) Branch translation buffer (b) Backtracking buffer
(c) Branch target buffer (d) Block translation buffer ( )

26. MAL stands for:
(a) Minimum average latency (b) Minimum allocation latency
(c) Maximum average latency (d) Maximum allocation latency ( )

27. Latencies that cause collision are called:
(a) Coollision latency
(b) Detected latency
(c) Forbidden latency
(d) All of the above ( )

28. Cir and cil are types of:
(a) Shift Micro operation
(b) Arithmetic operation
(c) Logical operation

(d) None of the above ( )

29. Which part of the computer performs arithmetic calculations?
(a) ALU
(b) Registers
(c) Logic bus
(d) None of the above ( )

30. RISC stands for:
(a) Reduced Instruction Set Cycle
(b) Reloaded Instruction Set Computer
(c) Reduced Instruction Set Computer
(d) None of the above ( )

31. A computer has a 64K memory. What does the letter K stands for:
(a) 1000 (b) Kilometer
(c) 1024 (d) 1064 ( )

32. Which is not true for cache memory mapping?
(a) Associate mapping (b) Direct mapping
(c) Direct associate mapping (d) Set associative mapping ( )

33. Which memory allows the address space to be large than the memory space?
(a) Cache memory (b) Main Memory
(c) Virtual memory (d) Auxiliary memory ( )

34. Which of the following is not a sequence storage device?
(a) Magnetic disk
(b) Magnetic tape
(c) Paper tape
(d) All of the above ( )

35. Cache memory is used in computer system to:
(a) Ensure3 fast booting (b) Replace static memory
(c) Replace hard disk (d) Speed-up memory access ( )

36. An external processor which communicates direct will all I/O devices without any intervention of CPU is called:
(a) Multiprocessor (b) I/O processor
(c) External processor (d) Microprocessor ( )

37. The technique, when peripheral device directly access the memory without any intervention of CPU is called:
    (a) Strobe control (b) DMA
    (c) Handshaking (d) Polling ( )

38. Which of the following transmissions is preferred in high speed transmission?
    (a) Synchronous transmission
    (b) Asynchronous transmission
    (b) Both of the above
    (d) None of the above ( )

39. Which monitor has a maximum resolution of 1024 X 768?
    (a) SXGA (b) XGA
    (c) SVGA (d) VXGA ( )

40. Which of the following is not included on a computer's motherboard?
    (a) RAM chips (b) Microprocessor
    (c) Keyboard (d) Expansion slots ( )

Answer Key

1. ( )	2. ( )	3. ( )	4. ( )	5. ( )	6. ( )	7. ( )	8. ( )	9. ( )	10. ( )
11. ( )	12. ( )	13. ( )	14. ( )	15. ( )	16. ( )	17. ( )	18. ( )	19. ( )	20. ( )
21. ( )	22. ( )	23. ( )	24. ( )	25. ( )	26. ( )	27. ( )	28. ( )	29. ( )	30. ( )
31. ( )	32. ( )	33. ( )	34. ( )	35. ( )	36. ( )	37. ( )	38. ( )	39. ( )	40. ( )

DESCRIPTIVE PART-II

Year- 2011

Time allowed : 2 Hours **Maximum Marks : 30**

Attempt any four descriptive questions out of the six. All questions carry 7½ marks each.

Q.1 (a) Explain the primary and secondary memory.

(b) What do you mean by printer? Explain different types of printers.

Q.2 (a) Explain NAND and NOR gates.

(b) Differentiate between encoder and decoder.

Q.3 Differentiate between combination circuits and sequential circuit and explain multiplexer and de-multiplexer with an example.

Q.4 (a) What do you understand by implied addressing mode? Explain with suitable example

(b) Explain opcode and operand part of an instruction with example.

Q.5 (a) What is mapping? Explain different types of mapping function.

(b) What is virtual memory? Write advantages of virtual memory.

Q.6 Write short notes on the following:

(a) DMA (Direct Memory Access).

(b) Instruction cycle

(c) Pipelining.

COMPUTER ARCHITECTURE

OBJECTIVE PART- I

Year - 2010

Time allowed : One Hour **Maximum Marks : 20**

The question paper contains 40 multiple choice questions with four choices and student will have to pick the correct one (each carrying ½ mark).

1. A byte corresponds to:
   (e) 4 bits (b) 8 bits
   (c) 16 bits (d) 32 bits ( )

2. The system bus is made up of:
   (a) Data bus
   (b) Data bus and address bus
   (c) Data bus and control bus
   (d) Data bus, control bus and address bus ( )

3. Cache memory enhances:
   (a) Memory capacity
   (b) Memory access time
   (c) Secondary storage capacity
   (d) Secondary storage access time ( )

4. An XOR operation is realized using the following expression:
   (c) F = A'B' = AB' (b) F = A'B' + AB
   (c) F = (A'+B'). (A+B') (d) F = (A'+B').(A+B) ( )

5. VGA stands for :
   (a) Video Graphics Array (b) Virtual Graphics Adaptor
   (c) Video Graphics Adaptor (d) Virtual Graphics Array ( )

6. The time required by the read/write head to reach the desired track in Magnetic disk is known as:
   (a) Seek Time (b) Search Time
   (c) Latency Time (d) Track Search Time ( )

7. Cache memory is implemented with using of:
   (a) DRAM
   (b) EEPROM
   (c) EPROM
   (d) None of the above ( )

8. The memory which is programmed at the time it manufactured:
   (a) ROM
   (b) RAM
   (c) PROM
   (d) All of the above ( )

9. Which of the following is/are basic computer registers:
   (a) PC
   (b) DR
   (c) ACC
   (d) All of the above ( )

10. A CPU consist of:
   (a) *ALU Only*
   (b) Control Unit Only
   (c) ALU, Control Unit and Registers
   (d) None of the above ( )

11. The process of accessing informing on a CD-ROM is:
   (a) Random
   (b) Sequential
   (c) Semi-random
   (d) None of the above ( )

12. SIMM sands for:
   (a) Single Instruction Memory Management
   (b) Single In-line Memory Module
   (c) Single Instruction Memory Module
   (d) Single In-line Memory Management ( )

13. The number or memory locations that a CPU with a 16-bit program counter can address:
   (a) 16 k (b) 256 k
   (c) 64 k (d) 32 k ( )

14. Cache memory is:
    (a) Temporary memory
    (b) Primary
    (c) High speed memory
    (d) All of the above ( )

15. Compare with secondary storage, primary storage is:
    (a) Slow and inexpensive (b) Fast and inexpensive
    (c) Fast and expensive (d) Slow and expensive ( )

16. RAM is:
    (a) Ream Only Memory
    (b) Write Only Memory
    (c) Read/Write Memory
    (d) None of the above ( )

17. One kilo byte is:
    (a) 1024 bits (b) 1064 bits
    (c) 1026 bits (d) 1000 bits ( )

18. A 4 – bit ring counter is initially loaded with:
    (a) 0000 (b) 0001
    (c) 1110 (d) 1111 ( )

19. How many full addresses are needed to add two 4-bit numbers?
    (a) 8 (b) 2
    (c) 4 (d) 16 ( )

20. An asynchronous counter can be designed using:
    (a) 4 flip - flops (b) 5 flip – flops
    (c) 10 flip flops (d) 6 flip – flops ( )

21. Which of the following is the internal memory of the computer?
    (a) CPU registers
    (b) Cache memory
    (c) Main memory
    (d) All of the above ( )

22. What does CISC stand for?

(a) Complex instruction set-computer
(b) Counter instruction set computer
(c) Complex instruction set counter
(d) Counter instruction set complex ( )

23. A multiplexer is a circuit with:
(a) Many inputs and a single output
(b) Many inputs and many outputs
(c) One input and many outputs
(d) None of the above ( )

24. Performance of a cache memory is measured in terms of:
(a) Hit ratio (b) Miss ration
(c) Direct ratio (d) Indirect ratio ( )

25. D type of flip – flop can be designed with:
(a) S-R Flip flop
(b) $J-K\ flip-flop$
(c) $T\ flip-flop$
(d) All of the above ( )

26. The poritiy bit is used for:
(a) Error checking (b) Coding
(c) Redudancy (d) Indexing ( )

27. Direct address are as same as:
(a) Effective address
(b) Address of operands
(c) Both (a) and (b)
(d) One of the above ( )

