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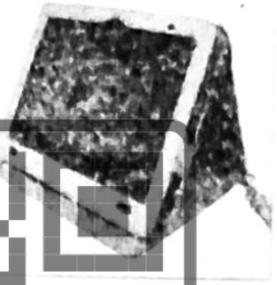
INTRODUCTION TO COMPUTERS

Q.1. What is Computer? or What is the term Computer? or Define Computer or Define the term Computer.

COMPUTER DEFINITION

The computer is defined in many different words. A few definitions are listed below:

1. **Computer** is an electronic device which is capable to accept a huge amount of data through input device, process that data in CPU into meaningful information and produce the result through output device.



2. **Computer** is an electronic data processing machine, which takes input, stores into memory and process it with the help of ALU under the supervision of CU and gives output according to the given instructions or program.
3. **Computer** is a machine that accepts input data, processes it and gives output.
4. **Computer** is a device capable of accepting data, applying described processes to data and supplying results of these processes.
5. **Computer** is an automatic electronic device that receives data from many input devices. Computer processes this inputted data with the help of stored program at high accuracy and speed. After the desire processing of data, results may be received on different output devices.

Q. 2. What are the advantages/ capabilities of a computer?

CAPABILITIES/ADVANTAGES OF COMPUTER

I. Speed

A computer can process data faster than any other machine designed to perform a similar task.

II. Repetition

A computer tirelessly performs the same operations millions of time in exactly the same way without getting bored and tired.

III. Accuracy

A computer's high speed processing is accomplished by high-accuracy result. No other system can have as much accuracy as a computer system.

IV. Logical Operation

The computer can make decision based on some conditions and takes alternative course of action accordingly.

V. Store/Recall Information

The computer is like a human brain. It can store facts and figures, information and instructions and recall them when needed.

VI. Self-Checking

The computer verifies the accuracy of its own work by mean of a parity check.

VII. Self-Operating

Once the data and instructions are fed into the computer's memory, the computer is capable of executing the instruction on its own without human intervention.

TYPES OF COMPUTERS

Computers can be classified:

1. According to purpose
2. According to type of data handled
3. According to capacity

Q. 3. Define computer according to purpose?

COMPUTER ACCORDING TO PURPOSE

a) General purpose

These computers are designed to handle a variety of different problems and to meet different needs. A general purpose computer can be used for such varied applications as payroll, accounts, inventory control, budgeting and sales analysis. General purpose computers are strong in versatility but are normally weak in speed and efficiency as compared to special purpose computers.

b) Special purpose

These computers are designed to handle a specific task. Examples of special purpose computers are those used for collecting highway tolls, satellite tracking, air traffic control and industrial process control.

Q.4. Define computer according to type of data handled.

COMPUTER ACCORDING TO TYPE OF DATA HANDLED

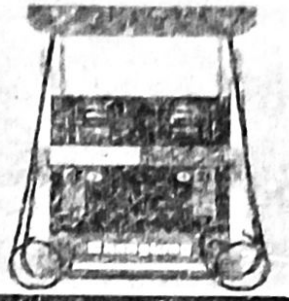
a) Analog computers

1. An analog computer operates on numbers represented by directly measurable quantities such as temperature changes or voltages which very continuously.
2. Analog computers are commonly used for scientific and engineering problems, chemical industries, electric power plants and petroleum refineries.
3. Analog computers use analog methods to process data.
4. Examples of analog computers are Mechanical watches; Analog Multimeter, Thermometer and speedometer are the examples of analog computers.

b) Digital computers

1. Digital computers are computers that specialize in counting.
2. These computers are designed to process data in numerical form.
3. Digital computer has memory to store and solve problems.
4. Digital computer is to handle alphabetic and alphanumeric data with precision and speed.
5. Digital watch, calculator, digital computer are the example of digital computers.

c) Hybrid computers



1. Hybrid computer is combination of analog and digital computer systems.
2. These are the machines that incorporate in a single computer both analog and digital features.
3. A hybrid computer uses analog to digital and digital to analog conversion and may input or output either analog or digital data.

Q.5. Compare and contrast: Analog and Digital computers.

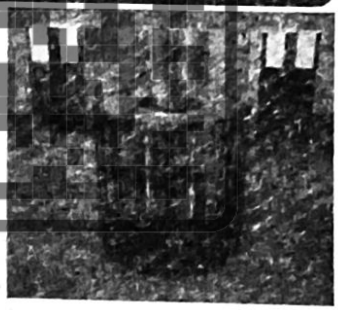
DIFFERENCE BETWEEN ANALOG AND DIGITAL COMPUTERS

ANALOG COMPUTER	DIGITAL COMPUTER
• Analog computers can process data continuously.	• Digital computers cannot process data continuously.
• Analog computer measure quantities in continuous form.	• Digital computer process data in discrete form.
• Collection of data at very high speeds.	• Speed is less than analog computers.
• They have low accuracy in general.	• They are characterized by high accuracy.
• Thermometer, Mechanical watches, and speedometer are the examples of analog computers.	• Digital watches, Calculators, Digital Computers are the example of digital computers.

Q.6. Define computer according to capacity.

COMPUTER ACCORDING TO CAPACITY

a) Super computers



Super computers are designed to perform complex calculations at fastest speed and are used to model very large dynamic systems such as weather patterns, national or global weather forecasting, satellite tracking, cold-testing of atomic and nuclear weapons etc.

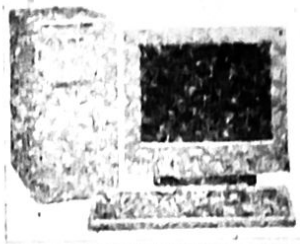
b) Mainframe (Macro) computers

Mainframe, the biggest and the most productive general purpose systems, that are made to model large dynamic computing needs of a big organization that serves hundreds of terminals all at the same time. A terminal consists of a monitor and keyboard that allow a person to enter information and retrieve it from the computer. These computers are ultimate in sophistication, Flexibility and speed.

c) Mini computers

Mini computers are increasingly powerful and do almost anything that large computers do. These computers are smaller than mainframe and large than microcomputers. A minicomputer is a multiprocessing system having terminals attached to it and is capable of supporting 4 to 200 users at a time. DEC VAX & IBM AS-400 are commonly used mini computers.

d) Micro (Personal) computers



Micro computers are computers that are powered by microprocessors. Personal computers or Micro computers are the smallest computers, designed to be used by individuals for writing, illustrating, budgeting, playing games and communicating with other computers.

Q.7. Draw a computer classification table according to capacity.

COMPUTER CLASSIFICATION TABLE ACCORDING TO CAPACITY

	Super Computers	Mainframe	Mini Computers	Micro Computers*
Processing Power	Extremely high	Very high	High	Moderate to low
Size	Very large	Moderately large	Medium	Small to handy
Applications	Scientific Research &Development	Business, Academic learning	Business, Academic learning	Business, Scientific, Research & Development, Academic learning
Use	Simulation of highly complex systems	Centralized computing	Centralized computing	General to specialized for variety of use and needs
Users	Federal agencies and Research organizations	Business, University	Business, University	Professionals in Business, Scientific and Academic fields

* ***Synonyms: desktop, personal computers, portables, notebooks, hand held computers, and palmtops.***

Q.8. Write some uses of a computer.

COMPUTER USES

1. Education

Computers are used in schools for teaching Computers are used for mathematical calculation Students can do their work by using computer.

2. Bank

Computers are used in banks for storing information about different account holders. Computers help in keeping a record of the cash. Computers help in giving all kinds of information regarding any account in the bank

3. Entertainment

Computers are used for playing games, listening to music and watching movies. Computers are used for making cartoon movies and animation films. Computers are used for making drawings.

4. Railway stations and Airports

Computers help in giving information about ticket reservations and bookings. Computers help in giving information about the arrival and departure timings of trains and aero planes. Computers help in keeping records of all the passengers.

5. Offices

Computers are used to type and print documents, letters, etc. Computers help in keeping records of office employees. Computers help in sending e-mails

6. Hospitals

Computers help in keeping records of all the patients in a hospital. Computers help doctors in controlling operation theatre machines. Computers help in doing a number of medical tests.

7. Designing

Computers help in designing magazines, newspapers, books, advertisement, etc. Computers help in designing buildings, houses, etc.

8. Health and Medicine

Computer technology is radically changing the tools of medicine. All medical information can now be digitized. Software is now able to computer the risk of a disease.

9. Movies

Computer generated graphics give freedom to designers so that special effects and even imaginary characters can play a part in making movies, videos, and commercials.

10. Sports

Computers compile statistics, sell tickets, create training programs and diets for athletes, and suggest game plan strategies based on the competitor's past performance.

11. Restaurants

Almost everyone has eaten food where the clerk enters an order by indicating choices on a rather unusual looking cash register; the device directly enters the actual data into a computer, and calculates the cost and then prints a receipt.

12. Government

Various departments of the Government use computer for their planning, control and law enforcement activities. To name a few – Traffic, Tourism, Information & Broadcasting, Education, Aviation and many others.

13. Defence

There are many uses of computers in Defence such as:

1. Controlling UAV or unmanned air-crafts an example is Predator.
2. They are also used on Intercontinental Ballistic Missiles (ICBMs) that use GPS and Computers to help the missile get to the target.
3. Computers are used to track incoming missiles and help slew weapons systems onto the incoming target to destroy them.
4. Computers are used in helping the military find out where all their assets are (Situational Awareness) and in Communications/Battle Management Systems.
5. Computers are used in the logistic and ordering functions of getting equipment to and around the battlefield.

6. Computers are used in tanks and planes and ships to target enemy forces, help run the platform and more recently to help diagnose any problems with the platforms.
7. Computers help design and test new systems.

14. Recording information

Official statistics keepers and some scouts use computers to record statistics, take notes and chat online while attending and working at a sports event.

15. Analyzing movements

The best athletes pay close attention to detail. Computers can slow recorded video and allow people to study their specific movements to try to improve their tendencies and repair poor habits.

16. Writers

Many sportswriters attend several sporting events a week and they take their computers with them to write during the game or shortly after while their thoughts are fresh in their mind.

17. Scoreboard

While some scoreboards are manually updated, most professional sports venues have very modern scoreboards that are programmed to update statistics and information immediately after the information is entered into the computer.

18. Safety

Computers have aided in the design of safety equipment in sports such as football helmets to shoes to mouth guards.

Q.9. What are the impacts of computer on society?

IMPACT OF COMPUTER ON SOCIETY

Computers have both positive and negative impact in our daily life as well as in our social life. But the gross development of the nation is faster with the application of computers in industries and education. The both positive and negative impacts of computers are listed below.

Positive Impact of Computer

1. The work can be done in very less time.
2. More information can be stored in small space.
3. Multitasking and multiprocessing capabilities of data.
4. Easy to access data.
5. Impartiality.
6. Documents can be kept secret.
7. Error free result.
8. It can be used for various purposes. i.e. It can be used in any type of work.

Negative Impact of Computer

1. Highly expensive.
2. Accidents.
3. Data piracy.
4. Increased Unemployment.
5. Huge data and information can be lost sometimes.

6. Fast changing computer technology.
7. Service distribution.
8. Illiteracy of computing and computers.

Q.10. Describe the History and Development of computer.

COMPUTER HISTORY AND DEVELOPMENT

In early ages data processing was the biggest problem for man. Even today's world, he wants to process large amount of data in short time with accuracy and high speed.

For this purpose man invented a number of calculating and data processing devices.

At early age people used pebbles, stones, sticks, scratches, symbols and fingertips to count, which were later replaced by number.

A complete history of computing would include a huge number of devices such as the ancient Chinese abacus, Napier's bones, Ought-red's slide rule, Jacquard loom, Babbage's analytical engine and much more.

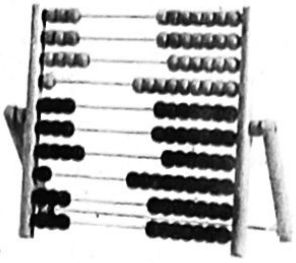
The history of computing is mainly divided into three ages during which man invented and improved different types of machines. These ages are 'Dark age', Middle age and Modern age.

Q.11. Describe Dark Age with inventions and inventors.

DARK AGE (3000 BC TO 1890 AD)

In the dark age of computer data processing equipment were all manual machine devices. The following manual machines were used for data processing in the dark age of computer.

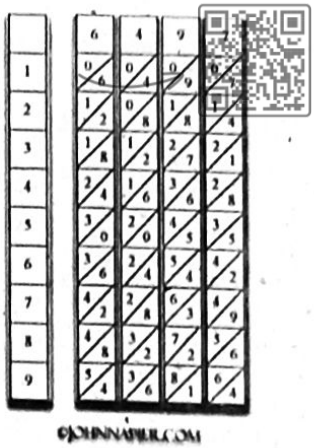
- **ABACUS**



The Abacus is thousands of years old and used worldwide is most ancient of digital computer. The Abacus was the first instrument that was used for helping men making calculations. Abacus was developed in China around 3000 B.C.

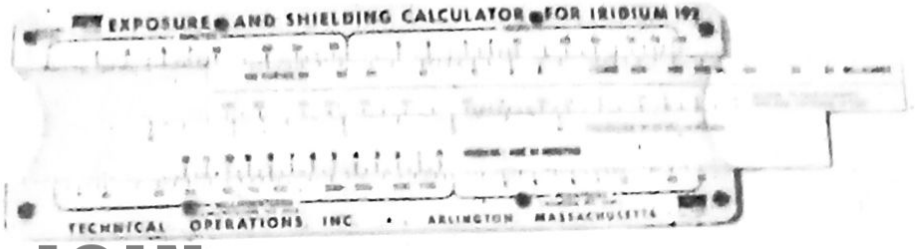
- **NAPIER'S BONES**

In 1617, a Scottish mathematician, John Napler, designed a device called Napier's bones. His benes were are set of 11 rods with number of marked on them in such a way that by simply placing roda side by side the products and quotients of large numbers could be obtained easily,



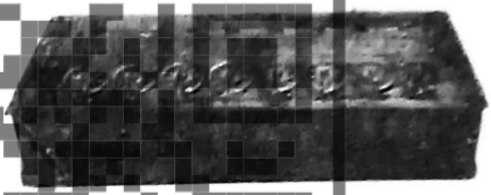
• SLIDE RULE

William Ought-red developed the Slide Rule in the 1622 based on the emerging work on logarithms by John Napier. Before the advent of the pocket calculator, it was the most commonly used calculation tool in science and engineering. Slide rules come in a diverse range of styles and generally appear in a linear or circular form with a standardized set of markings (scales) essential to performing mathematical computations. The use of Slide Rule continued to grow through the 1950s and 1960s.



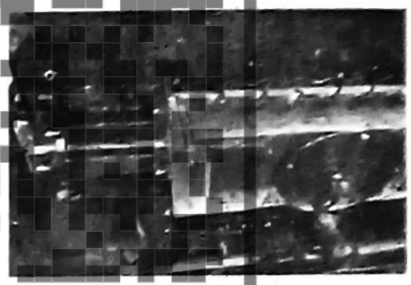
• PASCAL'S CALCULATOR

AFrench mathematician, Blaise Pascal developed the first mechanical calculator called Pascaline in 1642. It could only add and subtract and the result could be obtained up to eight digits.



• LEIBNIZ'S CALCULATOR

In 1671, Leibniz invented a better calculating device as compared to Pascal device which only added and subtracted but Leibnitz device could also multiply, divide and find square root.



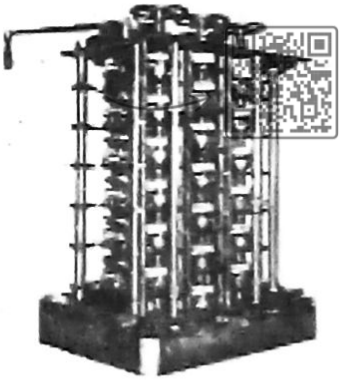
• ARITHOMETER

Arithometer built in 1820 by Charles Xavier Thomas de Colmar of France. It could perform addition, subtraction, multiplication and division. It was extremely popular and sold for 90 years. In contrast to the modern calculator's credit-card size, the Arithmometer was large enough to cover a desktop.

• DIFFERENCE ENGINE

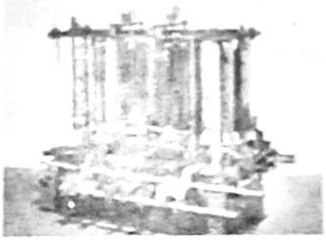
Charles Babbage (1792 – 1871), a great mathematician, the most deserving name in the history and development of computer. Now he is known as Father of Computer because he gave the concept of true computer only a part of this engine was ever constructed. It was based on pre-defined formulas. It consists of three basic parts:

- Arithmetic and Logic Unit (ALU)
- Memory Unit (MU)
- Control Unit (CU)



- **ANALYTICAL ENGINE**

Charles Babbage invents the first computer called Analytical Engine. It was program-controlled, general purpose, automatic mechanical computer. It would be able to perform any calculation set before it. There is no evidence that anyone before Babbage had ever conceived of such a device, let alone attempted to build one. The machine was designed to consist of four components: the Mill (calculating unit), the store, the reader, and the printer. These components are the essential components of every computer today.



Q.12. Describe Middle Age with inventions and inventors.

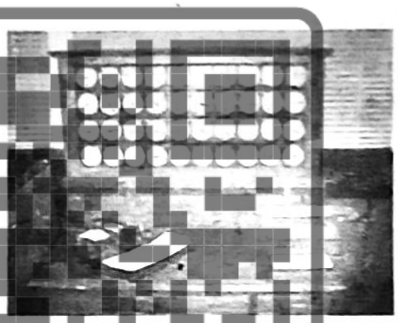
MIDDLE AGE (1890 AD TO 1944 AD)

In the Middle Age of computer data processing equipment were all Electro Mechanical Devices. The following Electro Mechanical Devices were used for data processing in the Middle Age of computer.

- **HOLLERITH TABULATING MACHINE**

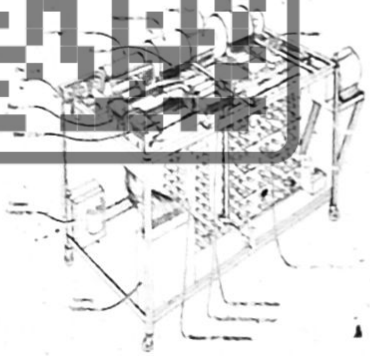
In 1890, the US Census bureau asked Dr. Herman Hollerith to find a way to speed-up the processing of census data.

Hollerith developed a mechanical tabulator based on punched cards in order to rapidly tabulate statistics from millions of pieces of data.



- **ATANASOFF BERRY COMPUTER (ABC)**

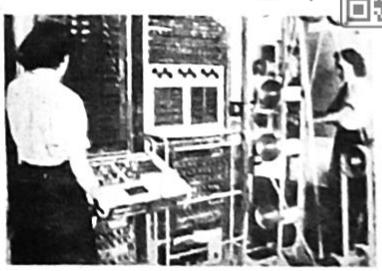
In 1937, J.V. Atanasoff, a professor of physics and mathematics at Iowa State University, attempted to build the first Electronic Digital Computer called **Atanasoff Berry Computer (ABC)** that can solve 29 equations simultane-ously. This was the ***first time a computer is able to store information*** on its main memory.



Note: (in 1973, the US District Court d*eclared **"ABC"** the First Electronic Digital Computer.*

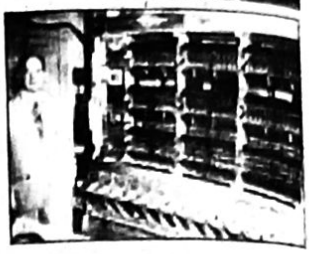
After that there was no major invention, but performance, speed and capabilities of existing machine were improved.

Q.13. Describe Modern Age with inventions and inventors.



MODERN AGE (SINCE 1944 AD)

- **Mark-I** The first Electro-Mechanical Computer was developed at Harvard University by Howard Aiken with his students and engineers of IBM completed the project in 1944 and known as



Mark-I. It could store information and instruction and it was the realization of Babbage's dream. The IBM introduced its new version as Mark-II in 1945.

- **ENIAC** In 1946, John W.Mauchly and J.P.Eckert developed ENIAC (Electronic Numerical Integrator And Calculator) as a result of military needs it could perform 5000 additions in a second.
- **EDVAC** (Electronic Discrete Variable Automatic Computer) improved version of ENIAC was developed by John Von Newman 1n 1949 that could store both the program as well as data. Afterwards computer with automatic data processing capabilities were developed.

GENERATION OF COMPUTER

The computers are categorized in five generations. Each generation is characterized by a major technological development that fundamentally changed the way computers operate, cheaper, more powerful and more efficient and reliable devices.

Q.14. Describe the 1st generation of computer also writes the advantages and disadvantages or characteristics of 1st generation of computer.

1ST GENERATION (VACUUM TUBES)

The first generation computers used vacuum tubes for circuitry and magnetic drums for memory and were often enormous, taking up entire rooms.

These computers were the fastest calculating device of their time. They could perform 5000 additions in a second. They were very expensive and in addition to using a great deal of electricity, generated a lot of heat, which was often the cause of malfunctions.

First generation computers relied on machine language to perform operations, and they could only solve one problem at a time.

- **Advantages**
  1. Vacuum tubes were as electronic components.
  2. Electronic digital computers were developed.
  3. Fastest computers of their time.
  4. Computations were performed in millisecond.
  5. Punch cards were used for input and output.
- **Disadvantages**
  1. Too large in size.
  2. These computers were unreliable.
  3. Vacuum tubes produce large amount of heat.
  4. Frequent hardware failures in these computers.
  5. Non-portable computers.

6. Commercial production was difficult and costly.
7. Operating speed was very slow.
8. Large amount of heat was produced due to vacuum tubes.
9. Air Conditions were required.
10. Constant maintenance work was required.
11. Commercial use was very limited.
12. Primary memory was limited.
13. Power consumption was very high.

Q.15. Describe the 2nd generation of computer also write the advantages and disadvantages or characteristics of 2nd generation of computer.

2ND GENERATION (TRANSISTORS)

The transistor was invented in 1947 but did not see widespread use in computers until the late 50s. The transistor was far superior to the vacuum tube, allowing computers to become smaller, faster, cheaper, more energy, efficient and more reliable than first generation computers.

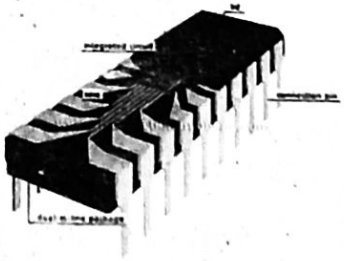
Transistor still generated a great deal of heat that subjected the computer to malfunction. In second generation computers Assembly Languages were used which allowed programmers to specify instructions in words.

- **Advantages**
  1. Transistors were used as internal components.
  2. Smaller in size as compared to first generation computers.
  3. Reliability increased.
  4. Magnetic tape and were used as wider secondary storage.
  5. Heat produces less than previous generation computers.
  6. Hardware failure was rare.
  7. Less electricity consumption as compared to 1st generation computer.
  8. Better portability.
  9. Commercially used.
- **Disadvantages**
  1. Commercial production was so expensive.
  2. Frequently maintenance required.
  3. Air-conditioning required for computers.

Q.16.Describe the 3rd generation of computer also writes the advantages and disadvantages or characteristics of 3rd generation of computer.

3RD GENERATION (INTEGRATED CIRCUIT)

The development of IC was the hallmark of third generation of computers. Instead of punched cards and printouts, users interacted with third generation computers through keyboards and monitors and interfaced with an operating system.



Operating system allowed the device to run many different applications at a time with a central program that monitored the processor and memory.

- **Advantages**
  1. Smaller in size compared to previous generation computers due to the use of Integrated Circuit (IC).
  2. Computations speed was in Nano seconds.
  3. Reliability increased in these computers.
  4. Heat generation was rare.
  5. Less electricity consumption required in these computers.
  6. Hardware failure was very rare.
  7. These computers were general purpose.
  8. Very easy portable computers.
  9. Commercially production was cheaper and easier.
- **Disadvantages**
  1. IC making was difficult task.
  2. Air-conditioning required in some cases.

Q.17. Describe the 4th generation of computer also writes the advantages and disadvantages or characteristics of 4th generation of computer.

4TH GENERATION (MICROPROCESSORS)

The microprocessors brought the fourth generation of computers, as thousands of ICs were built onto a single silicon chip.

IBM introduced its first computer for the home user, and Apple introduced the Macintosh. As these small computers became more powerful, they could be linked together to form networks.

Fourth generation computers also saw the development of GUIs, the mouse and handled devices.

- **Advantages**
  1. Smaller in size due to use of VLSI.
  2. Computations speed was much faster than previous.
  3. These computers were reliable computers.
  4. No air-conditioning required.
  5. Electricity consumption was less than previous generation computers.
  6. Minimum maintenance required
  7. Hardware failure was negligible.
  8. Computation speed was in picoseconds
  9. Heat generation was negligible.
  10. Totally general purpose computers
  11. They were very easy moveable computers.
  12. Cheapest in prices
- **Disadvantages**
  1. Very advanced technology required to make a microprocessor.
  2. Air-conditioning required in rare cases.

Q.18. Describe the 5th generation of computer also writes the advantages and disadvantages or characteristics of 5th generation of compute.

5TH GENERATION (ARTIFICIAL INTELLIGENCE)

Fifth generation computing devices, based on artificial intelligence, are still in development, through there are some applications, such as voice recognition, that are being used today.

The goal of fifth generation computing is to develop devices that respond to natural language input and are capable of learning and self-organization.

- **Advantages**
  1. All previous advantages with amazing improvement.
  2. Very huge storage capacity available in this generation.
  3. Long bit processors were built.
  4. Laptop and Palmtop computers introduced.
  5. Artificial intelligence languages developed in this generation.
- **Disadvantages**
  1. Disadvantages not reported.

Q.19. Draw the Computer Generation Table.

COMPUTER GENERATION TABLE

Generation	First	Second	Third	Fourth	Fifth
Duration	1946-1959	1959-1965	1965-970	1970-1981	1981-Onward
Technology	Vacuum Tubes	Transistors	ICs	Microprocessor	Further Improved Microprocessor
Internal Memory	Magnetic Drum	RAM & ROM	PROM & DRAM	EPROM & SRAM	EEPROM, SIMM & DIMM
External Memory	Punched Cards	Magnetic Tape & Magnetic Disk	Floppy Disk	Floppy Disk & Hard Disk	Optical Disk
Languages	Machine Languages	Assembly Languages	High Level Languages	4GL 4th Generation Languages	Artificial Intelligence
Operating System	No Operating System	Manually handles Punched Cards	Unix Operating System	DOS, Unix	Windows, Unix
Computer's category	Main Frame	Main Frame	Mini	Micro	Lap Top Tablet PC

Computers	ENIAC, EDVAC, EDSAC	IBM-1401, NCR-300	IBM System36, Honey Well316	IBM PC, Apple Macintosh	Tiny Computers Note Book etc.

Q. 20. Define Hardware and Software or what is the term Hardware and Software.

DEFINITION OF HARDWARE

- The physical or tangible components forming a computer are called Hardware.
- Hardware is a collective term. It includes not only the computer but also the cables, connectors, power supply and peripheral devices such as the keyboard, mouse, audio speakers, printers etc.

DEFINITION OF SOFTWARE

- Software refers to the programs that instruct the computer what to do. Software makes the computer useful.
- Software is the name given to all the programs to make the computer useable. Windows, Visual Basic, Microsoft Word, Microsoft Excel are the examples of Software.

Q.21. What is the difference between Hardware and Software?

DIFFERENCES BETWEEN HARDWARE & SOFTWARE

HARDWARE	SOFTWARE
• The physical components forming a computer are called Hardware	• Software refers to the programs that instruct the computer what to do.
• We can touch it.	• We can't touch it.
• It is permanent.	• It is temporary.
• Keyboard, Monitor, Mouse, Printers are the examples of Hardware.	• Windows, Visual Basic, MS-Word, MS-Excel are the examples of Software

Q.22. What do you mean by programming language?

PROGRAMMING LANGUAGES

A program is a set of instruction that directs the computer to do the tasks and produce the results you want.

A set of rules that provide a way of telling a computer what to do, is called programming language.

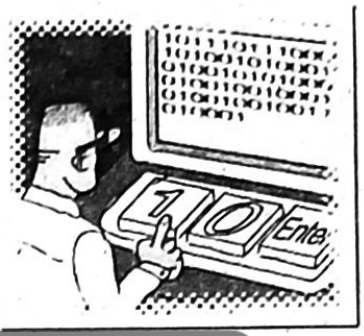
Q.23. State the types of programming language.

TYPES OF PROGRAMMING LANGUAGES

Types of programming languages are as follows:

- Machine or Low Level language
- Assembly language
- High Level language

➢ Machine or Low level language



Machine language is a language that instructing computer to perform specific task.

Machine language is also called binary language because it is the language of 0s and 1s means every instruction in machine language consists of a series of 0s and 1s that a computer can understand and execute directly.

Programmers do not write programs in machine language as it is difficult to write programs in it.

➢ Assembly language

Assembly language is the next level of programming languages. Each computer has its own unique assembly language.

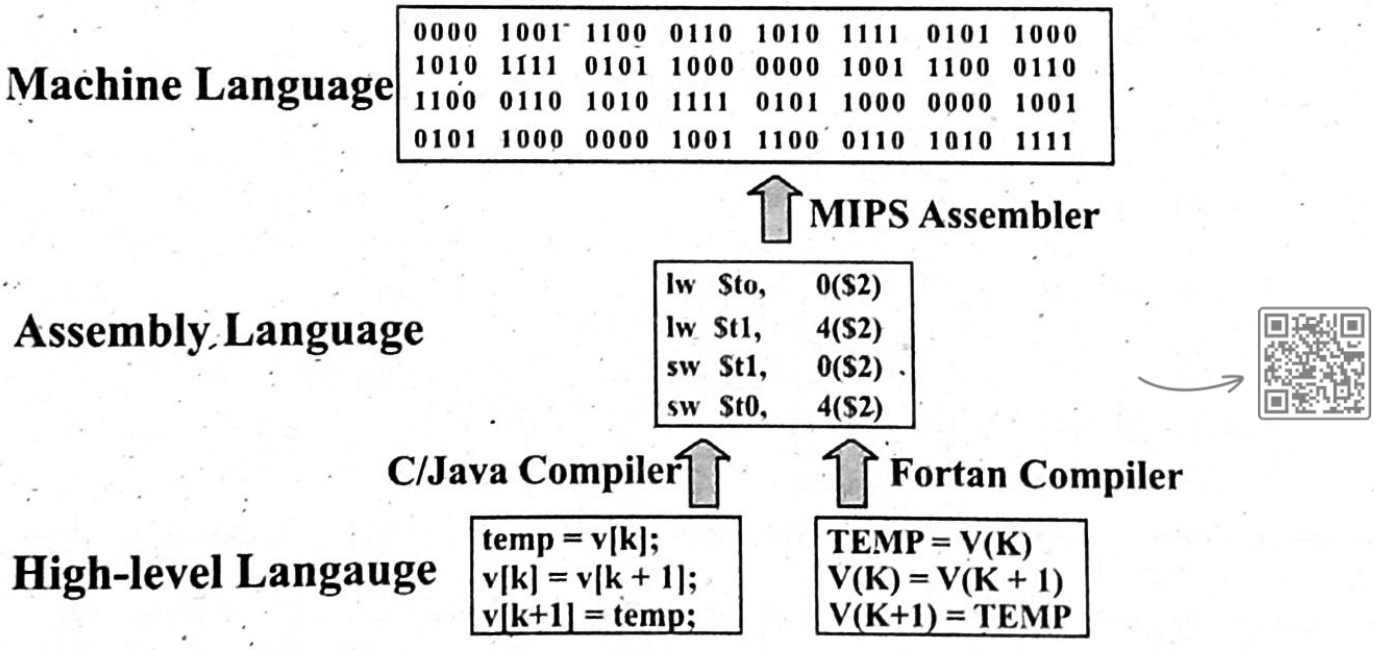
In assembly language the statements are written in symbolic codes that are easier for human to read and write as compared to machine language.

Each assembly language statement corresponds to one machine language statement.

➢ High Level language

High level languages are closer to human language and include statements like GOTO, INPUT and PRINT etc. which are regular words.

The programs of high level languages do not have to be written for a particular computer, but it can be executed on any machine that has a compiler for that language. A large numbers of high level languages used in computer world



Q.24. What are the advantages and disadvantages of machine language?

ADVANTAGES OF MACHINE LANGUAGE

Advantages of the machine language are listed below:

1. Machine language is highly suited for small computers which have the limited memory.
2. Programs which are written in the machine language are quite efficient because it takes shorter times for execution as compare to those programme which are written in other languages.
3. No need of translation of the programs because those programs which are written in Machine language are directly understood by the computer.

DISADVANTAGES OF MACHINE LANGUAGE

Machine language has a number of disadvantages which are listed below:

1. Machine language consists on zero(s) and one(s) therefore, all instructions written in the binary and numerical form.
2. The numerical form of instructions is difficult to remember and leads to errors.
3. Errors are difficult to find. Each statement has to be carefully checked. When an error is found, it and all of the statements below it have to be rewritten.
4. The modification in machine language program is a difficult task because any modification in machine language program results in a series of changes. If a program is to be modified by adding or deleting some instructions, then addresses of all the subsequent instruction are to be changed.
5. The parts of previously written program in machine language can not be used in new program without changing the addresses of the instructions and data to conform to the new program.
6. The machine language is different for different systems. This means that machine language is machine dependent. Any machine language program which is written for a particular computer can't be used on any other computer without drastic modification.

Q.25. What are the advantages and disadvantages of Assembly language?

ADVANTAGES OF ASSEMBLY LANGUAGE

Assembly language has the following advantages.

1. Operation codes of machine language are replaced by mnemonics, which are easier to remember.
2. An Assembly language program may be written easily as compared to machine language.
3. The memory addresses are used in machine language, which are replaced by the variable names in these languages.
4. Revision of complete program is quite easy.
5. The insertion and deletions of the instructions in the program are quite easy.

DISADVANTAGES OF ASSEMBLY LANGUAGE

Disadvantages of Assembly language are listed below:

1. As compared to machine language program, an assembly language program is less efficient.
2. An assembly language program can not be executed on small size computers.

Q.26. What are the advantages and disadvantages of high level languages?

ADVANTAGES OF HIGH LEVEL LANGUAGES

There are a large number of advantages of High Level Languages; some of these are described below:

1. Because high level languages are nearest to the human language therefore, these are easy to learn and use.
2. The writing of source programs in high level language is very easy because the syntax of the high level languages is similar to the commonly used languages.
3. The programs of high level languages are independent of internal structure of computer.
4. The high level languages are problems or procedure oriented languages.
5. Allocation of memory location for instructions and data is done by the machine itself and use is not to bother about it.
6. As compare to the other languages, the program written in high level languages are very small in size.
7. The modification of a high level language program is very easy.

DISADVANTAGES OF HIGH LEVEL LANGUAGES

1. High level languages are slower than low level languages.
2. You will still need a separate compiler for each platform.
3. High level languages use a large memory as compare to other types of languages.
4. When you use a high level language you are essentially using methods and components of lower level languages without ever knowing it.

Q.27. Define different types of high level languages.

TYPES OF HIGH LEVEL LANGUAGE

Some common types of high level languages are as under:

1. BASIC
2. COBOL
3. FORTRAN
4. C++
5. JAVA

1. BASIC

- BASIC stands for **B**eginner's **A**ll-Purpose **S**ymbolic **I**nstruction **C**ode
- BASIC developed by John G.Kemeney and Thomas E. Kurtz in the mid-1960s at Dartmouth College.
- BASIC is one of the earliest and simplest high-level programming languages.
- During the 1970s, it was the principal programming language taught to students, and continues to be a popular choice among educators.

2. COBOL

- COBOL stands for Common Business Oriented Language.
- COBOL was the first widely-used high-level programming language for business applications.
- Many Payrolls, Accounting, and other Business Application programs written in COBOL

3. FORTRAN

- FORTRAN is one of the oldest programming languages.
- FORTRAN was developed by a team of programmers at IBM led by John Backus, and was first published in 1957.
- FORTRAN is an acronym for FORmula TRANslation, because it was designed to allow easy translation of math formulas into code.

4. C++

- The C++ programming languages is an extension of C that was developed by Bjarne Stroustrup in the early 1980s at Bell Laboratories.
- C++ provides a number of features that "spruce up" the C language.
- It provides capabilities for object-oriented programming.

5. JAVA

- Java is a programming language and computing platform first released by Sun Microsystems in 1995.
- There are lots of applications and websites that will not work unless you have Java installed.
- Java is fast, secure, and reliable programming language.

Q.28. Differentiate between low level and high level languages.

DIFFERENCES BETWEEN LOW LEVEL &HIGH LEVEL LANGUAGES

LOW LEVEL LANGUAGES	HIGH LEVEL LANGUAGES
(1) Machine codes are used in program instructions.	(1) English language words are used in program instructions.
(2) Difficult to understand for a programmer.	(2) Easy to understand for a programmer
(3) Machine codes are directly understood by the CPU.	(3) Instructions in English words are not understand by the CPU.
(4) Fastest execution due to machine codes.	(4) Execution of program is not very fast.
(5) Translation not required.	(5) Translation required.
(6) Less consumption of memory.	(6) Large consumption of memory.
(7) Programs are difficult to modify.	(7) Programs are easy to modify.

Q.29. What is a language translator? Describe the types of language translators?

LANGUAGE TRANSLATORS

The computer doesn't understand a programming language, because computer only knows the machine codes or binary codes. Language Translators are used to convert program into machine codes.

Types of Language translators

Types of language translators are Assembler, Compiler and Interpreter.

➢ ASSEMBLER

Basically, Assembler is a translator or we can say Assembler is a program which translate Assembly language program into machine language. Except the translation Assembler perform the following functions:

- Includes the necessary linkage for closed sub-routines.
- Allocates areas of main storage.
- Will indicate invalid source language instructions.
- Produces the object program on disk.
- Produces a printed listing of the object program together with comments.

➢ COMPILER

Compiler is similar to assembler in a way that compiler translates whole program written in any high level language called source program into machine language at once and make a separate file called object program for execution without compilation. Each high level language has its own compiler.

➢ INTERPRETER

Interpreter is used to translate high level language program into machine language. Interpreter translates one statement at a time and executes it. It does not store translated instruction or does not make any object file. Interpreter translates the program every time you will execute it.

Q.30. What is the difference between compiler and interpreter?

DIFFERENCES BETWEEN COMPILER AND INTERPRETER

COMPILER	INTERPRETER
(1) Translates the whole program at once.	(1) Translates one instruction at a time.
(2) It creates an object file for execution.	(2) Interpreter does not create an object file.
(3) Translation is not required for object program.	(3) Translation is required every time for program execution.

Q.31. Why we need to translate a source code (source program) into object code (object program)?

SOURCE PROGRAM AND OBJECT PROGRAM

A program written in any language except the machine language is called source program. Source program must be converted to machine language code called object program in order to execute. Language translators are used to serve this purpose.

Q. 32. What is a Network? Describe different types of Networks.

NETWORK

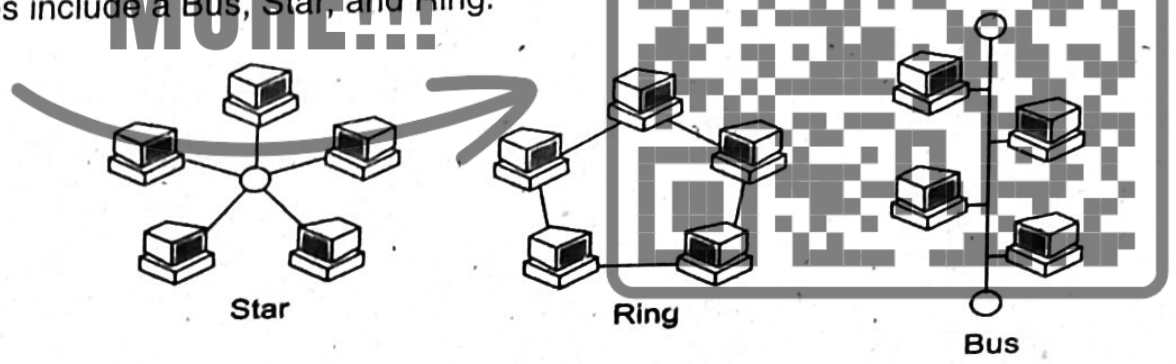
A network is a group of two or more computer systems linked together. There are many types of computer networks, including:

1. **Local Area networks (LANs):**
   The computers are geographically close together (that is, in the same building).
2. **Wide Area Networks (WANs):**
   The computers are farther apart and are connected by telephone lines or radio waves.
3. **Campus Area Networks (CANs):**
   The computers are within a limited geographic area, such as a campus or military base.
4. **Metropolitan Area Networks MANs):**
   A data network designed for a town or city.
5. **Home Area Networks (HANs):**
   A network contained within a user's home that connects a person's digital devices.