28. CPU of a computer system does not contain:
(a) Main storage
(b) *Arithmetic unit*
(c) Special register group
(d) None of the above ( )

29. Which of the following is the slowest in accessing data?
(a) Zip disk (b) *Hard disk*
(c) Floppy disk (d) Magnetic tape ( )

30. Which Gate is known as Universal Gate?
    (a) NOT gate (b) AND gate
    (c) NAND gate (d) XOR gate ( )

31. Data transfer rate in a modem is measured in:
    (a) Bits per sound (b) *bits per minute*
    (c) Cycles per second (d) Bits per hour ( )

32. The process of preparing a disk with tracks and sector is called:
    (a) Formatting (b) Caching
    (c) Surging (d) Crushing ( )

33. A storage device can be:
    (a) Direct access
    (b) Sequential access
    (c) Both (a) and (b)
    (d) None of the above ( )

34. The OCR stands for:
    (a) Outsized character reader
    (b) Optical character recognition
    (c) Operational character reader
    (d) Only character reader ( )

35. The NOR gate is logically equivalent to an OR gate followed by an:
    (a) AND (b) XOR
    (c) NOR (d) XNOR ( )

36. Storage device can be:
    (a) Sequential
    (b) Direct access
    (c) Both (a) and (b)
    (d) None of the above ( )

37. Effective address in addressing mode is:
    (a) Address of an instruction
    (b) *Address of the operation code*
    (c) Address of the operand to fetch
    (d) Contents of program counter ( )

38. The number of select input lines in 1 to 16 demultiplexer is:
(a) 1 (b) 4
(b) 8 (d) 16 ( )

39. The distance between the phosphor dots that make up a single pixel is called:
(a) Resolution (b) Dot pitch
(c) Dot distance (d) Dot rate ( )

40. Which of the following bus is bi- directional?
(a) Address bus
(b) data bus
(c) Control bus
(d) All of the above ( )

Answer Key

1. (b)	2. (d)	3. (a)	4. (d)	5. (c)	6. (a)	7. (b)	8. (c)	9. (d)	10. (c)
11. (a)	12. (b)	13. (c)	14. (d)	15. (c)	16. (c)	17. (a)	18. (a)	19. (c)	20. (a)
21. (d)	22. (a)	23. (a)	24. (a)	25. (a)	26. (a)	27. (c)	28. (a)	29. (d)	30. (c)
31. (a)	32. (a)	33. (c)	34. (b)	35. (c)	36. (c)	37. (c)	38. (b)	39. (c)	40. (b)

DESCRIPTIVE PART-II

Year- 2010

Time allowed : 2 Hours **Maximum Marks : 30**

Attempt any four descriptive questions out of the six. All questions carry 7½ marks each.

Q.1 (a) What is flip-flop? Explain S-R flip-flop in detail with a diagram and characteristic table.

(b) What do you mean by combinational logic? Explain half and full adder in detail.

Q.2 (a) What is a register? Explain shift registers in details.

(b) What is cache memory? Why is it called high speed memory? Explain cache-hit and cache miss.

Q.3 (a) Explain the concept of input-output interfacing and I/O processor.

(b) What is an encoder? Explain priority encoder in detail.

Q.4 (a) What do you mean by addressing modes? Explain indirect and indexed addressing modes in detail.

(b) Differentiate between RISC and CISC.

Q.5 (a) What is an interrupt? Explain the concept of priority interrupts.

(b) What is direct memory access? Explain DMA controller.

Q.6 Write short notes on the following :

(a) Programmable Logic Array (PLA)

(b) Random Access Memory (RAM)

(c) Instruction Execution Cycle

COMPUTER ARCHITECTURE

OBJECTIVE PART- I

Year - 2009

Time allowed : One Hour **Maximum Marks : 20**

The question paper contains 40 multiple choice questions with four choices and student will have to pick the correct one (each carrying ½ mark).

1. The capacity of CD-ROM is around:
   (a) 100 MB (b) 650 MB
   (c) 1 GB (d) 4 GB ( )

2. The faster and most expensive type of storage device is:
   (a) Electronic disk (b) Register
   (c) Cache (d) Magnetic Tape ( )

3. Which is not an output device?
   (a) Printer (b) Monitor
   (c) Scanner (d) Plotter ( )

4. The number of bits in a nibble are:
   (a) 16 (b) 5
   (c) 4 (d) 8 ( )

5. The device used in a data communication network to perform the conversion between analog and digital signal, is called a :
   (a) Front end processor (b) Modem
   (c) Decoder (d) Multiplexor ( )

6. The smallest addressable portion of disk is called a:
   (a) Sector (b) Track
   (c) Inode (d) Bit ( )

7. Which device has one input and many outputs?
   (a) Flip-flop (b) Multiplexor
   (c) Demultiplexer (d) Counter ( )

8. What does RAM and DRAM stand for?
   (a) Remote Access Memory, Dynamic Remote Access Memory
   (b) Random Access Memory, Dynamic Random Access Memory
   (c) Ramote Access Memory, Dependent Random Access Memory
   (d) Random Access Memory, Dependent Random Memory ( )

9. The out put of ……gate is 1, when all of its inputs are 1
   (a) NOR (b) XOR
   (c) *AND* (d) NOT ( )

10. Which part of the computer performs arithmetic calculations?
   (a) ALU
   (b) Registers
   (c) Logic Bus
   (d) None of the above ( )

11. The Parity bit is:
   (a) always 1
   (b) always 0
   (c) 1 or 0
   (d) None of the above ( )

12. Which monitor has a maximum resolution of 1024 x 768?
   (a) SXGA (b) XGA
   (c) SVGA (d) VXGA ( )

13. Magnetic tape is a:
   (a) Serial access medium
   (b) Random access median
   (c) Parallel access medium
   (d) None of the above ( )

14. What does DMA stand for?
   (a) Direct Memory Access
   (b) Direct Memory Accelerator
   (c) Directional Memory Access
   (d) Distributed Multiprogramming Assistant ( )

15. The system is made up of:

(a) Data bus
(b) Data bus and address bus
(c) Data bus and control bus
(d) Data bus, control bus and address bus ( )

16. What is RISC?
(a) Remodeled Interface System Computer
(b) Remote Internet Secured Connection
(c) Runtime Instruction Set Compiler
(d) Reduced Instruction Set Computer ( )

17. Which is a non- volatile memory?
(a) RAM
(b) ROM
(c) Both (a) and (b)
(d) None of the above ( )

18. The program counter:
(a) Stores the address of the instruction that is currently being executed
(b) Stores next instruction to be executed
(c) Stores the address of next instruction to be executed
(d) Stores the instruction that is currently being executed ( )

19. A process is a:
(a) Single thread of execution (b) Program in execution
(c) Program in memory (d) Task ( )

20 What do you need for an Inkjet Printer?
(a) A cartridge
(b) A drum
(c) A ribbon
(d) None of the above ( )

21. In which type of flip-flop the indeterminate condition of the SR flip -flop (When S=R=1 is defined) ?
(a) Edge Triggered Flip Flop (b) J K Flip-Flop
(c) D Flip-Flop (d) T Flip-Flop ( )

22. A binary cell capable of storing one bit of information is called is a:

(a) Flip-Flop (b) Latch
(c) Combinational Circuit (d) Clock ( )

23. The processor ……and I/O devices are interconnected by means of common bus.
(a) Cache memory (b) Auxiliary memory
(c) Virtual memory (d) Main memory ( )

24. A virtual memory is:
(a) A form of ROM
(b) Related to virtual reality
(c) A form of RAM
(d) None of the above ( )

25. Vacuum tube was used in the ……generation of computers.
(a) I (b) II
(c) III (d) IV ( )

26. CISC machines:
(a) Have fewer instruction than RISC machines
(b) Use more RAM than RISC machines
(c) Have medium clock speed
(d) Use variable size instruction ( )

27. Pick and odd one out:
(a) keyboard (b) Touch Screen
(c) Scanner (d) Plotter ( )

28. Interrupt signals generated by a printer are called:
(a) Internal interrupt
(b) External interrupt
(c) Software interrupt
(d) None of the above ( )

29. ……..interrupt is also called trap.
(a) Internal
(b) External
(c) Both A and B
(d) None of the above ( )

30. What is the name of logic circuit which can add two binary digits?
(a) Full adder
(b) Parallel adder
(c) Half adder
(d) None of the above ( )

31. Which of the following is a bus architecture?
(a) ISA
(b) AGP
(c) MCA
(d) All of the above ( )

32. Most computer come with:
(a) Serial Port (b) Parallel port
(c) Both Serial and Parallel Port (d) SCSI port ( )

33. Which memory allows the address space to be larger than the memory space?
(a) Cache memory (b) Main memory
(c) Virtual memory (d) Auxiliary memory ( )

34. Cache memory is used in computer system to:
(a) Ensure fast booting (b) Replace static memory
(c) Replace hard disk (d) Speed up memory access ( )

35. Bit is an abbreviation of:
(a) Binary digits
(b) Birla Institute of Technology
(c) British Institute of Technology
(d) None of the above ( )

36. In a JK flip- flop the function k = j will results into:
(a) T Flip – Flop (b) S R Flip Flop
(c) D Flip Flop (d) Master Slave flip flop ( )

37. Effective address in addressing mode is:
(a) Address of an Instruction
(b) Address of the Operation Code
(c) Address of the Opened to Fetch

(d) Contents to PC ( )

38. Which is the largest unit of storage among the following:
(a) Tera byte (b) Kilo byte
(c) Mega byte (d) Giga byte ( )

39. The minimum number of bits required to represent 128 are:
(a) 8 (b) 5
(c) 16 (d) 7 ( )

40. The output of combinational circuit depends in:
(a) Present input
(b) Previous input
(c) Both present and previous inputs
(d) None of the above ( )

Answer Key

1. (b)	2. (c)	3. (c)	4. (c)	5. (b)	6. (a)	7. (c)	8. (b)	9. (c)	10. (a)
11. (c)	12. (c)	13. (a)	14. (a)	15. (d)	16. (d)	17. (b)	18. (c)	19. (b)	20. (a)
21. (a)	22. (a)	23. (d)	24. (c)	25. (a)	26. (a)	27. (d)	28. (b)	29. (a)	30. (c)
31. (a)	32. (c)	33. (c)	34. (d)	35. (a)	36. (c)	37. (c)	38. (a)	39. (d)	40. (c)

DESCRIPTIVE PART-II

Year- 2009

Time allowed : 2 Hours **Maximum Marks : 30**

Attempt any four descriptive questions out of the six. All questions carry 7½ marks each.

Q.1 (a) What are combinational circuits? Explain the working of 4 to 1 line multiplexer with the help of block diagram and a function table.

(b) What is a computer system? Explain the technological evolution of computer.

Q,2 (a) Explain the bidirectional shift register with parallel load.

(b) Explain the functioning of D flip-flop with the help of diagram and characteristic table.

Q.3 Write short notes on:

(b) System Bus

(b) Pentium Microprocessor

(c) Asynchronous data transfer

Q.4 (a) What are the different types of addressing modes available? Explain indirect and index addressing.

(b) Discuss various phases of instruction cycle.

Q.5 (a) What do you understand by Register Transfer? Explain the use of register Transfer Languages.

(b) Describe internal and external interrupts

Q.6. (a) Differentiate between virtual memory and cache memory.

(b) What is an I/O processor? Explain

(c) Compare RISC and CISC.

COMPUTER ARCHITECTURE

OBJECTIVE PART- I

Year - 2008

Time allowed : One Hour **Maximum Marks : 20**

The question paper contains 40 multiple choice questions with four choices and student will have to pick the correct one (each carrying ½ mark).

1. The storage capacity of 3.5 inch floppy disk is:
   (a) 1.44 kb (b) 1.44 mb
   (c) 650 mb (d) 1.2 mb ( )

2. Which is a sequential storage device:
   (a) Hark Disk (b) Magnetic disk
   (c) magnetic tape (d) none ( )

3. Which is fastest memory:
   (a) Virtual memory (b) Ram
   (c) ROM (d) Cache Memory ( )

4. The input unit of a computer system:
   (a) Feeds the data in CPU
   (b) Retrieve the data from CPU
   (c) Directs all other units
   (d) All of the above ( )

5. An address is the number used by the CPU to specify :
   (a) A location in the memory (b) A location in the flags
   (c) A location in accumulator (d) A location in stack pointer ( )

6. Which of the flip-flops suffer from the race condition problem:
   (a) D flip-flop (b) T flip-flop
   (c) J K flip-flop (d) RS flip-flop ( )

7. A 16 to 1 multiplexer requires how may control signals:
   (a) 3 (b) 4
   (c) 2 (d) 5 ( )

8. The way the operands are chosen during program execution is dependent on the…..of the instruction.
   (a) Instruction format (b) Addressing mode
   (c) Data format (d) None ( )

9. The minimum number of bits required to represent 49 is:
   (a) 8 (b) 5
   (c) 6 (d) 7 ( )

10. Pick odd one out:
   (a) FPM (b) EDO
   (c) SD RAM (d) RS 232 ( )

11. A modem can be of type:
   (a) Fax
   (b) Data
   (c) Voice
   (d) All of the above ( )

12. Which is the smallest unit of storage:
   (a) Tracks (b) Cylinders
   (c) Sector (d) None ( )

13. Which is not an input device:
   (a) Scanner (b) Trackball
   (c) Mouse (d) Plotter ( )

14. An electric circuit that has two stable states is called:
   (a) Encoder (b) Flip-flop
   (c) Decoder (d) Multiplexer ( )

15. RAM is:
   (a) Read only memory
   (b) Write only memory
   (c) Read/write memory
   (d) None of the above ( )

16. Which is called a universal gate:
   (a) XOR (b) XNOR

(c) NAND (d) OR ( )

17. In which mode the operands are specified implicity in the definition of the instruction:
(a) Implied mode (b) Register Mode
(c) Relative Address mode (d) None ( )

18. The ALU of a computer normally contains a number of high speed storage elements called:
(a) Semiconductor memory (b) Register
(c) Hard Disk (d) Magnetic Disk ( )

19. The computer use addressing mode for the purpose of:
(a) the give programming versatility
(b) to reduce the number of bits in the addressing field
(c) both A & B
(d) None of these ( )

20. Which one use fixed length instruction format:
(a) RISC (b) CISC
(c) Both A & B (d) None ( )

21. Which port is more popular in these days.
(a) Serial (b) Parallel
(c) USB (d) AGP ( )

22. Which type of interrupts normally occur due to I/O divices:
(a) Software Interrupts (b) External Interrupts
(c) Internal Interrupts (d) None ( )

23. Interrupts arise from illegal or erroneous use of an instruction or data:
(a) Internal (b) External
(c) Hardware (d) None ( )

24. A large number of instructions are used in:
(a) CISC (b) RISC
(c) Both (a) and (b) (d) None ( )

25. The purpose of ……is to speed up the computer processing capability and increase its throughput.
(a) Parallel processing (b) Interrupts

(c) RISC (d) None ( )

26. The parity bit is used for:
(a) Error checking (b) Indexing
(c) Coding (d) Controlling ( )

27. Pick odd one put:
(a) VGA (b) SVGA
(c) EISA (d) SXGA ( )

28 Concentric circles in a bard disk are called:
a) Sector (b) Cylinder
(c) Read/write head (d) Tracks ( )

29. Which one term is not associated with a hard disk:
(a) IDE (b) Reels
(c) EIDE (c) SCSI ( )

30. Which is a bidirectional bus:
(a) Data (b) Address
(c) Both A & B (d) None ( )

31. Which one has the highest storage capacity:
(a) Floppy disk (b) CD
(c) DVD (d) None ( )

32. A ……supplied by one of the units to indicate to the other unit when the transfer has to occur:
(a) Strobe (b) Interrupt
(c) DMA (d) None ( )

33. The……technique improves the sped of transfer by managing memory buses directly:
(a) RISC (b) DAT
(c) DMA (d) None ( )

34. Which flip – flop have a toggle operation?
(a) RS (b) JK
(c) D (d) T ( )

35. Which combinational logic circuit is used to convert a decimal number to its equivalent binary number?
    (a) Multiplexor (b) Decoder
    (c) Encoder (d) None ( )

36. The transistor was used ……in the generation of computer:
    (a) I (b) II
    (c) III (d) IV ( )

37. Which one gives an illusion of unlimited memory?
    (a) Virtual (b) Cache
    (c) RAM (d) ROM ( )

38. Which memory is used to increase the speed of processing by making current programs and data available to the CPU at a rapid rate?
    (a) RAM (b) ROM
    (c) DMA (d) Cache ( )

39. A multiplexer is a circuit with
    (a) Many inputs but only one output
    (b) Many inputs and many outputs
    (c) One input and many outputs
    (d) None of the above ( )

40 Address of next instruction to be exacted is available in:
    (a) Program counter
    (b) Index register
    (c) Instruction register
    (d) None of the above ( )

Answer Key

1. (b)	2. (c)	3. (d)	4. (a)	5. (a)	6. (b)	7. (b)	8. (b)	9. (c)	10. (d)
11. (d)	12. (c)	13. (d)	14. (b)	15. (c)	16. (c)	17. (a)	18. (b)	19. (c)	20. (a)
21. (c)	22. (b)	23. (a)	24. (a)	25. (a)	26. (a)	27. (c)	28. (d)	29. (a)	30. (c)
31. (c)	32. (a)	33. (c)	34. (d)	35. (c)	36. (b)	37. (a)	38. (d)	39. (a)	40. (a)

DESCRIPTIVE PART-II

Year- 2008

Time allowed : 2 Hours **Maximum Marks : 30**

Attempt any four descriptive questions out of the six. All questions carry 7½ marks each.