Q.33. What is Topology? Describe its types.

TOPOLOGY

The geometrical arrangement of a computer system is called topologies. Common topologies include a Bus, Star, and Ring.



Star Network Topology

In the star network topology, there is a central computer or server to which all the workstations are directly connected. Every workstation is indirectly connected to every other through the central computer.

Ring Network Topology

In the ring network topology, the workstations are connected in a closed loop configuration. Adjacent pairs of workstations are directly connected. Other pairs of workstations are indirectly connected, the data passing through one or more intermediate nodes.

Bus Network Topology

In the bus network topology, every workstation is connected to a main cable called the bus. Therefore, each workstation is directly connected to every other workstation in the network.

Q.34. What is Internet?

INTERNET

Connection of various computers and other devices connected with each other to share the resources is called network. Internet is the largest network of the world that connects computers located at different parts of the world. The internet provides information and services, as well as the ability to communicate to people all around the world in a variety of ways. These range from bulletin boards and chat rooms to voice conversations and video conferencing.

Q.35. Write some advantages of internet.

ADVANTAGES OF INTERNET

1. Internet provides Electronic mail (E-mail) facility.
2. Internet provides information from all around the world.
3. Audio and video call facility.
4. Available world's newspapers.
5. Social networking.
6. Sale and purchase facility through internet.
7. Video conferencing.

Q.36. Write some drawbacks or disadvantages of internet.

DRAWBACKS OF INTERNET

1. Wastage of time without taking any benefit.
2. Website hacking is very common.
3. Always cheat and fraud concerns.
4. Computer viruses can damage your data through Internet.
5. Privacy is difficult to maintain.
6. Multiple E-mail messages to an address.
7. Indecent material is easily available.

EXERCISE

Answer the following questions.

1. Define the term Computer.

Ans. See Q. No.1

2. Write some capabilities/advantages of computer r.

Ans. See Q. No.2

3. Define the terms Hardware and Software.

Ans. See Q. No.18

4. Compare and contrast: Analog and digital computers.

Ans. See Q. No.5

5. Write some draw backs of Internet.

Ans. See Q. No.34

6. Why we need to translate a source code into machine code?

Ans. See Q. No.29

7. Write a short story of the history and development of Computers in your own words.

Ans. See Q. No.8

8. What do you mean by programming languages?

Ans. See Q. No.20

9. What is the difference between low-level and high-level languages?

Ans. See Q. No.26

10. Write short notes on the following:

(a) Super Computers See Q. No.6 (b) Main frames See Q. No.6

(c) Mini Computers See Q. No.6 (d) Micro-Computers See Q. No.6

11. Fill in the Blanks

i) A program written in high-level language is called Source Program.

ii) Program is a set of electronic instructions used to instruct the computers what to do.

iii) Mark–I was the first computer that was the real beginning of computers as we know them today.

(iv) Charles Babbage is known as the father of computing.

(v) The major invention of first generation of computers was vacuum tube.

(vi) Transistors were the major technological development of Second generation of computers.

(vii) Desktop, Laptop, and hand-held computers are examples of micro computers.

(viii) All the physical equipment of computer system are termed as hardware.

(ix) Slide Rules was invented by William Ought-red.

(x) Fifth generation is called the generation of Artificial Intelligence.

MCQ's

1. UNIVAC stands for
   a. **Universal Automatic Computer✓** b. Universal Array Computer
   c. Unique Automatic Computer d. Unvalued Automatic Computer
2. IBM 1401 is
   a. First Generation Computer b. **Second Generation Computer✓**
   c. Third Generation Computer d. Fourth Generation Computer
3. MSI stands for
   a. Medium Scale Integrated Circuit b. Medium System Integrated Circuit
   c. **Medium Scale Intelligent Circuit✓** d. Medium System Intelligent Circuit
4. The first computer introduced in Nepal was
   a. IBM 1400 b. **IBM 1401✓** c. IBM 1402 d. IBM1402
5. WAN stands for
   a. Wap Area Network b. **Wide Area Network✓**
   c. Wide Array Net d. Wireless Area Network
6. MICR stands for
   a. **Magnetic Ink Character Reader✓** b. Magnetic Ink Code Reader
   c. Magnetic Ink Cases Reader d. None
7. Which of the following is first generation of computer?
   a. **EDSAC✓** b. IBM-1401 c. CDC-1604 d. ICL-2900
8. Chief component of first generation computer was
   a. Transistors b. **Vacuum Tubes and Valves✓**
   c. Integrated Circuits d. None of above
9. Second Generation computers were developed during
   a. 1949 to 1955 b. **1956 to 1965✓** c. 1965 to 1970 d. 1970 to 1990
10. The computer size was very large in
    a. **First Generation✓** b. Second Generation
    c. Third Generation d. Fourth Generation
11. Microprocessors as switching devices are for which generation computers
    a. First Generation b. Second Generation
    c. Third Generation d. **Fourth Generation✓**
12. In analog computer
    a. Input is first converted to digital form
    b. **Input is never converted to digital form✓**
    c. Output is displayed in digital form d. All of above
13. In latest generation computers, the instructions are executed
    a. Parallel only b. Sequentially only
    c. **Both sequentially and parallel✓** d. All of above
14. Who designed the first electronics computer–ENIAC?
    a. Van-Neumann b. Joseph M. Jacquard
    c. **J. Presper Eckert and John W Mauchly✓** d. All of above
15. Who invented the high level language c?
    a. **Dennis M. Ritchie✓** b. NiklausWrith
    c. Seymour Papert d. Donald Kunth

16. When did arch rivals IBM and Apple Computers Inc. decide to join hands?
a. 1978 b. 1984 c. 1990 d. **1991✓**

17. A computer program that translates one program instructions at a time into machine language is called a/an
a. **Interpreter✓** b. CPU c. Compiler d. Simulator

18. The ALU of a computer responds to the commands coming from
a. Primary memory b. **Control section✓**
c. External memory d. Cache memory

19. The two kinds of main memory are:
a. **Primary and secondary✓** b. Random and sequential
c. ROM and RAM d. All of above

20. A computer which CPU speed around 100 million instruction per second and with the word length of around 64 bits is known as
a. **Super computer✓** b. Mini computer
c. Micro computer d. Macro computer

21. A hybrid computer
a. Resembles digital computer
b. Resembles analog computer
c. **Resembles both a digital and analog computer✓**
d. None of the above

22. The silicon chips used for data processing are called
a. RAM chips b. ROM chips
c. Micro processors d. **PROM chips✓**

23. A factor which would strongly influence a business person to adopt a computer is its
a. Accuracy b. Reliability c. Speed d. **All of above✓**

24. In which year was chip used inside the computer for the first time?
a. 1964 b. **1975✓** c. 1999 d. 1944

25. What was the name of the first commercially available microprocessor chip?
a. Intel 308 b. Intel 33 c. **Intel 4004✓** d. Motorola 639

26. When were the first minicomputer built?
a. **1965✓** b. 1962 c. 1971 d. 1966

27. The personal computer industry was started by
a. **IBM✓** b. Apple c. Compaq d. HCL

28. Which of the following is required when more than one person uses a central computer at the same time?
a. **Terminal✓** b. Light pen c. Digitizer d. Mouse

29. Which of the following is used only for data entry and storage, and never for processing?
a. Mouse b. **Dumb terminal✓**
c. Micro computer d. Dedicated data entry system

30. Which was the most popular first generation computer?
a. **IBM 1650✓** b. IBM 360 c. IBM 1130 d. IBM 2700

31. Which of the following is an acronym for electronic delay storage automatic calculator?
a. UNIVAC b. **EDSAC✓** c. EDVAC d. Abacus

32. Each model of a computer has a unique
a. Assembly of a computer
b. **Machine language✓**
c. High level language
d. All of the above

33. Computer professionals working in a computer center are
a. Software
b. Firmware
c. Hardware
d. **Human-ware✓**

34. Which company is the biggest player in the microprocessor industry?
a. Motorola
b. IBM
c. **Intel✓**
d. AMD

35. The first electronic computer in the world was
a. UNIVAC
b. EDVAC
c. **ENIAC✓**
d. All of above

36. Which was the computer conceived by Babbage?
a. **Analytical engine✓**
b. Arithmetic machine
c. Donald Knuth
d. All of above

37. Which American Computer Company is called big blue?
a. Microsoft
b. Compaq Corp
c. **IBM✓**
d. Tandy Sevenson

38. The digital computer was developed primarily in
a. USSR
b. Japan
c. **USA✓**
d. UK

39. Who is credited with the idea of using punch cards to control patterns of a weaving machine?
a. Pascal
b. Hollerith
c. Babbage
d. **Jacquard✓**

40. One computer that is not considered a portable computer is
a. **Minicomputer✓**
b. A laptop computer
c. Mini computer
d. All of the above

41. When was the world's first laptop computer introduced in the market and by whom?
a. Hewlett-Packard
b. **Epson, 1981✓**
c. Laplink traveling software Inc. 1982
d. Tandy model-2000, 1985

42. The first microprocessor built by the Intel Corporation was called
a. 8008
b. 8080
c. **4004✓**
d. 8800

43. Who built the world's first electronic calculator using telephone relays, light bulbs and batteries/
a. Claude Shannon
b. KonrardZues
c. **George Stibits✓**
d. Howard H. Aiken

44. Who developed a mechanical device in the 17th century that could add, subtract, multiple, divide and find square roots?
a. Napier
b. Babbage
c. Pascal
d. **Leibniz✓**

45. Most important advantage of an IC is its
a. Easy replacement in case of circuit failure
b. **Extremely high reliability✓**
c. Reduced cost
d. Low powers consumption

46. The first machine to successfully perform a long series of arithmetic and logical operations was:
a. ENIAC
b. **Mark-I✓**
c. Analytic Engine
d. UNIVAC-1

47. An IBM system/38 represents the computer class of:
a. **Small scale computer✓**
b. Medium scale computer
c. Large scale computer
d. Super computer

48. A digital computer did not score over an analog computer in terms of
a. Speed
b. **Accuracy✓**
c. Reliability
d. Cost

49. Which of the following professions has not been affected by personal computers?
a. Medical
b. Clerical and law
c. Accounting
d. **None of the above✓**

50. Most important advantage of an IC is its
a. Easy replacement in case of circuit failure
b. **Extremely high reliability✓**
c. Reduced cost
d. Lower power consumption

51. An integrated circuit is
a. A complicated circuit
b. An integrating device
c. Much costlier than a single transistor
d. **Fabricated on a tiny silicon chip✓**

52. In a punched card system, data is processed by a
a. Keypunch machine, sorter and posting machine
b. Accounting machine, posting machine, and billing machine
c. Sorter, posting machine, and billing machine
d. **Accounting machine, keypunch machine and sorter✓**

53. In the third generation of computers:
a. Distributed data processing first became popular
b. An operating system was first developed
c. High-level prcedu7ral languages were firs used
d. **On-line, real time systems first became popular✓**

54. The first firm to mass- market a microcomputer as a personal computer was
a. IBM
b. Sperry Univac
c. **Data General corporation✓**
d. Radio Shack

55. When did Charles Babbage show Analytical Engine of the "Paris Exhibition"?
a. 1820 b. 1860 c. **1855✓** d 1870

56. Which was the world's first minicomputer and when was it introduced?
a. **PDP-I, 1958✓**
b. IBM System/36, 1960
c. PDP-II, 1961
d. VAX 11/780, 1962

57. Which generation of computer is still under development?
a. Fourth Generation
b. **Fifth Generation✓**
c. Sixth Generation
d. Seventh Generation?

58 Artificial Intelligence is associated with which generation?
a. First Generation
b. Second Generation
c. **Fifth Generation✓**
d. Sixth Generation

59. Which operation is not performed by computer?
a. Inputting b. Processing c. Controlling d. **Understanding✓**

60. Fifth generation computer is also known as
a. **Knowledge information processing system✓**
b. Very large scale integration (VLSI)
c. Both of above
d. None of above

61. Analog computer works on the supply of
a. **Continuous electrical pulses✓**
b. Electrical pulses but not continuous
c. Magnetic strength d. None of the above

62. Digital devices are
a. **Digital Clock✓**
b. Automobile speed meter
c. Clock with a dial and two hands
d. All of them

63. The computer that process both analog and digital is called
a. Analog computer
b. Digital computer
c. **Hybrid computer✓**
d. Mainframe computer

64. A computer program that converts an entire program into machine language at one time is called a/an
a. Interpreter
b. CPU
c. **Compiler✓**
d. Simulator

65. Mnemonic a memory trick is used in which of the following language?
a. Machine language
b. **Assembly language✓**
c. High level language
d. None of above

66. The translator program used in assembly language is called
a. Compiler
b. Interpreter
c. **Assembler✓**
d. Translator

67. Software in computer
a. **Enhances the capabilities of the hardware machine✓**
b. Increase the speed of central processing unit
c. Both of above
d. None of above

68. Which of the following is not computer language?
a. High level language
b. **Medium level language✓**
c. Low level language
d. All of the above

69. Which language is directly understood by the computer without translation program?
a. **Machine language✓**
b. Assembly language
c. High level language
d. None of above

70. Which of the following is called low level languages?
a. Machine language
b. Assembly language
c. **Both of the above✓**
d. None of above

71. Which of the following is problem oriented language?
a. **High level language✓**
b. Machine language
c. Assembly language
d. Low level language

72. Which of the following is machine independence program?
a. **High level language✓**
b. Low level language
c. Assembly language
d. Machine language

73. Which is the limitation of high level language?
a. **Lower efficiency✓**
b. Machine dependence
c. machine level coding
d. None of above

74. High level language is also called
a. Problem oriented language
b. Business oriented language
c. Mathematically oriented language
d. **All of the above✓**

75. Microprocessors can be used to make
a. Computers
b. Digital systems
c. Calculators
d. **All of above✓**

76. How many numbers could ENIAC store in its internal memory?
a. 100
b. **20✓**
c. 40
d. 80

77. Which of the following require large computers memory?
a. Imaging
b. Graphics
c. Voice
d. **All of Above✓**

78. Who invented the microprocessor?
a. **Marcian E Huff✓**
b. Herman H Goldstein
c. Joseph Jacquard
d. All of above

79. LAN networking started from
a. First generation
b. **Second generation** ✓
c. Third generation
d. Fourth generation

80. Which characteristic of computer distinguishes it from electronic calculators?
a. Accuracy b. **Storage**✓ c. Versatility d. Automatic

81. LSI, VLSI & ULSI chips were used in which generation?
a. First b. Second c. **Third**✓ d. Fourth

82. The main electronic component used in first generation computers was
a. Transistors
b. **Vacuum Tubes**✓
c. Integrated Circuits
d. None of above

83. Which of the following was a special purpose computer?
a. **ABC** ✓ b. ENIAC c. EDVAC d. All of the above

84. What was the computer invented by Attanasoff and Clifford?
a. Mark I b. **ABC**✓ c. Z3 d. None of above

85. When was vacuum tube invented?
a. 1900 b. **1906** ✓ c. 1910 d. 1880

86. A digital computer is based on the principle of
a. measurement b. logic c. multiplication d. **counting**✓

87. The linking of computers with a communication system is called:
a. **networking**✓ b. pairing c. interlocking d. assembling

88. The concept that many users can share a computer is called:
a. **time-sharing**✓
b. distributed processing
c. parallel processing
d. interpersonal relationship

89. Which type of computers have really brought the advantages of computers to homes and small business?
a. minicomputers
b. **microcomputers**✓
c. super computers
d. mainframes

90. The tangible part of a computer system is called:
a. input data b. output data c. software d. **hardware**✓

91. Large computers which can process huge data at high speeds are known as
a. networks b. minicomputers c. microcomputers d. **mainframes**✓

92. Managers who have no technical knowledge about a computer can be easily trained to operate a/an
a. minicomputer
b. **personal computer**✓
c. super computer
d. microcomputer

93. Present day computers are based on
a. analog technology
b. hybrid technology
c. **digital technology**✓
d. None of the above.

94. The person contributing the idea of the stored program was
a. **John von Neumann**✓
b. Charles Babbage
c. Howard Aiken
d. Thomas J. Watson, Sr.

95. Transistorized computer circuit were introduced in the
a. First generation
b. **Second generation**✓
c. Third generation
d. Fourth generation

96. The first firm to mass-market a microcomputer as a personal computer was
a. Data general corporation b. Sperry Univac
c. **Radio shack✓** d. IBM

97. The "Father of Punched Card Processing" was
a. J. Presper Eckert b. Charles Babbage
c. Blaise Pascal d. **Dr. Herman Hollerith✓**

98. The punched card used in IBM System/3 contains
a. 80 column b. 90 column c. **96 column✓** d. 126 column

99. First integrated circuit chip was developed by
a. C.V.Raman b. W.H.Brittain c. **J.S.Kilby✓** d. Robert Noyc

100. The main distinguishing features of fifth generation digital computers will be
a. Liberal used microprocessors b. **Artificial intelligence✓**
c. Extremely low cost d. Versatility

101. IBM 7000 digital computer
a. Belongs to second generation b. Uses VLSI
c. Employs semi-conductor memory d. **Has modular construction✓**

102. The first mechanical computer designed by Babbage was called:
a. **Analytical Engine✓** b. Abacus
c. Calculator d. Processor

103 What is the name of the earliest calculating machine which was based on concepts found in modem computers but was unfortunately never build?
a. **Babbage's Difference Engine✓** b. Pascal's Adder
c. Leibnitz's Multiplier d. Differential Analyzer

104. In 1830, Charles Babbage designed a machine called the Analytical Engine which he showed at the Paris Exhibition. In which year was it exhibited
a. 1835 b. 1860 c. **1855✓** d. 1870

105. In 1944, an electromechanical computer was built having thousands of
a. colossus b. **Mark-1✓** c. Whirlwind d. EDSAC

106. When was punched-card equipment used for the first time to process the British census?
a. 1094 b. 1907 c. **1911✓** d. 1914

107. The use of computer work stations to send and receive messages is known as
a. Electronic funds transfer b. Electronic message switching
c. **Electronic mail✓** d. Electronic publishing

108. Which of the following is the fastest?
a. **CPU✓** b. Magnetic tapes and disks
c. Video terminal d. Sensors, mechanical controllers

109. A digital computer performs its computations by
a. Mechanical means b. Analogy
c. Guessing d. **Counting✓**

110. Who is regarded as the Father of computers?
a. Abacus b. John Napier
c. Pascal c. **Charles Babbage✓**

111. The analog computer deals directly with
a. number or codes

b. **Measured values of continuous physical magnitude✓**
c. Signals in the form of 0 or 1
d. Signals in discrete values from 0 to 9

112. Transistor was invented in
a. 1945 b. 1946 c. 1947 d. **1948✓**

113. The first microprocessor was introduced in
a. **1971✓** b. 1972 c. 1973 d. 1974

114. Networking is a connection of two or more
a. **Computer System✓** b. Man
c. Place d. Business

115. An operating system
a. is not required on large computers
b Is always supplies with computer?
c. Is always written in BASIC
d. **Consists of programs that help in the operation of computer✓**

116. Computerized railway reservation system is an example of
a. **On-line application✓** b. Off-line application
c. Both (a) and (b) d. None of the above.

117. Present day computers are based on
a. Analog technology b. Hybrid technology
c. **Digital technology✓** d. None of the above.