Q.1 (a) What is meant by combinational logic circuits? Explain the working mechanism of a 16 to 1 multiplexer.

(b) What is Hard Disk? Explain the various hard disk interfaces.

Q.2 Write short notes on:

(a) Direct memory access

(b) Register transfer languages

(c) Ports

Q.3 (a) How a J K flip-flop is superior than a R-S flip-flop? Explain the working mechanism of J-K flip-flop by giving its diagram and truth table.

(b) Differentiate between the CISC and RISC.

Q.4 (a) What is an interrupt? Discuss the various types of interrupts.

(b) What is meant by virtual memory? Why it is used? Explain.

Q.5 Write short notes on the following :

(i) Shift Registers (ii) RS flip-flop (iii) I/O processor

Q.6 Explain the following:

(a) Addressing modes (b) System Buses (c) Von Neumann machine

COMPUTER ARCHITECTURE

OBJECTIVE PART- I

Year - 2007

Time allowed : One Hour **Maximum Marks : 20**

The question paper contains 40 multiple choice questions with four choices and student will have to pick the correct one (each carrying ½ mark).

1. A byte is:
   (a) a group of 2 bits (b) a groups of 4 bits
   (c) a group of 8 bits (d) a group of 16 bits ( )

2. An address is the number used by the CPU to specify:
   (a) A location in the memory (b) a location in the flags
   (c) a location in accumulator (d) a location in stack pointer ( )

3. Which of the following is the internal memory of the computer?
   (a) CPU register
   (b) cache
   (c) Main memory
   (d) All of the above ( )

4. The input unit of a computer :
   (a) Feeds the data in CPU
   (b) retrieve the data from CPU
   (c) Directs all other units
   (d) All of the above ( )

5. The control units of a computer :
   (a) Performs arithmetic logical operations on the data
   (b) Controls the operations of output devices
   (c) Is a device for manually operating the computer
   (d) Directs the other units of the computer ( )

6. Dump means:
   (a) Erasing used data
   (b) Storing used data in pushdown stack

(c) Copying data from internal stage to external stage
(d) None of the above ( )

7. The minimum number of bits required to represent 34 is:
(a) 8 (b) 5
(c) 6 (d) 7 ( )

8. EEPROM stands for:
(a) Electrical and Electronic Programmable ROM
(b) Electronically Erasable Programmable ROM
(c) Electrically Erasable Programmable ROM
(d) Electronically Equipped Programmable ROM ( )

9. What does SICS stands for:
(a) Complex Instruction Set Computer
(b) Counter Instruction Set Computer
(c) Complex Instruction Set Counter
(d) Counter Instruction Set Complex ( )

10. The following is not an input device:
(a) Data Gloves (b) Scanner
(c) Bar code reader (d) Plotter ( )

11. CRT stands for:
(a) Crystal Ray Tube (b) Cathode Ray Tube
(c) Cathode Ray Terminal (d) Computer Ray Terminal ( )

12. A multiplexer is a circuit with:
(a) Many inputs but only one output
(b) Many inputs and many outputs
(c) One input and many outputs
(d) None of the above ( )

13. A CPU consists of:
(a) ALU only
(b) Control unit only
(c) ALU, control units and register
(d) None of the above ( )

14. Performance of a cache memory is measured in terms of:

(a) Hit ratio (b) Cache ratio
(c) Direct ratio (d) Indirect ratio ( )

15. An electronic circuit that has two stable states is called:
(a) Encoder (b) Flip flop
(c) Decoder (d) Multiplexer ( )

16. An XOR operation is realized using the following expression:
(a) F = A'B+AB (b) F = A'B + AB
(c) F = (A' +B). (A+B') (d) F = (A'+B). (A+B) ( )

17. Effective address in addressing mode is:
(a) Address of an instruction (b) Address of the operation code
(c) Address of the operand to fetch (d) Content of PC ( )

18. A D flip flop can be designed with:
(a) SR flip-flop
(b) JK flip-flop
(c) MS flip-flop
(d) All of the above ( )

19. Sum output of half adder with A and B input is expressed by:
(a) F (sum) = AB (b) F (sum) = A+B
(c) F (sum) = AB + A'B' (d) F (sum) = A'B + AB' ( )

20. Which of the following bus is bi-directional?
(a) Address bus
(b) Data bus
(c) Control bus
(d) All of the above ( )

21. The parity bit is used for:
(a) Error Checking (b) Indexing
(c) Coding (d) Controlling ( )

22. Which of the following is a unit of measurement with computer system?
(a) Byte
(b) Megabyte
(c) Kilobyte
(d) All of the above ( )

23. RAM is:
(a) Read only memory
(b) Write only memory
(c) Read/write memory
(d) None of the above ( )

24. Direct address are same as:
(a) Effective address
(b) Address of operands
(c) Both A & B
(d) None of the above ( )

25. What is the name of logic circuit which can add two binary digits?
(a) Full adder
(b) Parallel Adder
(c) Half Adder
(d) None of the above ( )

26. Any combination logic circuit can be implemented by using the following universal building block :
(a) AND (b) NAND
(c) OR (d) XOR ( )

27. Address of next instruction to be executed is available in:
(a) Program counter
(b) Address Register
(c) Instruction Register
(d) None of the above ( )

28. Accumulator of the basic computer is:
(a) Instruction Register
(b) Address Register
(c) Data register
(d) None of the above ( )

29. Which of the following is not output device of a computer?
(a) Printer (b) Keyboard
(c) VDU (d) CRT screen ( )

30. Which is secondary memory device?
(a) CPU (b) ALU
(c) Floppy disk (d) Mouse ( )

31. CPU of a computer system does not contain:
(a) main storage
(b) Arithmetic unit
(c) Special register group
(d) None of the above ( )

32. American Standard Code for Information Interchange (ASCII) employ a code character set consisting of :
(a) 7 bits (b) 7 bits with parity check
(c) 8 bits (d) 8 bits with parity check ( )

33. One of the following is a direct entry input device. :
(a) key-to-diskette (b) Punched
(c) Computer Terminal (d) Mouse ( )

34. One of the following is not found on the motherboard of a personal computer:
(a) Direct memory Access (DMA) controller
(b) Programmable timer
(c) Interrupt controller
(d) Video display adapter ( )

35. A CPU generally contain:
(a) Register and ALU
(b) A control and timing section
(c) Instruction and timing section
(d) All of the above ( )

36. Which of the following computers is least powerful?
(a) Minicomputer (b) Microcomputer
(c) Mainframe Computer (d) Supercomputer ( )

37. Which of the following storage device can be carried around?
(a) Floppy disks (b) Main memory
(c) Registers (d) Core memory ( )

38. Which of the following is responsible for coordinating various operations using timing signals?
(a) Arithmetic logic unit (b) Control unit
(c) Memory unit (d) Input/Output unit ( )

39. The ALU of a computer normally contains a number of high speed storage elements called:
(a) Semiconductor Memory (b) Register
(c) Hard Disk (d) Magnetic Disk ( )

40. Computer peripheral is:
(a) A computer device which is not connected to CPU
(b) A device which is connected to CPU
(c) A device for manually operating the computer
(d) None of the above ( )

Answer Key

1. (c)	2. (a)	3. (c)	4. (a)	5. (d)	6. (b)	7. (c)	8. (c)	9. (a)	10. (d)
11. (b)	12. (a)	13. (c)	14. (a)	15. (b)	16. (c)	17. (c)	18. (a)	19. (d)	20. (b)
21. (a)	22. (d)	23. (c)	24. (a)	25. (c)	26. (b)	27. (a)	28. (a)	29. (b)	30. (c)
31. (c)	32. (a)	33. (c)	34. (d)	35. (c)	36. (b)	37. (a)	38. (d)	39. (a)	40. (a)

DESCRIPTIVE PART-II

Year- 2007

Time allowed : 2 Hours **Maximum Marks : 30**

Attempt any four descriptive questions out of the six. All questions carry 7½ marks each.