118. Everything computer does is controlled by its?
a. RAM b. ROM
c. **CPU✓** d. Storage devices

119. The heart of any computer is the
a. **CPU✓** b. Memory c. I/O unit d. Disks

120. Abacus was first of all used by the country
a. USA b. Japan c. **China✓** d. France

121. A computer
a. Is an intelligent machine b. Can get tired easily
c. May forget if you give it too much data
d. **None of the above. ✓**

122. The fifth generation digital computer will be
a. Extremely low cost b. Very expensive
c. Versatility d. **Artificial intelligence✓**

123. A term associated with the comparison of processing speeds of different computer systems is:
a. EFTS b. MPG c. **MIPS✓** d. CPS

124. General purpose computes are those that can be adapted to countless uses simply by changing its.
a. Keyboard b. Printer c. **Program✓** d. Display screen

125. Modern computers compared to earlier computers are
a. Faster and larger b. Less reliable
c. Larger and stronger d. **Faster and smaller✓**

Unit-1

126. The use of computer for business applications is attractive because of its
a. Accuracy b. Reliability
c. Speed d. **All of the above✓**

127. Computer cannot do anything without a
a. Chip b. Memory c. Output device d. **Program✓**

128. A computer possesses information
a. As directed by the operator b **Automatically✓**
c. At once d Gradually and eventually

129. Control Unit of a digital computer is often called the
a. Lock b. **Nerve center✓** c. ICs d. all of the above

130. Group of instructions that directs a computer is called
a. Storage b. Memory c. Logic d. **Program✓**

131. Which of the following is not a factor when categorizing a computer?
a. Amount of main memory the CPU can use
b. Capacity of the storage devices
c. Cost of the system d. **Where it was purchased✓**

132. Which of the following is the most powerful type of computer?
a. Super micro b. Super conductor
c. Microcomputer d. **Super computer✓**

133. Which of the following people probably has the least amount of technical knowledge?
a. Programmer b. **User✓**
c. System analyst d. Computer operator

134. Which of the following terms applies to communication between separate computer systems?
a. Computer literacy b. Power supply
c. Applications software d. **Connectivity✓**

135. The Central Processing Unit (CPU) consists of:
a. Input, output and processing
b. Control unit, primary storage & secondary storage
c. **Control unit, arithmetic-logic unit, primary storage✓**
d. Control unit, processing, and primary storage

136. This is the part of the computer system that one can touch.
a. **Hardware✓** b. Data c. Software d. Input

137. The _____ tells the computer how to use its components.
a. Utility b. Network
c. **Operating system✓** d. Application program

138. A _____ is an electronic device that process data, converting it into information.
a. Processor b. **Computer✓** c. Case d. Stylus

139. _____ computers represent data as variable points along a continuous spectrum of values.
a. **Analog✓** b. Digital c. Precise d. Mainframe

140. The 'Difference Analyzer' was created in the early 1920s by _____.
a. Peter Norton b. Douglas Knuth
c. **Vannevar Bush✓** d. Alan Kay

141. Personal computers can be connected together to form a _____.
a. server b. Supercomputer c. Network d. Enterprise

142. The main component of a desktop PC is the _____ which houses the computer's critical parts.
a. Processor b. Memory c. Keyboard d. System case

143. To make a notebook act as a desktop model, the notebook can be connected to a _____ which is connected to a monitor and other devices.
a. Bay b. **Docking station✓**
c. Port d. Network

144. To access a mainframe or supercomputer, users often use a _____.
a. **Terminal✓** b. Node c. Desktop d. Handheld

145. The personnel who deals with the computer and its management put together are called
a. Software b. **Human ware✓** c. Firmware d. Hardware

146. Which statement is valid about interpreter?
a. **It translates one instruction at a time✓**
b. Object code is saved for future use
c. Repeated interpretation is not necessary
d. All of above

COMPUTER COMPONENTS

Q.1. Which devices or major components used to make a complete computer system?

COMPUTER COMPONENTS

Computer components are all the parts that make up a computer. Components include:

Input devices: Keyboard, Mouse, Trackball and Joystick etc.

Casing called Processor: Central Processing Unit (CPU), Buses, Ports, Main memory (RAM and ROM) etc.

Output devices: Monitor, Printer, Plotter and Speakers etc.

Q.2. What is the term CPU? Write its functions.

CENTRAL PROCESSING UNIT (CPU)

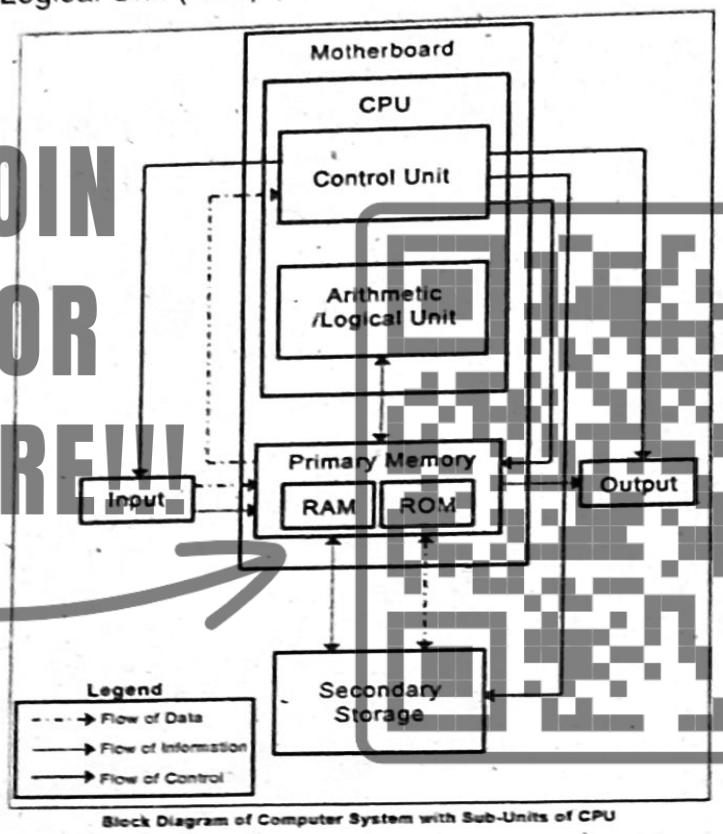
The Central Processing Unit (CPU) is the brain of any computing system. It is a hub of processing activities in a computer system. In terms of computing Power, the CPU is the most important element of the computer system.

- It is considered the brain of any computer system.

- The CPU is housed in the computer's motherboard.
- CPU is responsible for instruct the computer what to do and how to do.
- CPU interprets the data and instructions.
- It generates control signals.
- Perform arithmetic and logical operations.
- Produce the address bits needed by memory.

Two typical components of a CPU are the following:

1. Control Unit (CU)
2. Arithmetic and Logical Unit (ALU)



Block Diagram of Computer System with Sub-Units of CPU

Q.3. Define ALU and CU with their major functions.

CONTROL UNIT (CU)

Directs the entire computer system and works like a traffic cop, directing the flow of data between the components of CPU and other devices.

FUNCTIONS OF CONTROL UNIT

1. Control Unit directs the entire computer system to carry out stored program instructions.
2. Extract instruction from RAM, decodes and executes them.
3. Interprets and carries out instructions of computer programs
4. Communicate with both the arithmetic logic unit (ALU) and main memory.
5. Control unit generates control signals using one of the two organizations:
   i. Hardwired Control Unit
   ii. Micro-programmed Control Unit

6. Control Unit instructs the arithmetic logic unit that which logical or arithmetic operation is to be performed.
7. Control Unit co-ordinates the activities of the other two units as well as all peripherals and secondary storage devices linked to the computer.

ARITHMETIC AND LOGIC UNIT (ALU)

ALU stands for Arithmetic and Logic Unit. ALU performs mathematical, logical, and decision making operations in a computer which includes addition, subtraction, multiplication, division and perform certain logical operation such as comparing two numbers to see one is greater than other or they are equal, in this way computer is able to make simple decisions. After the processed of data by the ALU, it is sent to the computer memory.

In some computer processors, the ALU is divided into two distinct parts, the AU and the LU. The AU performs the arithmetic operations and the LU performs the logical operations.

FUNCTIONS OF ALU

1. ALU performs mathematical operation like addition, subtraction, multiplication and division.
2. It performs certain logical operation such as comparing two numbers to see one is greater than, less than or they are equal.
3. ALU has simple decision making capabilities.

Q.4. Write a note on Computer Registers.

REGISTERS

Register are special storage areas built into microprocessor used to quickly accept, store, and transfer data and instructions that are being used immediately by the CPU, there are fourteen basic registers shared by ALU and CU. Commonly used Registers are AC (Accumulator), DR (Data Register), AR (Address Register), PC (Program Counter), (MDR (Memory Data Register) (MDR), IR (Index Register) and MBR (Memory Buffer Register).

FUNCTIONS OF REGISTERS

1. It has very fast small amount of memory that is built into the CPU.
2. Registers are used to store data temporarily during the execution of a program.
3. The register can contain the address of a memory location where data is stored.
4. Contents can be accessed at extremely high speeds.
5. There are fourteen registers in a microprocessor, while each of new microprocessor has few more registers for special reasons.

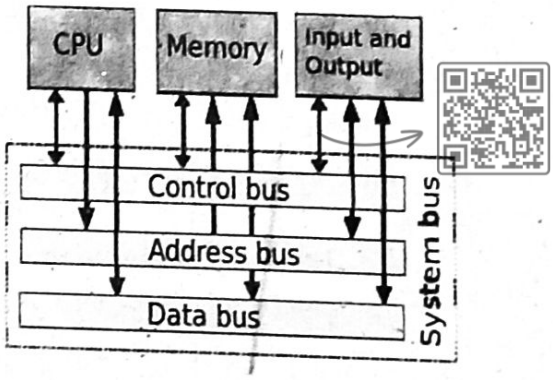
Q.5. Define the term BUS in general. What are the purposes of Data bus, Address bus and Control bus?

BUS

Bus is a set of wires through which data can transmit from one part of a computer to another.

Computer Bus like a highway on which data can travels within a computer that connects all the internal computer components with the CPU and main memory.

The purpose of buses is to reduce the number of "pathways" needed for communication between the components.



TYPES OF BUSES

There are three types of buses namely:

A. Data Bus

B. Address Bus

C. Control Bus

A. DATA BUS

1. Data Bus is a communication route through which data can travel between the computer's CPU, MU and peripherals.
2. The speed of data travelling between components depends upon the number of wires in the bus just as the number of lanes on a highway determine the number of vehicles reach their destinations at the same time.
3. Most of current processor design to use a 32-bit bus, meaning the 32-bits of data can be transferred at once.
4. Some processors have an internal data bus in order to make external connections cheaper.

B. ADDRESS BUS

1. Address bus is used to specify a physical address.
2. When processor needs to read or write to a memory location, it specifies that memory location on the address bus.
3. The width of the address bus determines the amount of memory a system can address.
4. E.g. A system with a 32-bit address bus can address 232 memory locations

C. CONTROL BUS

1. Control Bus is the physical connection that carries control information between the CPU and other devices within the computer.
2. The bus caries signals that report of status of various devices.
3. E.g. one line of the bus is used to indicate whether the CPU is currently reading from or Writing to Main memory.

Q.6. What is computer memory?

MEMORY UNIT (MU)

Memory Unit basically provides the space for storing of the data and instructions before processing, during processing and after processing. So, memory is an essential component of a digital computer. It is required for storage and retrieval of the instructions and data.

There are two types of memory:

1. Primary memory / Internal memory/ Main memory
2. Secondary storage /External memory / Backing storage

Q.7.Describe the internal memory.

PRIMARY MEMORY / ENTERNAL MEMORY / MAIN MEMORY

1. Primary memory is mainly used by CPU, so it is termed as primary memory. It is also called main memory.

2. Primary memory is a type of memory that is available in the form of silicon chips. These chips are created by IC by using very large scale integration techniques.
3. It stores data and instructions that are necessary to perform an operation. It holds both the intermediate and final results of the computer during processing as the program proceeds.
4. Primary memory is typically high speed memory and very costly.
5. Primary memory (RAM is a part of primary memory) is volatile i.e. the contents are erased when the power is off.

There are two types of primary Memory:

1) Random Access Memory (RAM)
2) Read Only Memory (ROM)

Q.8. Define RAM and ROM.

1) RAM

1. RAM stands for Random Access Memory.
2. This is really the main store and is the place where the programs and software we load gets stored.
3. When the Central Processing Unit runs a program, it fetches the program instructions from the RAM and carries them out.
4. If the Central Processing Unit needs to store the results of calculations it can store them in RAM.
5. Random Access Memory can have instructions READ from it by the CPU and also it can have numbers or other computer data written to it by the CPU.
6. The more RAM in your computer, the larger the programs you can run.
7. When we switch a computer off, whatever is stored in the RAM gets erased.

2) ROM

1. ROM stands for Read Only Memory.
2. The CPU can only fetch or read instructions from Read Only Memory (or ROM). ROM comes with instructions permanently stored inside and these instructions cannot be over-written by the computer's CPU.
3. ROM memory is used for storing special sets of instructions which the computer needs when it starts up.
4. When we switch the computer off, the contents of the ROM does not become erased but remains stored permanently. Therefore it is non-volatile.

Q.9. What is the difference between RAM and ROM?

DIFFERENCE BETWEEN RAM AND ROM

RAM	ROM
1. RAM stands for Random Access Memory.	1. ROM stands for Read Only Memory.
2. We can use them.	2. We cannot use ROM.
3. RAM is a volatile memory.	3. ROM is a non-volatile memory.
4. It is a blank memory.	4. It has programs called firmware.
5. We can read and write in this memory.	5. We can only read from ROM.
6 We can change/ remove the data.	6. We cannot change/ remove the data.

Q.10. Describe the external memory.

SECONDARY STORAGE / EXTERNAL MEMORY / BACKING STORAGES

- Secondary storage or External memory or is non-volatile(permanent) memory.
- When the power is turned off the non-volatile memory doesnot lose their data.
- Secondary storage is also called External memory or Auxiliary storage devices.
- These are physically separated but connected directly to the motherboard through a communication cable.
- External memory is the slowest and cheapest form of memory.
- It cannot be directly accessed by the CPU.
- Its contents must first be copied into RAM.
- It includes Floppy disk, Hard disk, CDs (Optical disk) and Flash disk etc.

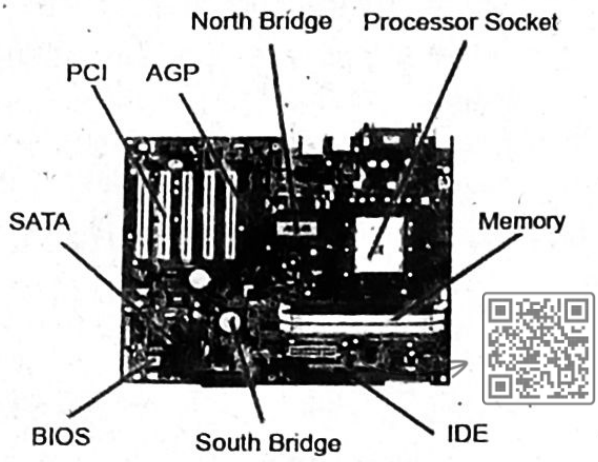
Q.11. Differentiate between internal memory and external memory?

DIFFERENCE BETWEEN INTERNAL AND EXTERNAL MEMORY

INTERNAL MEMORY	EXTERNAL MEMORY
1. Internal Memory located inside the computer on motherboard	1. External Memory is outside the computer, used to store data and information.
2. It is also called Primary of Main Memory.	2. It is also called Secondary, Auxiliary or Backing storage.
3. It is volatile. (in case of RAM)	3. It is non-volatile.
4. Storage capacity is very small.	4. Storage capacity is very huge.
5. It is very fast for accessing data.	5. It is slow for accessing data.
6. Examples are RAM,ROM and Registers etc.	6. Examples are Floppy disk, Hard disk, USB, CDs etc.

Q.12. What is a computer motherboard?

MOTHER BOARD



- Motherboard is a rectangular card containing the circuitry that connects the processor to the other hardware.
- Motherboard is the main circuit board of a microcomputer sometimes abbreviated as mobo.
- The motherboard contains the connect-ors for attaching additional boards.
- In most Personal Computers (PC) have many internal devices such as Video Card, Sound Card and other devices are housed on this mother board.
- Collectively, all these chips that reside on the motherboard are known as the motherboard's chipset.

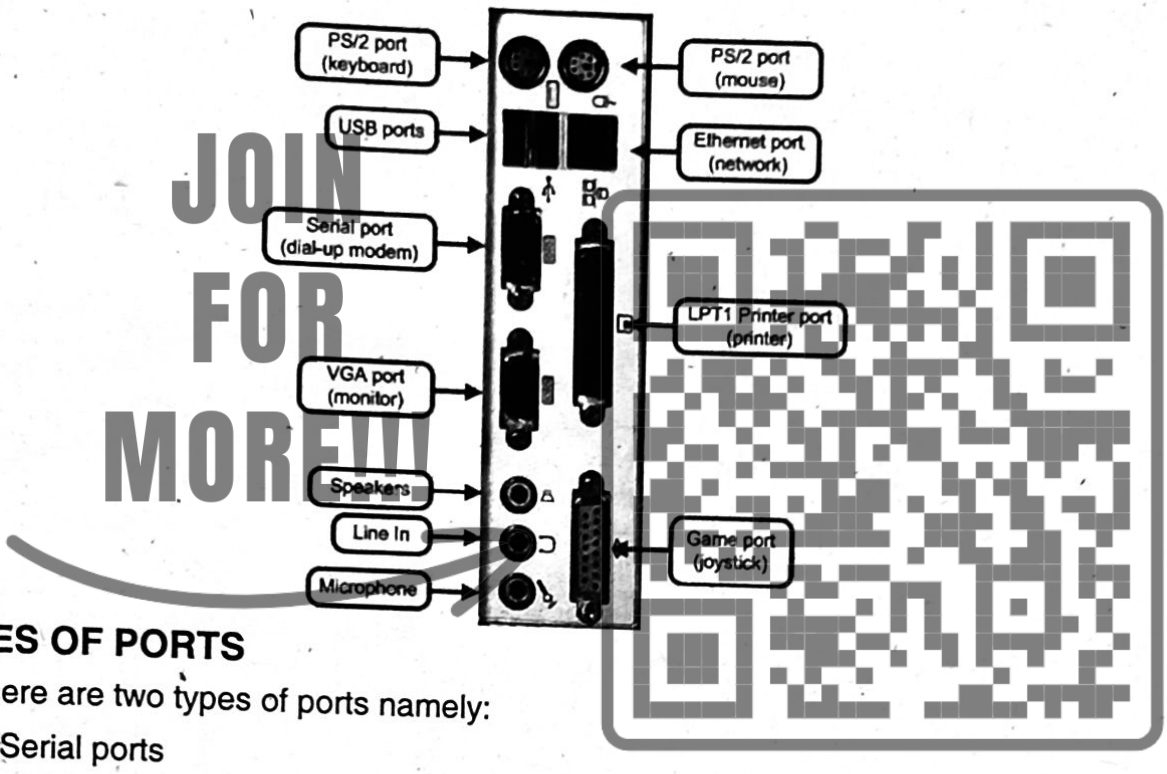
Q.13. Define Ports and its types.

PORTS

A port is a socket at the back of a computer used to plug-in various devices.

A computer has various types of ports.

- Internally there are several types of ports for connecting disk drives, display controller, mouse, keyboard etc.
- Externally, a computer has ports for connecting modem, printer, scanner and other peripheral devices.



TYPES OF PORTS

There are two types of ports namely:

1. Serial ports
2. Parallel ports.

SERIAL PORTS

1. Serial Ports are used for serial communication.
2. It transmit only one bit at a time.
3. A serial port is also called a male connector.
4. Serial Port has 9 or 25 pins.

PARALLEL PORTS

1. Parallel Ports transmit data more than one bit at a time.
2. It has 9 or 25 holes.
3. There may be 8, 16 or 32 wires for transmitting bits of information.
4. Not all wires are used to data; some are used for control signals.
5. Parallel port is also called female connector.

Q.14. What is the difference between Serial port and Parallel port?

DIFFERENCE BETWEEN SERIAL PORT AND PARALLEL PORT

SERIAL PORT	PARALLEL PORT
1. A port or interface that can be used for serial communication.	1. A port or interface that can be used for parallel communication.
2. Transmit one bit at a time.	2. Transmit more than one bit at a time.
3. It is called a male connector.	3. It is called a female connector.
4. It has 9 or 25 pins.	4. It has 9 or 25 holes.
5. It is reliable port.	5. Reliability doubtful of this port.
6. It is slower than parallel port.	6. It is faster than serial port.
7. Examples: Modem and Printer.	7. Examples: CD-ROM, HDD, Printer.

Q.15. Define input devices and output devices also write some examples of such devices.

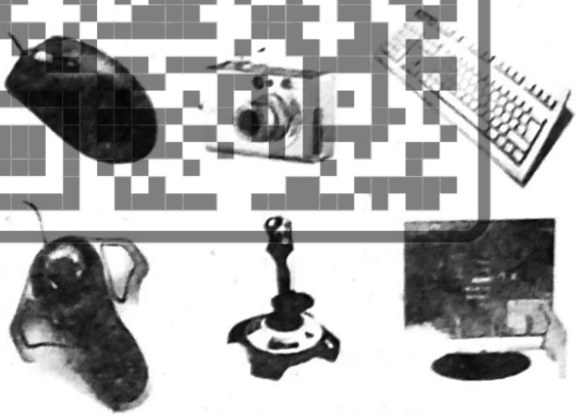
INPUT DEVICES

These are physical equipment that read or translate data consisting of alphabets, numbers or other symbols into electronic impulses, which can be understood by the computer.

The purpose of input devices is to pass information into the memory unit of the CPU

Some common input devices are:

1. Mouse
2. Touch screen
3. Light Pen
4. Graphics Tablet
5. Scanner
6. Bar-code readers
7. Magnetic Entry
8. Voice-Input Devices



OUTPUT DEVICES

The output devices are physical equipments, which present the outcome of information. This information can be understood by the humans.

The purpose of output devices is to convert data and information to human understandable form such as printed report.

Some common output devices are:

1. Headphones
2. Computer Output Microfilm (COM)
3. Monitor
4. Plotter
5. Printer

6. Projector
7. Sound card
8. Speakers
9. Speech-generating device (SGD)
10. Video card

Q.16. Differentiate Input devices and Output device.

DIFFERENCE BETWEEN INPUT AND OUTPUT DEVICES

INPUT DEVICE	OUTPUT DEVICES
1. Input devices are used to feed data and information into computer.	1. Output devices are used to takes information from computer.
2. Input devices translate given Information which computer can understand.	2. Output devices convert computer signals into a form to be understood by operator.
3. Pointing and textual input devices are two different kinds of input devices.	3. Hardcopy and softcopy output devices are two different kinds of output devices.
4. Keyboard, Mouse and Light Pen are some input devices.	4. Printer, Monitor and Speaker are some output devices.

EXERCISE

Answer the following questions.

1. Define the following terms with their major functions.
   a. Arithmetic and Logic Unit b. Control Unit
   Ans. See Q.3
2. Define the term Bus in general. What are the purposes of Data Bus, Address Bus and Control Bus?
   Ans. See Q.5
3. Differentiate: RAM and ROM.
   Ans. See Q.9
4. What is the difference between Internal Memory and External Memory?
   Ans. See Q.11
5. Write the major function of Input and Output devices.
   Ans. See Q.15
6. Define Ports. Compare and contrast: Serial ports and Parallel ports.
   Ans. See Q.13, 14

Fill in the Blanks.

1. CPU is the brain of computer.
2. There are two major parts of CPU: ALU and CU.
3. ALU stands for Arithmetic and Logic Unit.
4. Memory is the place to store data / information / programs.
5. There are two types of computer memory: Internal and External.
6. ROM is the abbreviation of Read Only Memory while RAM stands for Random Access Memory.
7. Input devices are used to take data from user and supply it to the computer.
8. Ports are the places that are used to connect various externals devices to the computer.
9. Serial port is also known as male connector.

Choose correct answer.

i) CPU stands for:
a. Controlling Power Unit
b. **Central Processing Unit✓**
c. Central Processor Unit

ii) There are two typical components of CPU, namely Arithmetic & Logic Unit and Control Unit.
a. **Two, Arithmetic &Logic Unit and Control Unit✓**
b. Three, ALU, CU and External storage
c. Two, arithmetic & logic unit and memory

iii) There are basically Fourteen registers.
a. **Fourteen✓** b. Eight c. Sixty Five d. None

iv) Bus is a set of Wires that is used as a communication pat.
a. **Wires✓** b. Processors c. Register

v) There are three buses, namely Address bus, Data bus and Control bus.
a. Two, control bus, connecting bus
b. **Three, Address bus, Data bus and Control bus✓**
c. Three, Address bus, data bus and communication bus
d. None of above

vi) A port or interface that can be used for communication, in which only 1 bit is transmitted at a time, is called Serial port.
a. **Serial port✓** b. Parallel Port c. None of above
d. Serial and Parallel port both transmit 1 bit

vii) Which port is reliable?
a. **Serial✓** b. Parallel
c. Both are equally reliable d. None of above

Choose the correct statement – True and False.

i) The CPU is housed in a single chip called a microprocessor.
a. **True✓** b. False

ii) The ALU performs arithmetic and logical operations.
a. **True✓** b. False

iii) Registers are non-volatile memory.
a. True b. **False✓**

iv) RAM stands for Random access memory and it is a permanent memory.
a. True b. **False✓**

v) RAM is also referred to as Primary memory.
a. **True✓** b. False

vi) A port is a socket at the back of a computer used to plug-in various devices.
a. **True✓** b. False

vii) A serial port has 9 or 30 pins.
a. True b. **False✓**

viii) Parallel port sends data faster but a serial port is much faster.
a. True b. **False✓**

MCQ's

1. _____ is the place that is used to connect various external devices to the computer.
   a. USB b. Serial c. Parallel d. **Port✓**
2. _____ Port is also known is male connector.
   a. **Serial✓** b. Parallel
   c. Equal d. None of the above
3. A port which transmit only one bit of information at a time is called
   a. **Serial✓** b. Parallel c. Both ports d. None of these
4. BUS is a set of
   a. Connectors b. **Wires✓** c. Ports d. RAM
5. The program stored in ROM is also called
   a. Software b. Live-ware c. **Firmware✓** d. Hardware
6. The components of a computer communicate with each other through
   a. Memory b. **BUS✓** c. Keyboard d. Monitor
7. ALU is
   a. **Arithmetic Logic Unit✓** b. Array Logic Unit
   c. Application Logic Unit d. None of above
8. The system unit of a personal computer typically contains all of the following except:
   a. Microprocessor b. Disk controller c. Serial interface d. **Modem✓**
9. The central processing unit (CPU) consists of
   a. Input, output and processing
   b. Control unit, primary storage, and secondary storage
   c. **Control unit, arithmetic-logic unit and primary storage✓**
   d. Control unit, processing, and primary storage
10. Which is used for manufacturing chips?
    a. Bus b. Control unit
    c. **Semiconductors✓** d. A and b only
11. A computer consists of
    a. A central processing unit b. A memory
    c. Input and output unit d. **All of the above✓**
12. Instructions for starting the computer are house on
    a. Random access memory b. CD-ROM
    c. **ROM✓** d. All of above
13. The ALU of a computer normally contains a number of high speed storage element called
    a. Semiconductor memory b. **Registers✓**
    c. Hard disks d. Magnetic disk
14. CAD stands for
    a. **Computer Aided Design✓** b. Computer algorithm for design
    c. Computer application in design d. All of the above
15. CPU stands for:
    a. Controlling Power Unit b. **Central Processing Unit✓**
    c. Central Processor Unit d. Central Programming Unit

16. There are ____ typical compounds of CPU, namely _____.
    a. **Two, arithmetic & logic unit and control unit.** ✓
    b. Three, ALU, CU and External storage
    c. Two, arithmetic & logic unit and memory
    d. Two, CU and MU
17. There are basically ____ registers.
    a. **Fourteen**✓ b. Eight c. Sixty five d. None
18. Bus is a set of _____ that is used as a communication part.
    a. **Wires**✓ b. Processors c. Register
19. There are ____ buses, namely _____ _____ _____.
    a. Two, control bus, connecting bus
    b. **Three, Address bus, data bus and control bus**✓
    c. Three, Address bus, data bus and communication bus
    d. None of above
20. A port or interface that can be used for communication, in which only 1 bit is transmitte at a time, is called
    a. **Serial port**✓ b. Parallel port c. None of above
    d. Serial and Parallel port both transmit 1 bit
21. Which port is reliable?
    a. **Serial**✓ b. Parallel c. Both are equally reliable
    d. none of above
22. Software that is stored in ROM is called
    a. Peripherals b. desktop computers
    c. embedded computers d. **firmware**✓
23. Devices that provide input or output to the computer are called _____
    a. **Peripherals**✓ b. desktop computers
    c. embedded computers d. firmware
24. A _____ might contain fifty or more tiny computers that perform the calculations necessary to display _____.
    a. Binary numbers, bits
    b. Random access memory, read-only memory
    c. **Graphics processing unit, 3D graphics**✓
    d. Register, CPU
25. The _____ is made up of one or more rotating platters, on which data is stored magnetically.
    a. **Magnetic disk**✓ b. socket
    c. Serial port d. parallel port.
26. A port is a _____ at the back of a computer used to plug in various devices.
    a. Magnetic disk b. **socket**✓ c. Serial port d. parallel port
27. A port or interface that can be used for serial communication, in which only one bit is transmitted at a time, is called _____.
    a. Magnetic disk b. socket c. **serial port**✓ d. parallel port
28. A socket on a computer for transmitting data in parallel, which means more than one bit at a time, is called _____
    a. Magnetic disk b. socket
    c. Serial port d. **parallel port**✓

29. A bar code reader is an example of a
a. Storage device b. **input device✓** c. Output device d. none of the above

30. Printers and screens are common form of
a. Input unit b. **Output unit✓** c. Storage unit d. Processing

31. An example of peripheral equipment:
a. CPU b. Keyboard c. **Disk Drive✓** d. Monitor

32. A device that inputs data by scanning letters and numbers:
a. Keyboard b. **Wand reader✓** c. Mouse d. Joystick

33. Another name for main memory is
a. **Primary storage✓** b. Secondary storage
c. Disk storage d. Backing storage

34. Laser beam technology is used for
a. **Optical disk✓** b. Magnetic tape c. Floppy disk d. Hard disk

35. The electrical circuitry that executes program instructions:
a. Register b. Accumulator
c. **Central Processing Unit✓** d. none of the above

36. The entire computer system is coordinated by
a. The ALU b. **Control unit✓** c. The Accumulator d. Memory unit

37. Equal to, less than, and greater than are examples of
a. **Logical operations✓** b. Subtraction
c. Locations d. Arithmetic operation

38. The primary storage unit is also known as
a. Storage registers b. mass storage
c. **Main memory✓** d. Auxiliary storage

39. Data and instructions are put into primary storage by
a. Memory b. Control unit
c. ALU d. **Keyboard✓**

40. Registers that collect the result of computations are
a. Main storage b. storage register c. **Accumulator✓**

41. During E-time the ALU
a. **Executes the instructions✓** b. enters the instructions
c. Examines the instruction d. none of the above

42. When the control unit gets an instruction it is called
a. E-time b. **I-time✓** c. Machine time

43. Computer operations are synchronized by
a. E-time b. **the CPU clock✓** c. megabytes

44. Another name for primary storage is
a. ROM b. Secondary storage c. **main storage✓**

45. When the central units direct the ALU to perform an operation on the data, the machine cycle is involved in it.
a. First step b. second c. **third step✓**

46. Which is not another name for memory?
a. Primary storage b. main storage c. **secondary storage✓**

47. Another name for a logic chip is
a. Memory b. **microprocessor✓** c. ROM

48. Data is represented on a computer by a two state on/off system called
a. a word b. a byte c. **the binary system**✓

49. A letter number, or special character is represented by a
a. bit b. **byte**✓ c. kilobyte

50. Which is not a kind of register?
a. address b. accumulator c. **variable**✓

51. An emerging technology that provides non-volatile memory chips
a. **Flash memory**✓ b. PROM c. ROM

52. Memory capacity may be expressed in
a. microsecond b. bits c. **kilobytes**✓

53. The shortest period of time
a. millisecond b. nanosecond c. **picoseconds**✓

54. The data coding scheme that is the American standard
a. KB b. **ASCII**✓ c. SIMM

55. Soft copy refers to
a. Music sound b. Photostat c. **screen output**✓

56. The CRT technology with the best resolution:
a. VGA b. **SVGA**✓ c. LCD

57. An ink jet printer is an example of a
a. Impact printer b. **non-impact printer**✓ c. Laser printer

58 The rate of screen refreshment is called
a. Raster rate b. **scan rate**✓ c. pixel speed

59. A one color scheme on a black ground is called
a. **Monochrome**✓ b. blank c. LCD

60. Imaging uses what device to input data?
a. **Scanner**✓ b. icon c. barcode reader

61. The cursor can be moved by rolling this device on a flat surface:
a. **mouse**✓ b. track ball c. barcode reader

62. Which input device is often attached to laptop computers?
a. **track ball**✓ b. barcode reader c. mouse

63. A screen that is lighter and slimmer than a CRT is a
a. terminal b. graphic c. **flat panel**✓

64. A color with the best resolution has the most
a. CRT b. OCR c. **Pixels**✓

65. What is the responsibility of the logical unit in the CPU of a computer?
a. To produce result b. **To compare numbers**✓
c. To control flow of information d. To do math's works

66. User programmable terminals that combine VDT hardware with built-in microprocessor is
a. Kips b. PC
c. Mainframe d. **Intelligent terminals**✓

67. A physical connection between the microprocessor memory and other parts of the m9crocomputer is known as
a. Path b. **Address bus**✓ c. Route

68. The brain of any computer system is
a. ALU b. Memory c. **CPU**✓ d. Control unit

69. Which term is used to describe RAM?
a. Dynamic RAM (DRAM) b. Static RAM (SRAM)
c. Video RAM (VRAM) d. **All of the above**✓

70. Which is the type of memory for information that does not change on your computer?
a. RAM b. **ROM**✓ c. ERAM d. RW / RAM

71. What type of memory is not directly addressable by the CPU and requires special software called EMS?
a. Extended b. **Expanded**✓ c. Base d. Conventional

72. What is required when more than one person uses a central computer at the same time?
a. Light pen b. Mouse c. Digitizer d. **Terminal**✓

73. Multi user systems provided cost savings for small business because they use a single processing unit to link several
a. Personal computers b. Workstations
c. **Dumb terminals**✓ d. Mini computers

74. What are the operations of decision making by ALU of a CPU??
a. Greater than b. Less than c. Equal to
d. **All of the above**✓

75. Which part of the computer is used for calculating and comparing?
a. Disk unit b. Control unit c. **ALU**✓ d. Modem

76. Which one of the following input device is user-programmable?
a. Dumb terminal b. Smart terminal
c. VDT d. **Intelligent terminal**✓

77. Which computer memory is used for storing programs and data currently being processed by the CPU?
a. Mass memory b. **Internal memory**✓
c. Non-volatile memory d. PROM

78. CD-ROM
a. Is a semiconductor memory b. Memory register
c. Magnetic memory d. **None of the above**✓

79. Which of the following is not a primary storage device?
a. Magnetic tape b. Magnetic disk
c. Optical disk d. **None of the above**✓

80. A name or number used to identify a storage location is called
a. A byte b. A record c. **An address**✓ d. All of above

81. The difference between memory and storage is that memory is .... and storage is ...
a. **Temporary, permanent**✓ b. Permanent, temporary
c. Slow, fast d. All of above

82. A floppy disk contains
a. Circular tracks only b. Sectors only
c. **Both circular tracks and sectors**✓ d. All of the above

83. Which of the following registers is loaded with the contents of the memory location pointed by the PC?
a. Memory address register b. Memory data register
c. **Instruction registers**✓ d. Program counter

84. Which of the following registers is used to keep track of address of the memory location where the next instruction is located?
a. Memory address register b. Memory data register
c Instruction register d. **Program counter**✓

85. Microprocessors can be used to make
a. Computer b. Digital systems
c. Calculators d. **All of the above**✓

86. The memory which is programmed at the time it is manufactured
a. **ROM**✓ b. RAM c. PROM d. EPROM

87. Different components on the motherboard of a PC processor unit are linked together by sets or parallel electrical conducting lines. What are these lines called?
a. Conductors b. **Buses**✓ c. Connectors d. Connectively

88. What does the disk drive of a computer do?
a. Rotate the disk b. Read the disk
c. Load a program from the disk into the memory
d. **Both b and c**✓

89. Which of the following is used as a primary storage device?
a. Magnetic drum b. **Prom**✓ c. Floppy d. All of above

90. Which of the following memories needs refreshing?
a. SRAM b. **DRAM**✓ c. ROM d. All of above

91 Central Processing Unit is the combination of
a. Control and storage b. Control and output unit
c. Arithmetic logic and input unit d. **Arithmetic logic and control unit**✓

92. Modern computers are very reliable but they are not
a. Fast b. Powerful c. **Infallible**✓ d. Cheap

93. Which of the following are the two main components of the CPU?
a. Control unit and registers b. Registers and main memory
c. **Control Unit and ALU**✓ d. ALU and bus

94. Personal computers used a number of chips mounted on a main circuit board. What is the common name for such boards?
a. Daughterboard b. **Motherboard**✓ c. Father-board d. Child-board

95. In most of the IBM PCs, the CPU, the device drivers, memory, expansion slots and active components are mounted on a single board. What is the name of the board?
a. **Motherboard**✓ b. Daughterboard c. Bredboard d. Fatherboard

96. A physical connection between the microprocessor memory and other parts of the microcomputer is known as
a Path b. **Address bus**✓ c. Route d. All of the above

97. The computer stores its program and data in its
a. ALU b. control unit c. **memory**✓ d. cache memory

98. Which of the following is a secondary memory device?
a. Keyboard b. **Disk**✓ c. ALU d. All of the above

INPUT/ OUTPUT DEVICES

Q.1. Discuss input devices.

INPUT DEVICES

These are physical equipment that read or translate data consisting of alphabets, numbers or other symbols into electronic impulses, which can be understood by the computer.

The purpose of input devices is to pass information into the memory unit of the CPU. Examples of input devices are:

- Keyboard
- Mouse
- Trackball
- Joystick
- Light Pen
- Touchpad
- Scanner
- Microphone
- Digital Camera

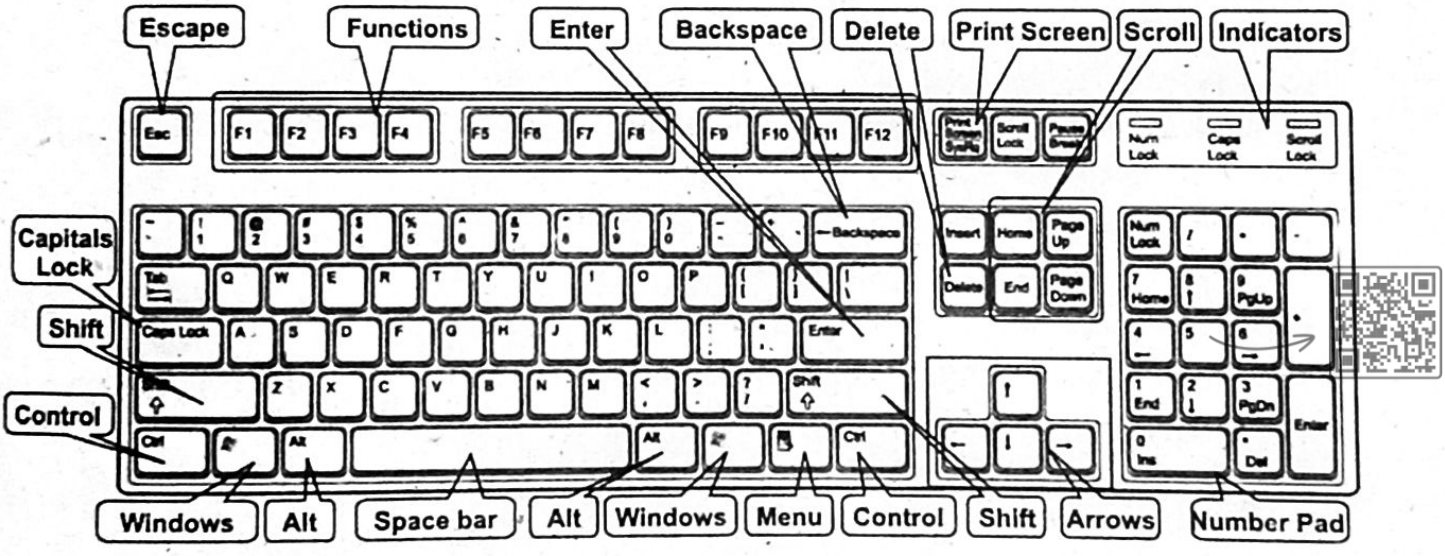
Q.2. Define Keyboard and state its division.