Q.1 What do you understand by combinational circuits? Describe half adder and full adder giving both the logic diagram and truth table.

Q.2 What do you mean by addressing modes? Describe the following addressing modes:

(a) Implied and immediate modes;

(b) Register mode and register indirect modes

(c) Relative address mode.

Q.3 What do you understand interrupts? Classify and describe different types of interrupts. Also discuss and difference between them.

Q.4 List of describe different registers for the basic computer. Also describe and common bus system for a basic computer.

Q.5 (a) Define locality of reference.

(b) Describe various mapping procedures when considering the organization of cache memory.

Q.6 Write short notes on any three.

(a) DMA controller;

(b) Static and dynamic RAM

(c) RISC and CISC

(d) Programmable logic device

COMPUTER ARCHITECTURE

OBJECTIVE PART- I

Year - 2006

Time allowed : One Hour **Maximum Marks : 20**

The question paper contains 40 multiple choice questions with four choices and student will have to pick the correct one (each carrying ½ mark).

1. Cache memory is:
   (a) Temporary and costly
   (b) Primary
   (c) High speed memory
   (d) All of the above ( )

2. Leser printer is:
   (a) Non-impact Line Printer (b) Non-impact Page Printer
   (c) Impact Line Printer (d) Non-impact Character Printer ( )

3. The major components of a computer are:
   (a) Memory
   (b) CPU
   (c) I/O line printer
   (d) All of the above ( )

4. Registers are part of:
   (a) Control unit and memory (b) Addresses and control unit
   (c) Address and ALU (d) Control unit and ALU ( )

5. Instruction is used to store the contents of accumulator into the memory word specified by the effective address:
   (a) LDA (b) BUN
   (c) STA (d) BSA ( )

6. Computer are normally stored in consecutive memory locations and are executed sequentially one at a time:
   (a) Program
   (b) Instruction

(c) Memory
(d) None of the above ( )

7. What does RISC stand for:
(a) Register Instruction Set Counter
(b) Reduced Instruction Set Counter
(c) Reduced Instruction Set Computer
(d) Register Instruction Set Computer ( )

8. What was the data bus width of 68000 Motorola CPU:
(a) 8
(b) 16
(c) 32
(d) None of the above ( )

9. Information is recorded on a number of concentric circles, called:
(a) Sectors
(b) Tracks
(c) Cylinder
(d) None of the above ( )

10. Personal computer use a simpler system structure, most of the machines have a card cage with a large printed circuit board at the bottom called:
(a) CPU
(b) Expansion slots
(c) Motherboard
(d) None of the above ( )

11. A computer system consists of a CPU, a memory, and one or more specialized I/O processors called:
(a) Bandwidth
(b) Data channels
(c) Interrupts
(d) None of the above ( )

12. The most common way of allowing users to point at the screen with a device called:
(a) Mouse (b) Keyboard
(c) Trackball (d) Touch screen ( )

13. A common electrical pathway between multiple devices is:

(a) Clock (b) Bus
(c) Memory (d) Modem ( )

14. Which of the following is the slowest in accessing data?
(a) Zip disk (b) Hard Disk
(c) Floppy Disk (d) Magnetic Tape ( )

15. Which is the re-usable optical disk?
(a) CD-ROM (b) WORM
(c) CD-R (d) CR-RW ( )

16. Which is the technology used in the evaluation of aptitude test?
(a) OCR (b) OMR
(c) MICR (d) MCR ( )

17. What is the measure of the package density of the pixels in a monitor?
(a) Refresh rate
(b) Resolution
(c) Pixel density
(d) None of the above ( )

18. Race (in determinate) condition occurs in the:
(a) JK flip-flop (b) D flip-flop
(c) RS flip-flop (d) T flip-flop ( )

19. Which gate is known as universal gate?
(a) Not Gate (b) AND Gate
(c) NAND Gate (d) XOR Gate ( )

20. Which kind of device allows the user the add components and capabilities to a computer system?
(a) System boards (b) Storage devices
(c) Input devices (d) Expansion slots ( )

21. Capacity of 3 ½ inch floppy disk is:
(a) 20 MB (b) 360 MB
(c) 1.44 MB (d) 1.44 GB ( )

22. Which of the following is an example of volatile memory?
(a) ROM (b) PROM

(c) RAM (d) Hard disk ( )

23. Data transfer rate in modem is measured in:
(a) Bits per second (b) Bits per minute
(c) Cycles per second (d) Bits per hour ( )

24. A computer has a 64 memory. What does letter K stand for?
(a) 1000 (b) Kilometer
(c) 1024 (d) 1064 ( )

25. The full form of MODEM is:
(a) Modifier detoxifier
(b) Modulator demodulator
(c) Both A & B
(d) None of the above ( )

26. The process of preparing a disk with tracks and sector is called :
(a) *Formatting* (b) Caching
(c) Surfing (d) Crushing ( )

27. What is the following is bus architecture?
(a) ISA
(b) AGP
(c) MCA
(d) All of the above ( )

28. Example of display adaptor card is:
(a) CGA
(b) VGA
(c) SUGA
(d) None of the above ( )

29. Storage device can be:
(a) Direct access
(b) Sequential access
(c) Both of the above
(d) None of the above ( )

30. Linkage between the CPU and the users is provided by:
(a) Peripheral devices (b) Storage

(c) control unit (d) Software ( )

31. A combinational circuit that converts binary information from n input lines to a maximum of 2^n unique output liens:
(a) Encoder (b) Multiplayer
(c) Decoder (d) Demultiplexer ( )

32. CISC is a:
(a) Complete Instruction Set Computer
(b) Complex Instruction Set Computer
(c) Complex Inline Store Computer
(d) Complete Instruction, Store Computer ( )

33. A combinational circuit, which performs the addition of two bits, is called:
(a) Full-adder (b) Half-adder
(c) Multiplexer (d) Decoder ( )

34. SIMM is a:
(a) Single Instruction Memory Modules
(b) Single in Line Memory Modules
(c) Single Instruction Memory Manufacture
(d) Single in Line Micro programs Modules ( )

35. A memory having 2^{16} words with each word of 8 bits is referred to as:
(a) 32 K memory (b) 64 k memory
(c) 128 K memory (d) 256 K memory ( )

36. The storage magnetic tape is divided into vertical columns called:
(a) Tracks
(b) Sectors
(c) Frames
(d) None of the above ( )

37. The storage capacity of a disk system depends upon:
(a) Number of recording surfaces
(b) Number of Tracks Per Surface
(c) Number of sectors per track
(d) All of the none ( )

38. Access times for optical disk are typically in the range of:

(a) 10 to 30 milliseconds
(b) 100 to 200 milliseconds
(c) 100 to 300 milliseconds
(d) None of the above ( )

39. Which is the largest unit of storage among the following?
(a) Terabyte (b) Kilobyte
(c) Megabyte (d) Gigabyte ( )

40. Most computers come with:
(a) Serial port (b) Parallel port
(c) Both serial and parallel ports (d) SCSI ports ( )

Answer Key

1. (c)	2. (a)	3. (c)	4. (a)	5. (d)	6. (b)	7. (c)	8. (c)	9. (a)	10. (d)
11. (b)	12. (a)	13. (c)	14. (a)	15. (b)	16. (c)	17. (c)	18. (a)	19. (d)	20. (b)
21. (a)	22. (d)	23. (c)	24. (a)	25. (c)	26. (b)	27. (a)	28. (a)	29. (b)	30. (c)
31. (c)	32. (d)	33. (b)	34. (b)	35. (d)	36. (b)	37. (a)	38. (b)	39. (c)	40. (b)

DESCRIPTIVE PART-II

Year- 2006

Time allowed : 2 Hours **Maximum Marks : 30**

Attempt any four descriptive questions out of the six. All questions carry 7½ marks each.

Q.1 (a) Draw a block diagram to illustrate the basic organization of computer system and explain the function of the logic units.

(b) What are basic logic gates? Draw the truth table of each of them;

Q.2 (a) Draw the logic diagram of an edge triggered JK flip-flop and explain its working with the help of timing diagram.

(b) What is shift register? Discuss its types and application?

Q.3 Differentiate between the following

(a) RISC and CISC processor

(b) Programmable logic Array (PLA) and Programmable Array of Logic (PAL)

(c) Virtual and cache memory.

Q.4 (a) Explain the execution cycle within CPU.

(b) Draw the logic circuit of a 8 x 1 multiplexer with enable input and explain its operations with the help of truth table.

Q.5 (a) What is an I/O processor? Why are I/O processors used in large system?

(b) What are the different type of addressing modes available? Give example of each and explain the working of any one of them in detail.

(c) Describe an interrupt cycle and its need.

Q.6 Write short notes on:

(a) DMA control (b) Features of Pentium microprocessor

(c) Buses used in computer system (d) Asynchronous data transfers

MCQs

1. Cache memory is:
   (a) Temporary and costly
   (b) Primary
   (c) **High speed memory**
   (d) All of the above (c)

2. Laser printer is:
   (a) **Non-impact Line Printer** (b) Non-impact Page Printer
   (c) Impact Line Printer (d) Non-impact Character Printer (a)

3. The major components of a computer are:
   (a) Memory
   (b) CPU
   (c) **I/O line printer**
   (d) All of the above (c)

4. Registers are part of:
   (a) **Control unit and memory** (b) Addresses and control unit
   (c) Address and ALU (d) Control unit and ALU (a)

5. Instruction is used to store the contents of accumulator into the memory word specified by the effective address:
   (a) LDA (b) BUN
   (c) STA (d) **BSA** (d)

6. Computer are normally stored in consecutive memory locations and are executed sequentially one at a time:
   (a) Program
   (b) **Instruction**
   (c) Memory
   (d) None of the above (b)

7. What does RISC stand for:
   (a) Register Instruction Set Counter
   (b) Reduced Instruction Set Counter
   (c) **Reduced Instruction Set Computer**
   (d) Register Instruction Set Computer (c)

8. What was the data bus width of 68000 Motorola CPU:
   (a) 8
   (b) 16

(c) **32**
(d) None of the above (c)

9. Information is recorded on a number of concentric circles, called:
(a) **Sectors**
(b) Tracks
(c) Cylinder
(d) None of the above (a)

10. Personal computer use a simpler system structure, most of the machines have a card cage with a large printed circuit board at the bottom called:
(a) CPU
(b) Expansion slots
(c) Motherboard
(d) **None of the above** (d)

11. A computer system consists of a CPU, a memory, and one or more specialized I/O processors called:
(a) Bandwidth
(b) **Data channels**
(c) Interrupts
(d) None of the above (b)

12. The most common way of allowing users to point at the screen with a device called:
(a) **Mouse** (b) Keyboard
(c) Trackball (d) Touch screen (a)

13. A common electrical pathway between multiple devices is:
(a) Clock (b) Bus
(c) **Memory** (d) Modem (c)

14. Which of the following is the slowest in accessing data?
(a) **Zip disk** (b) Hard Disk
(c) Floppy Disk (d) Magnetic Tape (a)

15. Which is the re-usable optical disk?
(a) CD-ROM (b) **WORM**
(c) CD-R (d) CR-RW (b)

16. Which is the technology used in the evaluation of aptitude test?
(a) OCR (b) OMR
(c) **MICR** (d) MCR (c)

17. What is the measure of the package density of the pixels in a monitor?

(a) Refresh rate
(b) Resolution
(c) **Pixel density**
(d) None of the above (c)

18. Race (in determinate) condition occurs in the:
(a) **JK flip-flop** (b) D flip-flop
(c) RS flip-flop (d) T flip-flop (a)

19. Which gate is known as universal gate?
(a) Not Gate (b) AND Gate
(c) NAND Gate (d) **XOR Gate** (d)

20. Which kind of device allows the user the add components and capabilities to a computer system?
(a) System boards (b) **Storage devices**
(c) Input devices (d) Expansion slots (b)

21. Capacity of 3 ½ inch floppy disk is:
(a) **20 MB** (b) 360 MB
(c) 1.44 MB (d) 1.44 GB (a)

22. Which of the following is an example of volatile memory?
(a) ROM (b) PROM
(c) RAM (d) **Hard disk** (d)

23. Data transfer rate in modem is measured in:
(a) Bits per second (b) Bits per minute
(c) **Cycles per second** (d) Bits per hour (c)

24. A computer has a 64 memory. What does letter K stand for?
(a) **1000** (b) Kilometer
(c) 1024 (d) 1064 (a)

25. The full form of MODEM is:
(a) Modifier detoxifier
(b) Modulator demodulator
(c) **Both A & B**
(d) None of the above (c)

26. The process of preparing a disk with tracks and sector is called :
(a) *Formatting* (b) **Caching**
(c) Surfing (d) Crushing (b)

27. What is the following is bus architecture?
(a) **ISA**
(b) AGP
(c) MCA
(d) All of the above (a)

28. Example of display adaptor card is:
(a) **CGA**
(b) VGA
(c) SUGA
(d) None of the above (a)

29. Storage device can be:
(a) Direct access
(b) **Sequential access**
(c) Both of the above
(d) None of the above (b)

30. Linkage between the CPU and the users is provided by:
(a) Peripheral devices (b) Storage
(c) **control unit** (d) Software (c)

31. A combinational circuit that converts binary information from n input lines to a maximum of 2^n unique output liens:
(a) Encoder (b) Multiplayer
(c) **Decoder** (d) Demultiplexer (c)

32. CISC is a:
(a) Complete Instruction Set Computer
(b) Complex Instruction Set Computer
(c) Complex Inline Store Computer
(d) **Complete Instruction, Store Computer** (d)

33. A combinational circuit, which performs the addition of two bits, is called:
(a) Full-adder (b) **Half-adder**
(c) Multiplexer (d) Decoder (b)

34. SIMM is a:
(a) Single Instruction Memory Modules
(b) **Single in Line Memory Modules**
(c) Single Instruction Memory Manufacture
(d) Single in Line Micro programs Modules (b)

35. A memory having 2^{16} words with each word of 8 bits is referred to as:

(a) 32 K memory (b) 64 k memory
(c) 128 K memory (d) **256 K memory** (d)

36. The storage magnetic tape is divided into vertical columns called:
(a) Tracks
(b) **Sectors**
(c) Frames
(d) None of the above (b)

37. The storage capacity of a disk system depends upon:
(a) **Number of recording surfaces**
(b) Number of Tracks Per Surface
(c) Number of sectors per track
(d) All of the none (a)

38. Access times for optical disk are typically in the range of:
(a) 10 to 30 milliseconds
(b) **100 to 200 milliseconds**
(c) 100 to 300 milliseconds
(d) None of the above (b)

39. Which is the largest unit of storage among the following?
(a) Terabyte (b) Kilobyte
(c) **Megabyte** (d) Gigabyte (c)

40. Most computers come with:
(a) Serial port (b) **Parallel port**
(c) Both serial and parallel ports (d) SCSI ports (b)

41.A byte corresponds to:
(f) 4 bits (b) 8 bits
(c) 16 bits (d) 32 bits (b)

42.The system bus is made up of:
(a) Data bus
(b) Data bus and address bus
(c) Data bus and control bus
(d) Data bus, control bus and address bus (d)

43. Cache memory enhances:
(a) Memory capacity
(b) Memory access time
(c) Secondary storage capacity
(d) Secondary storage access time (a)

44. An XOR operation is realized using the following expression:
(d) F = A'B' = AB' (b) F = A'B' + AB
(c) F = (A'+B'). (A+B') (d) F = (A'+B').(A+B) (d)

45. VGA stands for :
(a) Video Graphics Array (b) Virtual Graphics Adaptor
(c) Video Graphics Adaptor (d) Virtual Graphics Array (c)