KEYBOARD

The main communicator with computer is keyboard. The standard keyboard is same just as the typewriter keyboard. The data can be inputted by typing at keyboard.

The keyboard come in different models and each model is introduced with new features, making it easier than before. The keyboard may be divided into the following parts:

1. Alphanumeric keypad
2. Numeric keypad
3. Function keypad
4. Cursor movement keys
5. Modifier keys

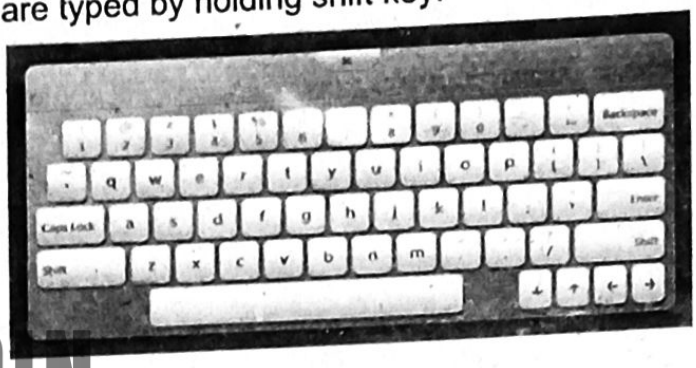


1. ALPHANUMERIC KEYPAD

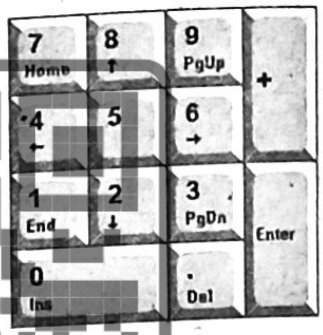
This is the main part of keyboard.

By using this keypad:

- The letters from a to z or A to Z
- Numbers from 0 to 9
- Some special characters like!@#$ %^&*()_+~`{} [];'", <>? / etc. may be typed. Many of these characters are typed by holding shift key.

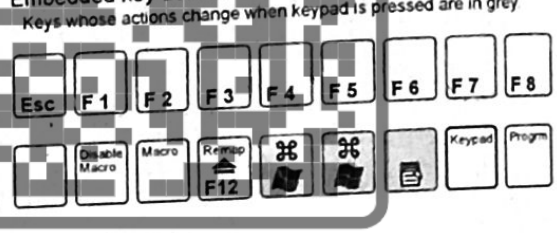


2. NUMERIC KEYPAD



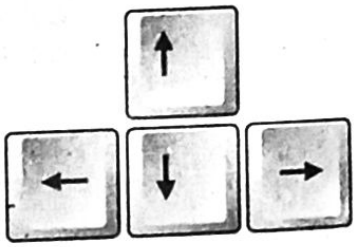
- The numeric keypad is located on the right side of keyboard.
- When "Num-Lock" key is pressed then the numbers on numeric keypad can be used to enter numeric data.
- When Num-Lock key is off, the keys marked with arrows, Home, End, PgUp, PgDn, Ins and Del can be used.

3. FUNCTION KEYPAD



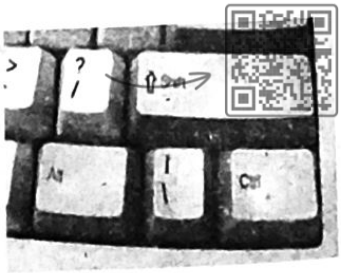
- A set of twelve keys marked as F1 to F12, called Function key pad.
- Function keypad located at the top of the keyboard.
- All of these keys have pre-defined meanings which depend on the application software.

4 CURSOR MOVEMENT KEYS



- A blinking cell or underscore displayed on the screen is called cursor.
- Cursor movement keys are used to move cursor position on the screen.
- New text will be typed by keyboard at the point of cursor.
- Cursor movement keys are↑↓→←.

5. MODIFIER KEYS



- Modifier keys are used to modify the input of other keys.
- ***You press a key while holding down one of the modifier keys.***
- Ctrl, Alt and Shift keys are the example of modifier keys.

Q.3. What do you mean by pointing input devices? Write some examples of such devices.

POINTING INPUT DEVICES

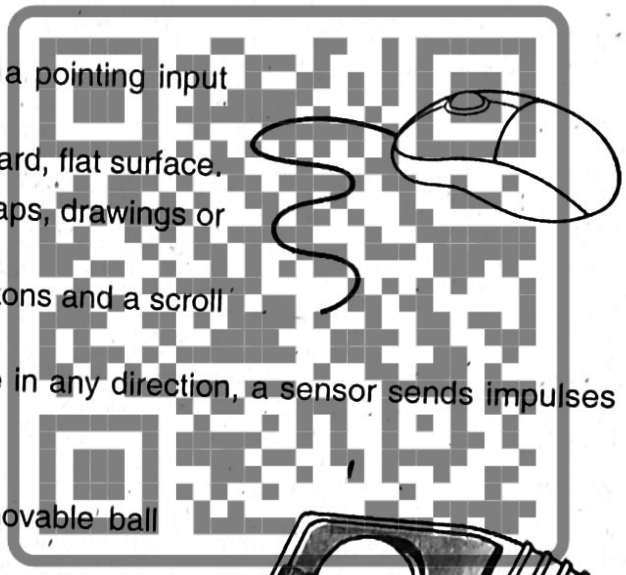
Pointing input device is a device which you can used to control the movement of the pointer on the display screen in order to select an item from monitor and to select one or more actions to be taken from that position.

Pointing input devices are:

1. Mouse
2. Trackball
3. Joystick
4. Light pen
5. Touchpad

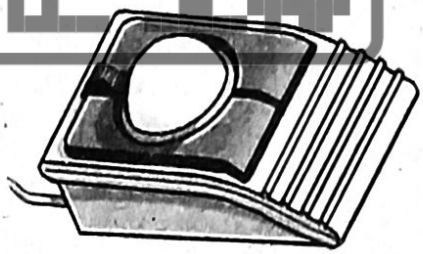
Q.4. Write notes on the following:
Mouse, Trackball, Joystick, Light pen, Touch pad, Microphone and Digital Camera

MOUSE



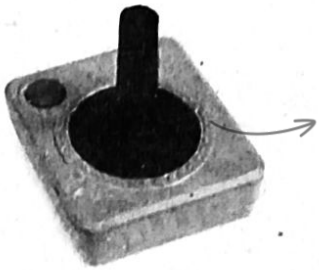
- The mouse is an input device, normally called a pointing input device.
- A mouse is a small object you can roll along a hard, flat surface.
- It is used to select various options or to draw maps, drawings or pictures etc.
- The mouse consists of a unit of two or more buttons and a scroll wheel, which can also act as a third, button.
- When the mouse is moved over the flat surface in any direction, a sensor sends impulses to the computer.

TRACKBALL



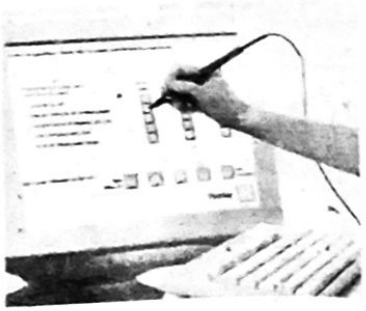
- A stationary pointing device that contains a movable ball rotated with the fingers or palm.
- Normally trackball has two or more buttons are located in various positions depending on the unit.
- The advantage of the trackball, and the reason many people like it, is that the unit remains in the same position on the desk, and only the ball is moved.

JOYSTICK



- Joystick is a pointing input device, which is mostly used for computer or video games.
- Joysticks are also used occasionally for CAD/CAM systems and other applications.
- Joystick is just like a vertical handle that is gripped by hands.
- A joystick is similar to a mouse, except that with a mouse, pointer stops moving as soon as you stop. With a joystick, the pointer continues moving in the direction the joystick is pointing.
- Most joysticks include two buttons called triggers.

LIGHT PEN



- An input device that is utilizes a light-sensitive detector to select objects on a display screen.
- A light pen is similar to a mouse, except that with a light pen you can move the pointer and select objects on the display screen by directly pointing to the objects with the pen.

TOUCHPAD

- A small, touchpad or track-pad is used as a pointing device.
- Touchpads are a common feature of laptop computers and also used with desktop computers as a separate device.
- By moving a finger or other object along the pad, you can move the pointer on the display screen and then click by tapping the pad.

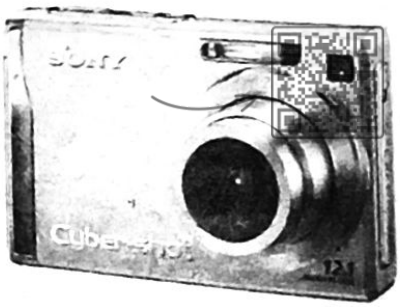
Touchpad with
Laptop computers

Touchpad with
Desktop computers

MICROPHONE

- Microphones are used to record voice or speech.
- Voice input is used most often where the presentation can benefit from narration.
- If you have a microphone and speaker, you can make telephone calls from your computer.
- Microphone is also useful to arrange audio conferences through internet.

DIGITAL CAMERA



- A digital camera is used to takes pictures as input.
- Normal camera capture pictures on a special coated film while digital camera captures images electronically without the need of a film.
- The camera stores the snapshots in its memory then user can copy them into a computer's memory.
- Images of digital cameras can be edited, printed or copied in a document etc.

Q.5. What is the major difference between Mouse and Trackball?

DIFFERENCE BETWEEN MOUSE AND TRACKBALL

MOUSE	TRACKBALL
1. A mouse is a small object you can roll on flat surface	1. Rotate the ball with your fingers to move the pointer on screen.
2. It is a commonly use input device	2. It is a rear use input device.
3. Mouse has a ball at the bottom.	3. Trackball has a ball on the top.
4. Mouse is a moving device.	4. It is a stationary device.
5. Mouse requires more space for movement.	5. Less space required to use them.
6. Mouse is a separate device.	6. Trackball occasionally attached with keyboard.

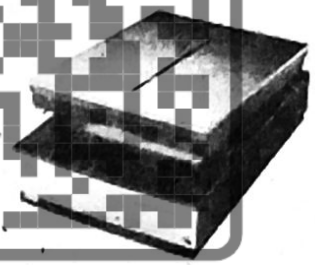
Q.6. Define Scanner also describes its types.

SCANNER

A scanner converts graphic and pictorial data to digital form which can be directly fed and stored in computer.

The scanner is capable of digitizing not only shape and size of drawings but also varying intensities on a gray to black.

They are used to scan more complex pictures and photographs.



TYPES OF SCANNERS

Some most common types of scanners are:

a) Flatbed scanner
b) Hand-held or Hendy scanner
c) Sheet-fed scanner

a) FLATBED SCANNER

- Flatbed scanner has a flat piece of glass.
- The document is put on the glass upside down to scan it.
- A mechanism is now moved over the surface of drawing which scans it and produces signals for the computer.
- This mechanism is similar to a normal photo copier machine.

b) HAND-HELD OR HANDY SCANNER

- The handy scanner is very small in size.
- The picture is placed on a flat surface and the scanner is moved downward by hand onto that picture to start scanning.
- Handy scanners are easy to use, but sometimes they are limited to scan a fixed width of picture.
- The latest scanners provide a facility to scan a wide picture.

c) SHEET-FED SCANNER

- A scanner that feeds each sheet of paper across a non-moving scan heads.
- These scanners are different from the flatbed scanner in which the paper is laid on a sheet of glass and the scan head moves.
- A sheet-fed scanner cannot be used to scan pages in books or magazines.

Q.7. Discuss output devices.

OUTPUT DEVICES

The output devices are physical equipment's, which present the outcome of information. This information can be understood by the humans.

The purpose of output devices is to convert data and information to human understandable form such as printed report. Examples of output devices are Monitors, Printers, Plotters and Speakers etc.

Q.8. Define Monitor and its types.

MONITOR

To display results or output from computer, a TV like device is used, called "Monitor".

The displayed output on monitor is called a "Soft Copy" of information.

A program can be typed or edited very easily by the help of monitor.

There are two basic types of monitors; these are:

i. CRT (Cathode Ray Tube)
ii. LCD (Liquid Crystal Display) or Flat-panel display

i. CRT (Cathode Ray Tube)

- It is similar to the television screen and also works the same way.
- These are heavy, use a lot of desk space and electricity.
- It uses a large vacuum tube called Cathode Ray Tube (CRT).

ii. LCD or Flat-panel display

- It uses a large vacuum tube called Cathode Ray Tube (CRT).
- LCD is usually used with portable computers but now has become very popular with the desktop computers too.
- LCD monitors use much less desk space, are lightweight and use less electricity than CRT.
- It can produce a very high quality and stable display of graphics and text.
- It is also used for screens in every mobile phone, and many handheld technologies.

CLASSIFICATION OF MONITORS

Monitors can be classifying:

a) According to color capabilities
b) According to latest graphics system.

Q.9. Classify the monitors according to color capabilities.

CLASSIFICATION ACCORDING TO COLOR CAPABILITIES

In terms of color capabilities all the CRTs fall into three categories:

i. Monochrome ii. Gray-scale iii. Color

I. Monochrome

- Monochrome monitors actually display two colors, one for the background and another for foreground.
- The color can be black and white, green and black or amber and black

II. Gray-scale

- A gray-scale monitor is a special type of monochrome monitor capable of displaying different shades of gray.

III. Color

- Color monitor can display anywhere from 16 to one million different colors.
- Color monitors are sometimes called RGB monitors because they accept three separate signals red, green and blue (the three fundamental colors).

Q.10. Classify the monitors according to its latest graphics system.

CLASSIFICATION ACCORDING TO LATEST GRAPHICS SYSTEM

In terms of latest graphics system, there are three types of monitors.

i. General purpose
ii. Advanced purpose
iii. Special purpose monitors.

I. General Purpose monitors

- The general purpose monitors include CGA, HGA, EGA, VGA and SVGA.
- These monitors are commonly used in normal business and personal applications.

II. Advanced purpose monitors

- Advanced purpose monitors include PGA, 8514/A System, TIGA and Windows accelerator-XGA.
- These monitors are widely used in scientific and graphical applications.

III. Special purpose monitors

- Special purpose monitors may be of any shape or size.
- Monitors used in publishing business are called "A4 Monitors".
- Some monitors are called "A3 monitors".
- These monitors can display the size of A3 page or two pages of A4 size.
- A3 monitors are also called large size monitors.

Q.11. What are the factors that determine a monitor quality?

FACTORS THAT DETERMINE A MONITOR'S QUALITY

Following are some factors that determine the quality of a monitor:

a) Resolution b) Bandwidth c) Refresh rate
d) Dot pitch e) Convergence

a) Resolution

The resolution of a monitor indicates how densely packed the pixel are. In general, high resolution provides a sharper image.

b) Bandwidth

The range of signals frequencies the monitor can handle. This determines how much data it can process and therefore how cast it can refresh at higher resolutions.

c) Refresh rate

How many times per second the screen is refreshed or redrawn. To avoid flickering, the refresh rate should be at least 72Hz.

d) Dot pitch

The amount of space between each pixel is called dot pitch. Closer spacing generally produces a sharper image.

e) Convergence

The clarity and sharpness of each pixel

Q.12. What is a printer? Discuss different types of printers.

PRINTERS

Printer is a device that accepts information in the form of text and graphics and transferred it to paper as output, called hardcopy.

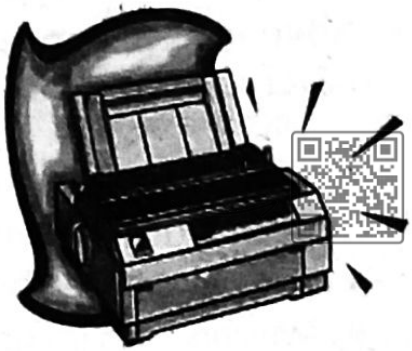
Printers vary in size, speed and cost.

There are different types of printers in terms of technology and utilization.

TYPES OF PRINTERS

Printers fall into basic two types namely:

1. Impact printers
2. Non-impact printers.



1. IMPACT PRINTERS

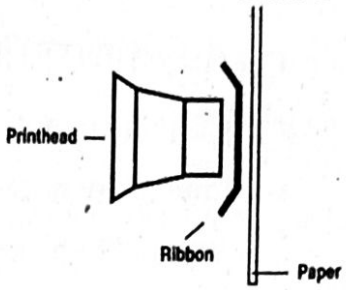
- They print by striking the ribbon against the paper.
- The biggest advantage of impact printer is to produce carbon copies.
- These printers are called noisy printers because they produce much noise when printing.

TYPES OF IMPACT PRINTERS

The three most common types of impact printers are:

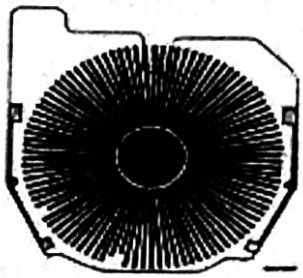
a) Dot-matrix
b) Daisy-wheel
c) Line printers

a) DOT-MATRIX PRINTERS



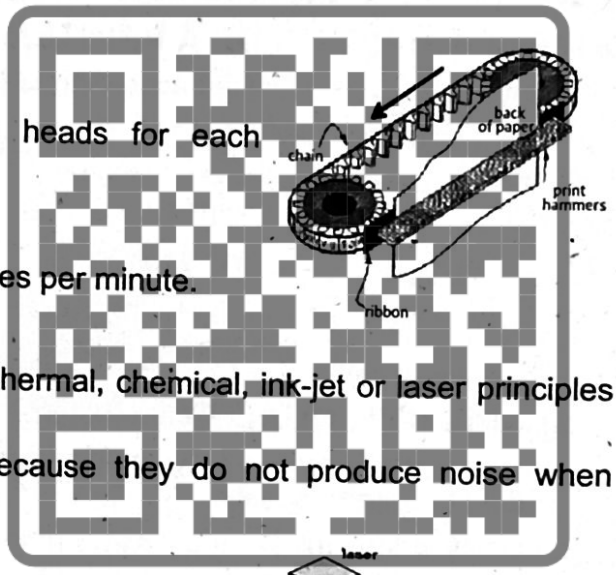
- They create characters by striking pins against an ink ribbon.
- Each pin makes a dot, and combinations of dots form a character.
- Dot-matrix printers vary in print resolution and overall quality with either 9 or 24-pin print heads.

b) DAISY-WHEEL PRINTERS



- The daisy-wheel printers have a wheel, on which characters are embossed.
- The daisy-wheel is a type of printer that produces letter-quality printing.
- An electronic motor spins this daisy-wheel and a print hammer strikes to produce image of character on paper.

c) LINE PRINTERS



- A line printer can print an entire at a time.
- These printers have 80 or 132 printing heads for each character.
- Normally covers 80 or 132 characters.
- A normal line printer can print about 2500 lines per minute.

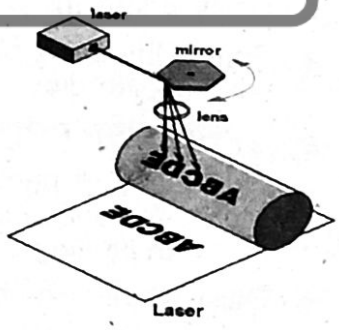
2. NON-IMPACT PRINTERS

- These printers use magnetic, electrostatic, thermal, chemical, ink-jet or laser principles to produce hard copy of information.
- These printers are called quite printers because they do not produce noise when printing.

TYPES OF NON-IMPACT PRINTERS

Some non-impact printers are:

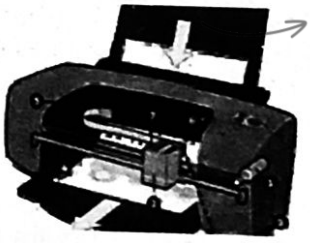
a) Ink-Jet printers
b) Laser printers
c) LED printers
d) Thermal printers



a) LASER PRINTERS

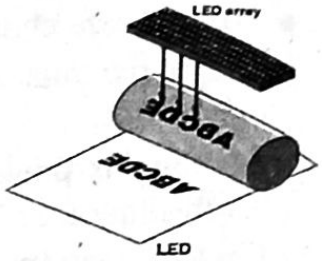
- Laser printer uses the same technology as photocopier machines.
- Laser printers produce very high quality text and graphics.

b) INK-JET PRINTERS



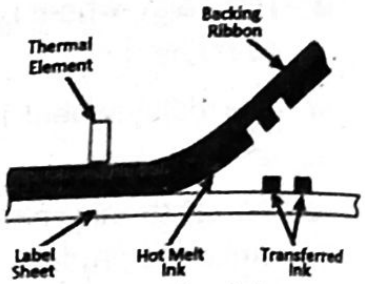
- Ink-jet printer sprays ink on sheet of paper to form an image or text.
- Ink-jet printers produce very high quality text and graphics.

c) LED PRINTERS



- LED printers are counterpart of Laser printer.
- A stationary array of LED forms an image to print on paper.
- LEDs printers also produce very high quality text and graphics.

d) THERMAL PRINTERS



Thermal Transfer Printing

- These printers are inexpensive.
- They print by pushing heated pins against heat-sensitive paper.
- Thermal printers are widely used in calculators and fax machines.

Q.13. What are the characteristics of a printer?

CHARACTERISTICS OF A PRINTER

Printers are also classified according to the following characteristics:

a) Printing quality
b) Speed of printer
c) Graphics
d) Fonts
e) Colors
f) Resolution

a) PRINTING QUALITY

- The output produced by printer is used to be either letter quality, near letter quality (NLQ), or draft quality.
- Daisy-wheel, Ink-jet, and Laser printers produce letter-quality type.
- Some Dot-matrix printers claim letter-quality print, but if you look closely, then you can see the difference of quality.

b) SPEED OF PRINTER

- The speed of printer is measured in characters persecond (cps) or pages perminute (ppm), the speed of printers varies widely. Speed of printer becomes important, if you do much printing.
- Daisy wheel printer is the slowest, printing about 30 characters per second.
- Line printers are fastest (up to 3000 lines per minute).
- Dot-matrix printers can print up to 500 characters per second.
- Laser printers can print about 4 to 20 text pages per minute.
- Generally more expensive printers are much faster.

c) GRAPHICS

- Some printers such as daisy-wheel and line printers can print only text.
- Other printers can print both text and graphics.

d) FONTS

- Some printers, notably dot-matrix printers are limited to one or a few fonts.
- Laser printers and ink-jet printers are capable of printing an almost unlimited variety of fonts.

e) COLOR PRINTERS

- Colors are most important for users who need to print pages for presentations or maps and other pages where colors are part of the information.
- Color printers can also be set to print only in black & white.
- Color printers are more expensive to operate since they use two ink cartridges (one in color and one in black ink) that need to be replaced after certain number of pages.

f) RESOLUTION

- Printer resolution (the sharpness of text and graphics on paper) is usually measured in dots per inch (dpi). Most inexpensive printers provide sufficient resolution for most purposes at 600dpi.

Q.14. What is the difference between Impact & Non-impact printers?

DIFFERENCE B/W IMPACT AND NON-IMPACT PRINTERS

IMPACT PRINTER	NON-IMPACT PRINTER
1. Impact printers print by striking the ribbon against paper.	1. Non-impact printers form a character or image by using photo-copier technique.
2. Impact printers produce carbon copies.	2. They do not produce carbon copies.
3. They produce much noise when printing and are called noisy printers.	3. They can't produce noise when printing and are called quite printer.
4. Operation cost is less than Non-impact printers.	4. Operation cost is more than Impact printers.
5. Printing speed is less than Non-impact printers.	5. They produce their result very fast.
6. They do not produce a good quality result.	6. They produce a good quality result.
7. Dot-matrix, Daisy-wheel and Line printers are the examples of impact printers.	7. Thermal, Ink-jet and Laser printers are the examples of Non-impact printers.

Q.15. What is the difference between Hardcopy and Softcopy?

DIFFERENCE B/W HARD COPY AND SOFT COPY

HARD COPY	SOFT COPY
1. Output on paper is called Hard Copy.	1. Output on screen is called Soft Copy.
2. It is a permanent copy.	2. It is a temporary copy.
3. It is non-editable copy.	3. It is editable copy
4. We can touch it.	4. We can't touch it.
5. Hard Copy produces by printer.	5. Soft Copy produces by monitor.

Q.16. What is Plotter? Describe its types.

PLOTTER

- Plotter is a special kind of output device that prints drawings, graphs, maps, machines components and engineering drawings.
- Plotter draws lines using a pen.
- They can produce continuous lines, whereas printer prints a line by series of dots.

TYPES OF PLOTTERS

Plotters can be of two types:

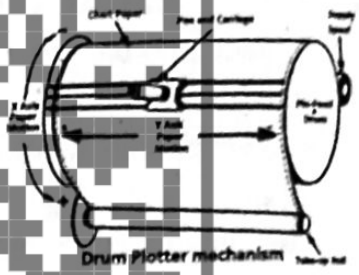
1. Pen plotters
2. Electrostatic plotters

1. PEN PLOTTER

- Pen plotters have an ink pen attached to draw the images.
- Pen plotters are further divided into two types:
  a) Drum plotters
  b) Flatbed plotters

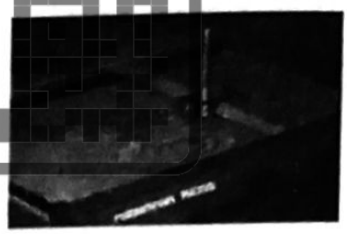
a) DRUM PLOTTER

- A type of pen plotter that wraps the paper around a drum with a pin feed attachment.
- In drum plotters the pen is moved in a single axis track and the paper itself moves on a cylindrical drum to add the other axis or dimension.



b) FLATBED PLOTTER

- Flatbed plotter is a plotter in which the paper is fixed on a flat surface and pens are moved to draw the image.
- The size of this surface (bed) determines the maximum size of the drawing.



2. ELECTROSTATIC PLOTTER

- An electrostatic plotter produces a faster image by charging the paper with high voltage.
- This voltage attracts toner, which is then melted on the paper with heat to form image.

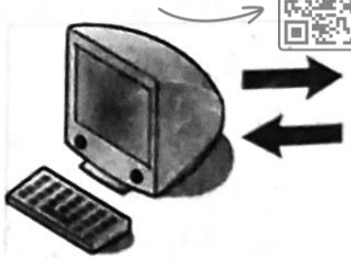
The quality of printing is poor as compare to pen plotters.

Q.17. Which devices are used as input as well as output? Define it in detail.

DUAL PUURPOSE (I/O) DEVICES

A device which can do input as well as output operation is called dual purpose device.

Dual purpose devices are also known as Input/output or I/O devices.



TYPES OF DUAL PURPOSE DEVICE

Dual purpose devices can be of two types:

1. Disk Drives
2. CD-Writer

1. DISK DRIVE

- Disk Drive is a peripheral device that reads or writes on the disk.
- Disk drive store information to a floppy disk and retrieves information from it.
- When the disk drive is used to read some data from a disk, it will fall in the category of input devices
- During writing data onto disk, disk drive will be considered as output devices.

2. CD-WRITER

- A CD-Writer is a device that connected with your computer which can write on CD-R and CD-RW.
- CD-R may be written only once, while CD-RW may be written, erased, and rewritten.
- CD-Writer's performance is measured in "X" unit, where one-X is equal to 150 KB/sec.

EXERCISE

Answer the following questions.

1. What do you mean by pointing input devices? Write some examples of such devices.

Ans. SEE Q # 3

2. What is the difference between Hardcopy and Softcopy?

Ans. SEE Q # 15

3. What is the use of Cursor Movement Keys in a Keyboard?

Ans. SEE Q # 2

4. What is the Major difference between Mouse and Trackball?

Ans. SEE Q # 5

5. Define different types of Scanners.

Ans. SEE Q # 6

6. What is the difference between Impact and non-impact printers?

Ans. SEE Q # 14

7. Which device is used as an input device as well as output device (Dual Purpose)? Define it in detail.

Ans. SEE Q # 17

Fill in the Blanks.

i) Keyboard and Mouse are the two most common input devices.

ii) GUI stands for Graphical User Interface.

iii) Scanner is an input device to read images as inputs.

iv) LCD and CRT are the two basic types of monitors.

v) Resolution is a characteristic of monitors that effects on the sharpness on an image.

vi) CD-ROM is the abbreviation of Compact Disk Read Only Memory.

Choose correct answer.

i) The purpose of input device is Pass information directly to CPU.

a. Pass information b. Filtration of Information

c. **Pass Information directly to CPU✓**

ii) The mouse is a primary input device but lacks the ability to easily transmit Textual information.

a. Graphical b. Numerical c. Alpha numerical d. **Textual✓**

iii) The following are the input devices.

a. **Keyboard, mouse, scanner, flatbed scanner✓**

b. Keyboard, mouse scanner, flatbed plotter

c. Hand-held scanner Drum plotter, Mice, joystick

iv) Laser printer and ink-jet printers are example of _____.

a. Impact printers b. Line printers c. Drum printers d. **None of above✓**

v) Plotters can be generally divided into Two categories, namely Pen plotters and Electrostatic plotters.

a. **Two, Pen plotters and Electrostatic plotters✓**

b. Two, Drum plotters and Flatbed plotter

c. Four, Pen Electrostatic, Drum and Flatbed plotter

d. Three, Pen, Electrostatic and Flatbed plotters

vi) The CD – Writer performance is measured in _____ unit.

a. DPI b. Y c. Bytes d. **None of above✓**

vii) Screen output is known as Softcopy.

a. Software b. Live-ware c. **Softcopy✓** d. Hardcopy

viii) Where engineering applications are used and precision is mandatory, we use Pen Plotter for printing.

a. Laser printer b. Electrostatic Plotter c. **Pen Plotter✓**

ix) Printer resolution is usually measured in Dots per inch.

a. Data per inch b. Characters per inch c. **Dots per inch✓**

Choose the correct statement – True and False.

i) A keyboard is a secondary text input device.

a. True b. **False✓**

ii) The function of trackball is same as joystick.

a. True b. **False✓**

iii) A sheet-fed scanner can be used to scan pages in books or magazines.

a. True b. **False✓**

iv) The light pen is only used for engineering applications?

a. True b. **False✓**

v) LCD stands for Liquid crystal display.

a. **True✓** b. False

vi) The screen output is known as software.
a. True b. **False✓**

vii) A machine – readable form of corresponding hardcopy is software.
a. True b. **False✓**

viii) Plotter is used for general purpose printing.
a. True b. **False✓**

ix) DPI stands for data per inch.
a. True b. **False✓**

MCQ's

1. _____ is the characteristic of a monitor that affects the sharpness of an image.
a. Net pitch b. Path pitch
c. **Dot pitch✓** d. None of the above

2. Plotter can be generally divided into
a. **Two types✓** b. Three types c. Four types d. Five types

3. LCD stands for
a. Light Code Digit b. **Liquid Crystal Display✓**
c. List Code Digit d. Light Color Display

4. The screen output which is intangible and temporary is refers to
a. **Softcopy✓** b. Hardcopy c. Source code d. Object code

5. Hard disk is a ____ storage device.
a. volatile b. **Permanent✓**
c. Primary d. None of the above

6. The device mostly used for compute or video games
a. Mouse b. Light pen c. Track ball d. **Joy Stick✓**

7. Which one of the following device is mostly used with GUIs?
a. **Mouse✓** b. Microphone c. Keyboard d. Scanner

8. The device that is used to feed text or images into computer's memory is called
a. Mouse b. Microphone c. Keyboard d. **Scanner✓**

9. Most common types of input devices are
a. **Mouse & Keyboard✓** b. Microphone & Keyboard
c. Keyboard & Joystick d. None of the above

10. Most common types of output devices are
a. Printer and Plotter b. Printer and Speaker
c. **Printer and Monitor✓** d. None of the above

11. Device used to give instructions to computer in the form of text is
a. Mouse b. Microphone c. **Keyboard✓** d. Scanner

12. VGA is
a. **Video Graphics Array✓** b. Visual Graphics Array
c. Volatile Graphics Array d. Video Graphics Adapter

13. Which of the following devices can be sued to directly image printed text?
a. **OCR✓** b. OMR c. MICR d. All of above

14. The output quality of a printer is measured by
    a. **Dot per inch**✓ b. Dot per sq. inch
    c. Dots printed per unit time d. All of above
15. Regarding a VDU, Which statement is more correct?
    a. **It is an output device**✓ b. It is an input device
    c. It is a peripheral device d. It is hardware item
16. What is the name of the computer terminal which gives paper printout?
    a. Display screen b. Soft copy terminal
    c. **Hard copy terminal**✓ d. Plotter
17. Dot-matrix is a type of
    a. Tape b. **Printer**✓ c. Disk d. Bus
18. A kind of serial dot-matrix printer that forms characters with magnetically-charged ink sprayed dots is called
    a. Laser printer b. **Ink-jet printer**✓ c. Drum printer d. Chan printer
19. Which printer is very commonly used for desktop publishing?
    a. **Laser printer**✓ b. Inkjet printer
    c. Daisywheel printer d. Dot matrix printer
20. An output device that uses words or messages recorded on a magnetic medium to produce audio response is
    a. Magnetic tape b. Voice response unit
    c. **Voice recognition unit**✓
21. A/n .... Device is a device that provides information, which is sent to the CPU
    a. **Input**✓ b. Output c. CPU d. Memory
22. Which of the following is not an input device?
    a. OCR b. Optical scanners
    c. Voice recognition device
    d. **COM (Computer Output to Microfilm)** ✓
23. Which is considered a direct entry input device?
    a. Optical scanner b. Mouse and digitizer
    c. Light pen d. **All of the above**✓
24. To produce high quality graphics (hardcopy) in color, you would want to use a/n
    a. RGB monitor b. **Plotter**✓ c. Ink-jet printer d. Laser printer
25. Which of the following printers are you sure will not to use if your objective is to print on multi carbon forms?
    a. Daisy wheel b. Dot matrix c. **Laser**✓ d. Drum
26. Magnetic tape can serve as
    a. Secondary storage media b. Output media
    c. Input media d. **All of the above**✓
27. The purpose of input device is _____.
    a. Pass information b. Filtration of information
    c. **Pass information directly to CPU**✓

28. The Mouse is a primary input device but lacks the ability to easily transmit _____ Information.
a. Graphical
b. Numerical
c. Alpha numerical
d. **Textual**✓

29. The following are the input devices.
a. **Keyboard, mouse, scanner, flatbed scanner**✓
b. Keyboard, mouse scanner, flatbed plotter.
c. Han-held scanner, Drum plotter, Mice, joystick

30. Laser printer and ink-jet printers are example of _____.
a. Impact printer b. Line printer c. Drum printer d. **None of above**✓

31. Plotters can be generally divided into _____ categories, namely _____.
a. **Two, Pen plotters and Electrostatic plotters**✓
b. Two, Drum plotters and Flatbed plotter
c. Four, Pen, Electrostatic, Drum and Flatbed plotter
d. Three, Pen, Electrostatic and Flatbed plotters

32. The CD-writer performance is measured in _____ unit.
a. DPI
b. Y
c. Bytes
d. **None of above**✓

33. Screen output is known as _____.
a. Software b. Liveware c. **Softcopy**✓ d. Hardcopy

34. Where engineering applications are used and precision is mandatory, we use _____ for printing.
a. Laser printer
b. Electrostatic Plotter
c. **Pen Plotter**✓

35. Printer resolution is usually measured in _____.
a. Data per inch
b. Characters per inch
c. **Dots per inch**✓

36. _____ is a peripheral device that reads or writes the disks (hard disks, floppy disks, etc that store information.
a. Electronic data storage
b. **Disk drive**✓
c. Electrostatic plotter
d. Flatbed plotter

37. _____is a plotter in which the paper is fixed on a flat surface and pens are moved to draw the image.
a. Electronic data storage
b. Disk drive
c. Electrostatic plotter
d. **Flatbed plotter**✓

38. Which of the following produces the best quality graphics output?
a. Laser printer b. Ink jet printer c. **Plotter**✓ d. Dot matrix printer

39. An input /output device at which data enters or leaves a computer system is
a. Keyboard b. **Terminal**✓ c. Printer d. Plotter

40. Which of the following are (is) considered to be video component?
a. Resolution
b. Color depth
c. Refresh rate
d. **All of the above**✓

41. What type of device is computer keyboard?
a. Memory b. Output c. Storage d. **Input**✓

42. Whereas a computer mouse moves over the table surface, the trackball is
a. **Stationary**✓ b. Difficult to move
c. Dragged d. Moved in small stems

43. A dumb terminal has
a. An embedded microprocessor b. Extensive memory
c. Independent processing d. **A keyboard, Mouse and Monitor**✓

44. Plotter accuracy is measured in terms of repeatability and
a. Buffer size b. **Resolution**✓
c. Vertical dimensions d. Intelligence

45. Daisy wheel printer is a type of
a. Matrix primer b. **Impact printer**✓ c. Laser printer d. Manual printer

46. A disadvantage of the laser printer is:
a. It is quieter than an impact printer b. It is very slow
c. The output is of a lower quality d. **None of above**✓

47. A/An _____ produces a faster image by charging the paper with high voltage.
a. Electronic data storage b. Disk drive
c. **Electrostatic plotter**✓ d. Flatbed plotter

48. A hard copy would be prepared on a
a. Line printer b. Dot matrix Printer
c. Typewriter terminal d. **All of the above**✓

STORAGE DEVICES

Q.1. What do you know about storage device?

STORAGE DEVICES

Storage Devices are the data storage devices that are used in the computers to store the data.

The computer has many types of data storage devices.

Some of them can be classified as the removable data storage devices and the others as the non-removable data storage devices.

The memory is of two types:

1. Primary memory
2. Secondary memory.

Q.2. Define Primary /Main memory or Internal memory.

PRIMARY /MAIN MEMRY OR INTERNAL MEMORY

- Primary memory is also known as primary storage, main memory or internal memory.
- Primary memory or main memory is a computer memory that processor or computer accesses first or directly.
- It allows a processor to access running execution applications and services that are temporarily stored in a specific memory location.
- Primary memory is considered faster than secondary memory.

TYPES OF PRIMARY MEMORY

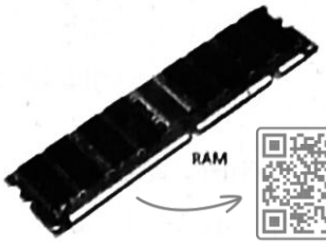
There are two basic types of primary memory:

I. RAM II. ROM

Q.3. Describe RAM and its types.

RAM

- RAM stands for Random Access Memory.
- It is temporarily highly accessible, high speed work area.
- The term RAM also refers to Read and Write Memory. You can both write and read data from it.
- RAM is a volatile or erasable memory.
- When the power is turned off the volatile storage lost their data.



There are two basic types of RAM called:

a) DRAM b) SRAM

a) DRAM

- DRAM stands for Dynamic Random Access Memory.

- It is a type of RAM that stores each bit of data in a separate capacitor within a circuit.
- DRAM is the most common type and it need to be refreshed thousands of times per second.
- DRAM is a volatile memory.

b) SRAM

- SRAM stands for Static Random Access Memory.
- It does not need to be refreshed like Dynamic RAM.
- SRAM is faster and more reliable than DRAM.
- SRAM can give access times as low as 10 nanoseconds.
- SRAM is also a volatile memory.

Q.4. What is the difference between SRAM and DRAM?

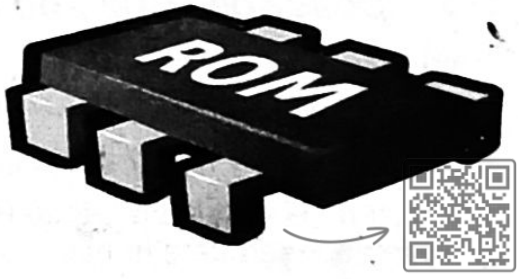
DIFFERENCE BETWEEN SRAM AND DRAM

SRAM	DRAM
1. SRAM stands for Static Random Access Memory.	1. DRAM stands for Dynamic Random Access Memory.
2. It does not to be refreshed.	2. Need to be refreshed thousands of times per second.
3. SRAM is expensive memory.	3. DRAM is low cost memory.
4. They are made up of transistors.	4. They are made up of combination of capacitors and transistors.
5. SRAM utilizes less electricity.	5. DRAM utilizes more electricity than SRAM.
6. It is faster than DRAM.	6. DRAM is a low speed memory as compare to SRAM.

Q.5. Describe ROM and its types?

ROM

- ROM stands for Read Only Memory.
- It is a pre-programmed memory that contains one or more programs called "Firmware".
- It is responsible to start-up the computer and performs diagnostics.