46. The time required by the read/write head to reach the desired track in Magnetic disk is known as:
(a) Seek Time (b) Search Time
(c) Latency Time (d) Track Search Time (a)

47. Cache memory is implemented with using of:
(a) DRAM
(b) EEPROM
(c) EPROM
(d) None of the above (b)

48. The memory which is programmed at the time it manufactured:
(a) ROM
(b) RAM
(c) PROM
(d) All of the above (c)

49. Which of the following is/are basic computer registers:
(a) PC
(b) DR
(c) ACC
(d) All of the above (d)

50. A CPU consist of:
(a) *ALU Only*
(b) Control Unit Only
(c) ALU, Control Unit and Registers
(d) None of the above (c)

51. The process of accessing informing on a CD-ROM is:
(a) Random

(b) Sequential
(c) Semi-random
(d) None of the above (a)

52. SIMM sands for:
(a) Single Instruction Memory Management
(b) Single In-line Memory Module
(c) Single Instruction Memory Module
(d) Single In-line Memory Management (b)

53. The number or memory locations that a CPU with a 16-bit program counter can address:
(a) 16 k (b) 256 k
(c) 64 k (d) 32 k (c)

54. Cache memory is:
(a) Temporary memory
(b) Primary
(c) High speed memory
(d) All of the above (d)

55. Compare with secondary storage, primary storage is:
(a) Slow and inexpensive (b) Fast and inexpensive
(c) Fast and expensive (d) Slow and expensive (c)

56. RAM is:
(a) Ream Only Memory
(b) Write Only Memory
(c) Read/Write Memory
(d) None of the above (c)

57. One kilo byte is:
(a) 1024 bits (b) 1064 bits
(c) 1026 bits (d) 1000 bits (a)

58. A 4 – bit ring counter is initially loaded with:
(a) 0000 (b) 0001
(c) 1110 (d) 1111 (a)

59. How many full addresses are needed to add two 4-bit numbers?
(a) 8 (b) 2

(c) 4 (d) 16 (c)

60. An asynchronous counter can be designed using:
(a) 4 flip - flops (b) 5 flip – flops
(c) 10 flip flops (d) 6 flip – flops (a)

61. Which of the following is the internal memory of the computer?
(a) CPU registers
(b) Cache memory
(c) Main memory
(d) All of the above (d)

62. What does CISC stand for?
(a) Complex instruction set-computer
(b) Counter instruction set computer
(c) Complex instruction set counter
(d) Counter instruction set complex (a)

63. A multiplexer is a circuit with:
(a) Many inputs and a single output
(b) Many inputs and many outputs
(c) One input and many outputs
(d) None of the above (a)

64. Performance of a cache memory is measured in terms of:
(a) Hit ratio (b) Miss ration
(c) Direct ratio (d) Indirect ratio (a)

65. D type of flip – flop can be designed with:
(a) S-R Flip flop
(b) $J-K\ flip-flop$
(c) $T\ flip-flop$
(d) All of the above (a)

66. The poritiy bit is used for:
(a) Error checking (b) Coding
(c) Redudancy (d) Indexing (a)

67. Direct address are as same as:
(a) Effective address

(b) Address of operands
(c) Both (a) and (b)
(d) One of the above (c)

68. CPU of a computer system does not contain:
(a) Main storage
(b) *Arithmetic unit*
(c) Special register group
(d) None of the above (a)

69. Which of the following is the slowest in accessing data?
(a) Zip disk (b) *Hard disk*
(c) Floppy disk (d) Magnetic tape (d)

70. Which Gate is known as Universal Gate?
(a) NOT gate (b) AND gate
(c) NAND gate (d) XOR gate (c)

71. Data transfer rate in a modem is measured in:
(a) Bits per sound (b) *bits per minute*
(c) Cycles per second (d) Bits per hour (a)

72. The process of preparing a disk with tracks and sector is called:
(a) Formatting (b) Caching
(c) Surging (d) Crushing (a)

73. A storage device can be:
(a) Direct access
(b) Sequential access
(c) Both (a) and (b)
(d) None of the above (c)

74. The OCR stands for:
(a) Outsized character reader
(b) Optical character recognition
(c) Operational character reader
(d) Only character reader (b)

75. The NOR gate is logically equivalent to an OR gate followed by an:
(a) AND (b) XOR

(c) NOR (d) XNOR (c)

76. Storage device can be:
(a) Sequential
(b) Direct access
(c) Both (a) and (b)
(d) None of the above (c)

77. Effective address in addressing mode is:
(a) Address of an instruction
(b) *Address of the operation code*
(c) Address of the operand to fetch
(d) Contents of program counter (c)

78. The number of select input lines in 1 to 16 demultiplexer is:
(a) 1 (b) 4
(b) 8 (d) 16 (b)

79. The distance between the phosphor dots that make up a single pixel is called:
(a) Resolution (b) Dot pitch
(c) Dot distance (d) Dot rate (c)

80. Which of the following bus is bi- directional?
(a) Address bus
(b) *data bus*
(c) Control bus
(d) All of the above (b)

KEY-TERMS

Accumulator - a register in a CPU in which intermediate arithmetic and logic results are stored

ATX - ATX (Advanced Technology eXtended) is a motherboard form factor specification developed by Intel in 1995 to improve on previous de facto standards like the AT form factor.

AT (form factor) - The AT form factor referred to the dimensions and layout (form factor) of the motherboard for the IBM AT.

AGP - 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.

Bus - a subsystem that transfers data between computer components inside a computer or between computers

Blu-ray Disc - a optical disc storage medium designed to supersede the DVD format

BASIC - BASIC is a family of general-purpose, high-level programming languages whose design philosophy emphasizes ease of use - the name is an acronym from Beginner's All-purpose Symbolic Instruction Code.

Cache - a small, but fast memory that transparently improves the performance of a larger, but slower memory or storage device

CD-ROM (compact disc read-only memory) - a pre-pressed compact disc that contains data accessible to a computer for data storage and music playback. It is read in an optical disc drive

Chip (integrated circuit) - a miniaturized electronic circuit (consisting mainly of semiconductor devices, as well as passive components) that has been manufactured in the surface of a thin substrate of semiconductor material

Control store - the memory that stores the microcode of a CPU; originally read-only memory was employed

CPU (Central processing unit) - the portion of a computer system that carries out the instructions of a computer program, and is the primary element carrying out the computer's functions.

Conventional PCI - Conventional PCI (PCI is an initialism formed from Peripheral Component Interconnect,[1] part of the PCI Local Bus standard and often shortened to PCI) is a computer bus for attaching hardware devices in a computer.

Computer case - A computer case (also known as a computer chassis, cabinet, box, tower, enclosure, housing, system unit or simply case) is the enclosure that contains most of the components of a computer (usually excluding the display, keyboard and mouse).

Computer form factor - In computing, the form factor is the name used to denote the dimensions, power supply type, location of mounting holes, number of ports on the back panel, etc.

Chipset - A chipset, PC chipset, or chip set refers to a group of integrated circuits, or chips, that are designed to work together. They are usually marketed as a single product.

Channel I/O - In computer science, channel I/O is a generic term that refers to a high-performance input/output (I/O) architecture that is implemented in various forms on a number of computer architectures, especially on mainframe computers.

DVD (Digital Video Disc or Digital Versatile Disc) - an optical disc storage media format, and was invented and developed by Philips, Sony, TOSHIBA, and Time Warner in 1995. Its main uses are video and data storage. DVDs are of the same dimensions as compact discs (CDs), but store more than six times as much data

DASD (Direct Access Storage Device) - mainframe terminology introduced by IBM denoting secondary storage with random access, typically (arrays of) hard disk drives

DIMM - DIMM which means (dual in-line memory module) comprises a series of dynamic random-access memory integrated circuits. These modules are mounted on a printed circuit board and designed for use in personal computers, workstations and servers. DIMM replaced SIMM which is the single in-line memory module.

Display Port – Display Port is a digital display interface developed by the Video Electronics Standards Association (VESA). The interface is primarily used to connect a video source to a display device such as a computer monitor, though it can also be used to transmit audio, USB, and other forms of data.

DVI - Digital Visual Interface (DVI) is a video display interface developed by the Digital Display Working Group (DDWG). The digital interface is used to connect a video source to a display device, such as a computer monitor.

DRAM - Dynamic random-access memory (DRAM) is a type of random-access memory that stores each bit of data in a separate capacitor within an integrated circuit.

Expansion card (expansion board, adapter card or accessory card) - a printed circuit board that can be inserted into an expansion slot of a computer motherboard to add functionality to a computer system

EEPROM - EEPROM (also written E2PROM and pronounced "e-e-prom," "double-e prom," "e-squared," or simply "e-prom") stands for Electrically Erasable Programmable Read-Only Memory and is a type of non-volatile memory used in computers and other electronic devices to store small amounts of data that must be saved when power is removed.

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

Firewall - A hardware device or software to protect a computer from viruses, malware, trojans etc.

Firmware - fixed, usually rather small, programs and data structures that internally control various electronic devices

Floppy disk - a data storage medium that is composed of a disk of thin, flexible ("floppy") magnetic storage medium encased in a square or rectangular plastic shell

Floppy disk drive (FDD) - a device for reading floppy disks

Flash Memory - Flash Memory in a type of non volatile computer storage chip that can be electrically erased and reprogrammed. It was developed from EEPROM (electrically erasable programmable read-only memory) and must be erased in fairly large blocks before these can be rewritten with new data. The high density NAND type must also be programmed and read in (smaller) blocks, or pages, while the NOR type allows a single machine word (byte) to be written or read independently.

Hard disk drive (HDD) - a non-volatile storage device that stores digitally encoded data on rapidly rotating rigid (i.e. hard) platters with magnetic surfaces

Hardware - multiple physical components of a computer, upon which can be installed an operating system and a multitude of software to perform the operator's desired functions

HDMI - HDMI (High-Definition Multimedia Interface) is a compact audio/video interface for transferring encrypted uncompressed digital audio/video data from a HDMI-compliant device ("the source" or "input") to a compatible digital audio device, computer monitor, video projector, and digital television.

Input device - any peripheral piece of computer hardware equipment) used to provide data and control signals to an information processing system

Input/output - the communication between an information processing system (such as a computer), and the outside world possibly a human, or another information processing system

IOPS - IOPS (Input/Output Operations Per Second, pronounced eye-ops) is a common performance measurement used to benchmark computer storage devices like hard disk drives (HDD), solid state drives (SSD), and storage area networks (SAN). As with any benchmark, IOPS numbers published by storage device manufacturers do not guarantee real-world application performance

Keyboard - an input device, partially modeled after the typewriter keyboard, which uses an arrangement of buttons or keys, to act as mechanical levers or electronic switches

Mainframe - powerful computers used mainly by large organizations for critical applications, typically bulk data processing such as census, industry and consumer statistics, enterprise resource planning, and financial transaction processing

Motherboard - the central printed circuit board (PCB) in many modern computers and holds many of the crucial components of the system, while providing connectors for other peripherals

Memory - devices that are used to store data or programs (sequences of instructions) on a temporary or permanent basis for use in an electronic digital computer

Monitor - an electronic visual display for computers. The monitor comprises the display device, circuitry, and an enclosure

Mouse - a pointing device that functions by detecting two-dimensional motion relative to its supporting surface

Mini-VGA - Mini-VGA connectors are used on some laptops and other systems in place of the standard VGA connector.

Microcode - Microcode is a layer of hardware-level instructions or data structures involved in the implementation of higher level machine code instructions in many computers and other processors; it resides in special high-speed memory and translates machine instructions into sequences of detailed circuit-level operations.

Mask ROM - Mask ROM (MROM) is a type of read-only memory (ROM) whose contents are programmed by the integrated circuit manufacturer

Network - a collection of computers and devices connected by communications channels that facilitates communications among users and allows users to share resources with other users

Non-volatile memory - nonvolatile memory, NVM or non-volatile storage is computer memory that can retain the stored information even when not powered.

Non-volatile random-access memory - Non-volatile random-access memory (NVRAM) is random-access memory that retains its information when power is turned off (non-volatile). This is in contrast to dynamic random-access memory (DRAM) and static random-access memory (SRAM), which both maintain data only for as long as power is applied

Optical disc drive (ODD) - is a disk drive that uses laser light or electromagnetic waves near the light spectrum as part of the process of reading or writing data to or from optical discs

Operating system - An operating system (OS) is a set of software that manages computer hardware resources and provide common services for computer programs.

Pen drive - another name for a USB flash drive

Peripheral - a device attached to a host computer but not part of it, and is more or less dependent on the host. It expands the host's capabilities, but does not form part of the core computer architecture. Some computer peripheral include (Express Card, USB Drive, SD Card Memory Stick, router, external SSD & HDD Drives).

Personal computer (PC) - any general-purpose computer whose size, capabilities, and original sales price make it useful for individuals, and which is intended to be operated directly by an end user, with no intervening computer operator

Printer - a peripheral which produces a text or graphics of documents stored in electronic form, usually on physical print media such as paper or transparencies

PSU (power supply unit) - A unit of the computer that converts mains AC to low-voltage regulated DC for the power of all the computer components

PROM - programmable read-only memory (PROM) or field programmable read-only memory (FPROM) or one-time programmable non-volatile memory (OTP NVM) is a form of digital memory where the setting of each bit is locked by a fuse or antifuse. Such PROMs are used to store programs permanently. The key difference from a strict ROM is that the programming is applied after the device is constructed.

PCI Express - PCI Express (Peripheral Component Interconnect Express), officially abbreviated as PCIe, is a computer expansion bus standard designed to replace the older PCI, PCI-X, and AGP bus standards.

PCI-X - PCI-X, short for PCI-eXtended, is a computer bus and expansion card standard that enhances the 32-bit PCI Local Bus for higher bandwidth demanded by servers.

RAID (redundant array of independent disks) - an umbrella term for computer data storage schemes that can divide and replicate data among multiple hard disk drives in order to increase reliability, allow faster access, or both

RAM (random-access memory) - a form of computer data storage. Today, it takes the form of integrated circuits that allow stored data to be accessed in any order (i.e., at random)

ROM - (read-only memory) - a class of storage media used in computers and other electronic devices

Server - any combination of hardware or software designed to provide services to clients. When used alone, the term typically refers to a computer which may be running a server operating system, but is also used to refer to any software or dedicated hardware capable of providing services

Software - a general term primarily used for digitally stored data such as computer programs and other kinds of information read and written by computers. Today, this includes data that has not traditionally been associated with computers, such as film, tapes and records

SIMM - A SIMM, or single in-line memory module, is a type of memory module containing random access memory used in computers from the early 1980s to the late 1990s.

Solid-state drive - A solid-state drive (SSD), sometimes called a solid-state disk or electronic disk, is a data storage device that uses integrated circuit assemblies as memory to store data persistently.

Static random-access memory - Static random-access memory (SRAM) is a type of semiconductor memory where the word static indicates that, unlike dynamic RAM (DRAM), it does not need to be periodically refreshed.

Synchronous dynamic random-access memory - Synchronous dynamic random access memory (SDRAM) is dynamic random access memory (DRAM) that is synchronized with the system bus.

Tape drive - a peripheral device that allows only sequential access, typically using magnetic tape

Terminal - an electronic or electromechanical hardware device that is used for entering data into, and displaying data from, a computer or a computing system

Touchpad or **track pad** - a pointing device consisting of specialized surface that can translate the motion and position of a user's fingers to a relative position on screen

USB (Universal Serial Bus) - a specification to establish communication between devices and a host controller (usually a personal computers). USB is intended to replace many varieties of serial and parallel ports.

USB flash drive - a flash memory data storage device integrated with a USB (Universal Serial Bus) 1.1, 2.0, or 3.0 interface. USB flash drives are typically removable and rewritable, and much smaller than a floppy disc

VGA - A Video Graphics Array (VGA) connector is a three-row 15-pin DE-15 connector. The 15-pin VGA connector is found on many video cards, computer monitors, and some

high definition television sets. On laptop computers or other small devices, a mini-VGA port is sometimes used in place of the full-sized VGA connector.

Volatile memory - also known as volatile storage, is computer memory that requires power to maintain the stored information.

Virus - a computer program that can replicate itself[1] and spread from one computer to another. The term "virus" is also commonly, but erroneously, used to refer to other types of malware, including but not limited to adware and spyware programs that do not have a reproductive ability.

Webcam - A webcam is a video camera that feeds its images in real time to a computer or computer network, often via USB, Ethernet, or Wi-Fi.

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