There are several types of ROM called:

a) PROM
b) EPROM
c) EEPROM

a) PROM

- PROM is a type of primary memory in computer, which is called Programmable Read Only Memory (PROM).

- We can't modify or erase programs stored in ROM, but it is possible for you to store your program in PROM chip.
- Once the programmers are written in PROM, you cannot clean it and use it to store something else.

b) EPROM

- EPROM stands for Erasable Programmable Read Only Memory.
- It is special types of PROM that can be erased by expose it to ultraviolet light.
- After that you can reuse its memory.

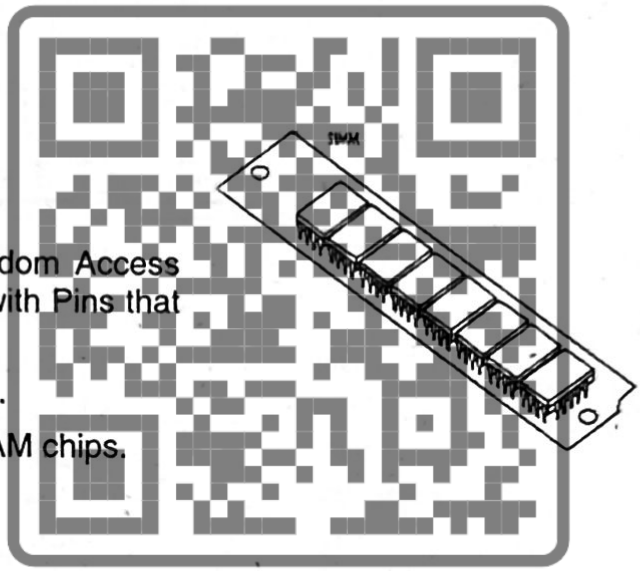
c) EEPROM

- EEPROM stands for Electrically Erasable Programmable Read Only Memory
- EEPROM is a special type of PROM that can be erased by exposing it to an electrical charge like EPROM.
- EEPROM is similar to flash memory (sometimes called flash EEPROM).
- EEPROM is not fast as RAM.
- We can reuse it after erased data.

Q.6. Describe SIMM and DIMM?

SIMM

- SIMM stands for Single In-line Memory Module.
- It is a module containing one or several Random Access Memory (RAM) chips on a small circuit board with Pins that connect to the computer motherboard.
- SIMMs usually comes in multiple memory chips.
- The memory chips on a SIMM are typically DRAM chips.



DIMM

- DIMM is short for Dual In-line Memory Module.
- A DIMM is a double SIMM because a SIMM has a 32-bit path to the memory chips whereas a DIMM has 64-bit path.
- DIMM has a large memory.
- It is an expensive memory than SIMM.
- DIMM is a new technology and more efficient than SIMM and used widely.

Q.7. Differentiate between SIMM and DIMM?

DIFFERENCE BETWEEN SIMM AND DIMM

SIMM	DIMM
1. SIMM stands for Single In-line Memory Module.	1. DIMM stands for Dual In-line Memory Module.
2. SIMM requires 72 pins connectors.	2. DIMM requires 168 pins connectors.
3. SIMM has a 32-bit path	3. DIMM has 64-bit path
4. It has less memory.	4. It has large memory.
5. SIMM is an oldest technology.	5. DIMM is a new technology.

6. It is cheaper.	6. It is expensive.
7. It is less efficient then DIMM.	7. It is more efficient than SIMM.

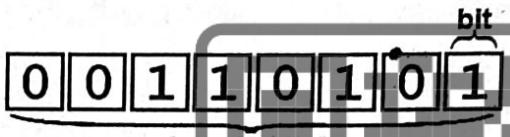
Q.8. What are units of memory or memory measuring units?

UNITS OF MEMORY

- Computer memory is an array of storage boxes. Each of box length is one byte.
- Each box has a unique address (memory location) assigned to it.
- By specifying a memory address, programmers can access a particular byte of data.
- A byte is a collection of 8 bits and represents a character.

MEMORY MEASURING UNITS

BIT = A smallest non-addressable memory (0 or 1)
Nibble = A group of four bits.
8 bits = 1 Byte (smallest addressable memory) or 1 character



16 bits	= 2 bytes	or	(1 word)
1024 Bytes	= 1 Kilobyte (KB)	or	2^{10} bytes
1024 KB	= 1 Megabyte (MB)	or	2^{20} bytes
1024 MB	= 1 GB (Giga Byte)	or	2^{30} bytes
1024 GB	= 1 TB (Terra Byte)	or	2^{40} bytes
1024 TB	= 1 PB (Peta Byte)	or	2^{50} bytes
1024 PB	= 1 EB (Exa Byte)	or	2^{60} bytes
1024 EB	= 1 ZB (Zetta Byte)	or	2^{70} bytes
1024 ZB	= 1 YB (Yotta Byte)	or	2^{80} Bytes
1024 YB	= 1 Bronto Byte	or	2^{90} bytes
1024 Bronto Byte	= 1 Geop Byte	or	2^{100} bytes

Geop byte is the highest memory at present

Q.9. Define Secondary memory/Secondary storage or Backing storage.

SECONDARY MEMORY / STORAGE / BACKING STORAGE

- When data processing is going on, the programs and data are stored in the internal memory of computer known as RAM.
- Since the RAM is volatile, therefore this data has to be erased when power is turned off.
- It is necessary to save program and data on any storage media, to use it again and again.
- It is essential to use secondary storage media for huge amount of data, because a big amount of data cannot be loaded into RAM at a time.

TYPES OF SECONDARY MEMORY / STORAGE

Some commonly used data storage units are: I. Floppy disk II. Hard disk III. CDs IV. Flash disk (USB) V. Magnetic tape

Q.10. Define the following secondary or storage devices: Floppy disk, Hard disk, CDs, Flash disk (USB), Magnetic tape

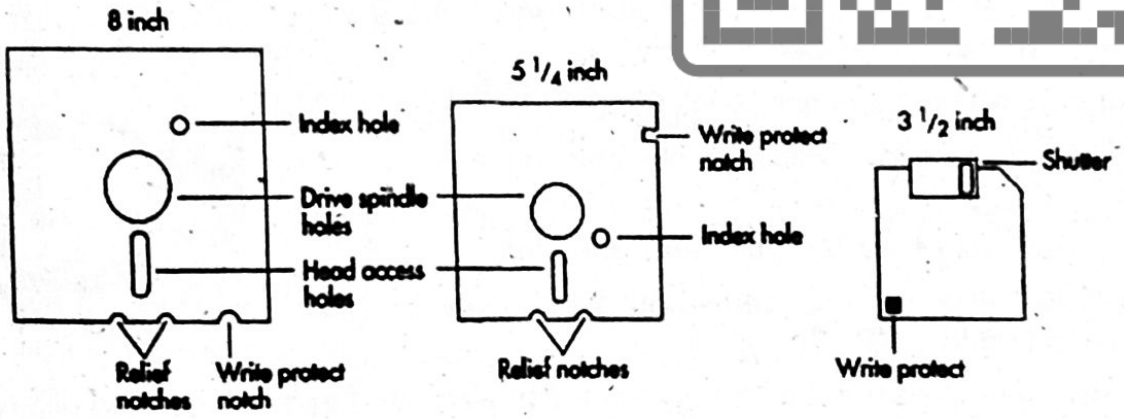
I. FLOPPY DISK

- Floppy disk is a secondary storage media.
- A floppy disk is a circular piece of plastic like material coated with iron oxide.
- This flexible disk is housed in a protective jacket called floppy.

- The unit which reads or writes the floppy disk is called disk drive.
- Data is recorded on a disk in the form of magnetic dots.

DIFFERENT SIZE OF FLOPPY DISKS

Floppy disks, initially as 8-inch (200 mm) media and later in 5.25-inch (133 mm) and 3.5-inch (90 mm) sizes, while the data capacity has risen.

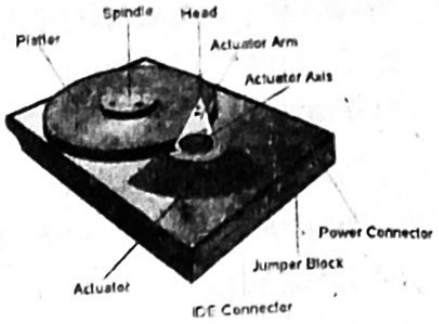


FLOPPY DISK FORMAT

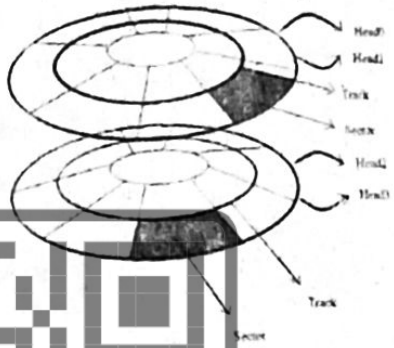
The following formats of floppy disks are used on IBM PCs and elsewhere.

Capacity	Density	Width
360K	Double	5.25"
720K	Double	3.50"
1.2M	High	5.25"
1.44M	High	3.50"

II. HARD DISK



- A storage device that uses a set of rotating magnetically coated disks called platters to store data or programs.
- A typical hard disk platter rotates at up to 7200 RPM, and the read/write heads float on a cushion of air from 10 to 25 millionths of an inch thick so that the heads never come into contact with the recording surface.
- The whole unit is airtight sealed to prevent airborne.
- Hard disks range in capacity from a few tens of megabytes to several gigabytes of storage space.
- Hard disks are very reliable, but they do fail, and usually at the most inconvenient moment.

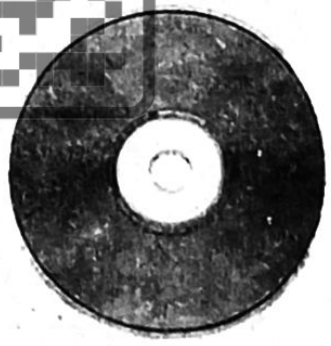


III. OPTICAL DISK / CD-ROM

- CD-ROM is short for Compact Disc-Read-Only Memory, a type of optical disk capable of storing large amounts of data -- up to 1GB, although the most common size is 650MB (megabytes).
- A single CD-ROM has the storage capacity of 700 floppy disks, enough memory to store about 300,000 text pages.

CHARACTERISTICS OF CD-ROM

- A CD-ROM is a CD that can be read by a computer with an optical drive.
- An optical disk is impressed with a series of spiral pits in a flat surface.
- A master disk is burnt by high-intensity laser beams in bit-patterns from which subsequent copies are formed which can be read optically by laser.
- The "ROM" part of the term means the data on the disc is "read-only," or cannot be altered or erased.
- The optical disk is random access storage medium.
- Information can be easily read from any point on the disk.
- CD-ROMs are popularly used to distribute computer software, including video games and multimedia applications
- The first CD-ROMs could hold about 600 MB of data, but now they can hold up to 1 GB.
- CD-ROMs share the same technology as audio CDs, but they are formatted differently, allowing them to store many types of data.



IV. USB / FLASH DRIVE

- A small, portable flash memory card that plug into computers USB port and functions as a portable hard drive.
- USB / Flash drives are easy-to-use as they are small enough to be carried in a pocket and can plug into any computer with a USB drive.

- USB flash drives have less storage capacity than an external hard drive, but they are smaller and more durable because they do not contain any internal moving parts.
- USB flash drives also are called: ➢ Thumb drives ➢ Jump drives ➢ Pen drives ➢ Key drives ➢ Tokens ➢ USB drives

V. MAGNETIC TAPE

- Magnetic tape is a long and narrow strip of plastic that thin magnetic material is coated on.
- Nearly all recording tape is of this type, whether used for recording audio or video or computer data storage.
- It provides only sequential (serial) data access unlike magnetic and optical disks which provide random access.
- Data are recorded in blocks of contiguous bytes, separated by a space called an "inter-record gap" or "inter-block gap."
- Tape drive speed is measured in inches per second (ips). Over the years, storage density has increased from 200 to 38,000 bpi.

EXERCISE

Answer the following questions

1. Define various types of ROM.

Ans. See Q # 5

2. What is the difference between Dynamic and Static RAM?

Ans. See Q # 4

3. Define:

a. Floppy Diskette b. Hard Disk c. Magnetic tape

Ans. See Q # 10 See Q # 10 See Q # 10

4. What is the difference between SIMM and DIMM?

Ans. See Q # 7

Fill in the Blanks.

i) RAM is a volatile memory.
ii) The program stored in ROM is called Firmware.
iii) The smallest accessible unit of computer memory is Byte.
iv) 1 KByte = 1024 Bytes
v) All the programs must be copied into main memory before execution.
vi) Magnetic tape is a storage device that stores data serially.
vii) CD stands for Compact Disk.
viii) Inter Block-gap separates logical blocks in a magnetic tape.

Choose correct answer.

i) RAM is _____ memory.
a. **Volatile✓** b. Non – volatile c. Permanent d. None of the above

ii) _____ is a pre-programmed memory.
a. Static RAM b. Dynamic RAM
c. SIMM and DIMM both d. **None of the above✓**

iii) Irregular data can be accessed on magnetic tape _____.
a. Randomly b. **Serially✓** c. Use indexing d. None of the above

iv) LBA stands for _____.
a. **Logical block address✓** b. Logical buffer area
c. None of the above

v) Auxiliary storage is _____ memory.
a. Primary b. **Non-volatile**✓ c. Temporary

vi) The read/write heads of a hard disk drive, floppy disk drive and tape drive contain electromagnets.
a. **The above statement is true**✓
b. The above statement needs little correction
c. The above statement is a false statement
d. Information is not sufficient

vii) Each byte is the combination of _____ small unit called bits.
a. Sixteen b. Ten c. Eighteen d. **Eight**✓

viii) Each box of memory has _____ address.
a. Alterable b. **Unique**✓ c. Two

ix) Smallest unit of the memory is _____.
a. Nibble b. **Bit**✓ c. 0 or 1 d. Byte

Choose the correct statement – True and False.

i) From magnetic tape one can access data randomly.
a. True b. **False**✓

ii) Static RAM does not need to be refreshed, which makes it faster and cheaper.
a. True b. **False**✓

iii) Static RAM does not need to be refreshed, which makes it faster and cheaper.
a. True b. **False**✓

iv) RAM always retains the data it holds, even when the computer is turned off.
a. True b. **False**✓

v) PROM, EPROM AND EEPROM are types of SIMM>
a. True b. **False**✓

vi) RAM is an external storage.
a. True b. **False**✓

vii) SDRAM stands for Synchronous data random access memory.
a. True b. **False**✓

viii) A group of four bits makes two nibbles.
a. True b. **False**✓

ix) RPM stands for rotation per mile.
a. True b. **False**✓

x) The smallest accessible unit of memory is byte?
a. **True**✓ b. False

MCQ's

1. Non-volatile memory is
a. **ROM**✓ b. Cache memory c. RAM d. All of them

2. Hard disk is a ____ storage device.
a volatile b. **Permanent**✓
c. Primary d. None of the above

3. The speed of CD-ROM is measured in X-Units; one X is equal to ____KB/Sec.
a. **150**✓ b. 128 c. 1024 d. 100

4. CD-ROM stands for
a. Compactable Read Only Memory b. **Compact Data Read Only Memory**✓
c. Compactable Disk Read Only Memory d. Compact Disk Read Only Memory

5. The capacity of 3.5 inch floppy disk is
   a. 1.40 MB b. 1.44 GB c. 1.40 GB d. **1.44 MB**✓
6. EEPROM stands for
   a. **Electrically Erasable Programmable Read Only Memory**✓
   b. Easily Erasable Programmable Read Only Memory
   c. Electronic Erasable Programmable Read Only Memory
   d. None of the above
7. The act of retrieving existing data from memory is called
   a. Read-out b. Read from c. Read d. **All of above**✓
8. Instructions and memory address are represented by
   a. Character code b. **Binary codes**✓ c. Binary word d. Parity bit
9. What is the latest write-once optical storage media?
   a. Digital paper b. Magneto-optical disk
   c. WORM disk d. **CD-ROM disk**✓
10. Before a disk drive can access any sector record, a computer program has to provide the record's disk address. What information does this address specify?
    a. Track number b. Sector number c. Surface number d. **All of above**✓
11. As compared to diskettes, the hard disks are
    a. **More expensive**✓ b. More portable c. Less rigid d. Slowly accessed
12. Floppy disks which are made from flexible plastic material are also called?
    a. Hard disks b. High-density disks
    c. **Diskettes**✓ d. Templates
13. What is the number of read-write heads in the drive for a 9-trac magnetic tape?
    a. **9**✓ b. 16 c. 18 d. 27
14. To locate a data item for storage is
    a. Field b. Feed c. Database d. **Fetch**✓
15. The metal disks, which are permanently housed in, sealed and contamination free containers are called
    a. Hard disks b. Floppy disk
    c. **Winchester disk**✓ d. Flexible disk
16. Which of the following terms is the most closely related to main memory?
    a. Non volatile b. Permanent c. Control unit d. **Temporary**✓
17. RAM is _____ memory.
    a. **Volatile** ✓ b. Non – volatile
    c. Permanent d. None of the above
18. _____ is a pre-programmed memory.
    a. Static RAM b. Dynamic RAM
    c. SIMM and DIMM both d. **None of the above** ✓
19. Irregular data can be accessed on magnetic type _____.
    a. Randomly b. **Serially** ✓ c. Use indexing d. None of the above
20. LBA stands for _____.
    a. **Logical block address**✓ b. Logical buffer area
    c. Logical block area d. None of the above.

21. Auxiliary storage is _____ memory.
a. Primary b. Volatile c. **Non- volatile**✓ d. Temporary

22. The read / write heads of a hard disk drive, floppy disk drive and tape drive contain electromagnets.
a. The above statement is true
b. The above statement needs little correction
c. The above statement is a false statement
d. **Information is not sufficient.** ✓

23. Each byte is the combination of _____ small unit called bits.
a. Sixteen b. Ten c. Eighteen d. **Eight** ✓

24. Each box of memory has _____ address.
a. Alterable b. **Unique**✓ c. two d. same

25. Smallest unit of the memory is _____ .
a. Nibble b. **Bit** ✓ c. 0 or 1 d. Byte

26. 1 MB = 1024 _____
a. **KB** ✓ b. bytes c. bits d. MB

27. 1 KB = 1024 _____
a. KB b. **bytes**✓ c. bits d. MB

28. 1 Byte = 8 _____
a. KB b. bytes c. **bits**✓ d. MB

29. 1 GB = 1024 _____
a. KB b. bytes c. bits d. **MB**✓

30. Data reside in file on a disk under DOS environment, which of the following file name is invalid?
a. WAJAHAT.DOC b. ACCOUNTS c. **PAKSTD.BOOK**✓ d. MYPROG.BAS

31. A _____ enable computers to share hardware and software resources
a. cable link b. I/O Port c. Parallel Port d. **Computer network**✓

32. _____ is a device that stores digital data.
a. **ALU**✓ b. Register c. Control Unit d. Printer

33. In CD-ROM; CD Stands for _____.
a. Common Disk b. **Compact Disk**✓ c. Clear Dice d. Compact Decoder

34. Which of the following is "Analog" in nature?
a. Camera Shutter b. Dice
c. Height of Human Beings d. **None of these**✓

35. _____computers are useful in simulating, modeling and solving problems with physical phenomenon.
a. Digital b. Analog c. **Hybrid**✓ d. Super

36. The program to be translated by means of a translator is called _____
a. Source program b. **Object program**✓
c. Batch program d. Benchmark

37. EDI stands for _____.
a. Electronic Data Information b. Electronic Data Interconnection
c. **Electronic Data Interchange**✓ d. Electronic Device Interconnection.

38. Which is an invalid media for Data transmission in LAN (Local Area Network).
a. Infra-Red waves b. Microwaves c. Radio waves d. **Satellite waves**✓

39. The two major types of computer chips are
a. External memory chip b. Primary memory chip
c. Microprocessor chip d. **Both b and c**✓

40. As compared to the secondary memory, the primary memory of a computer is
a. Large b. Cheap c. **Fast**✓ d. Slow

41. Which of the following memories allows simultaneous read and writes operations?
a. ROM b. **RAM**✓ c. EPROM d. None of above

42. Which of the following memories has the shortest access times?
a. **Cache memory**✓ b. Magnetic bubble memory
c. Magnetic core memory d. RAM

43. Which chips using special external equipment can reprogram
a. ROM b. **PROM**✓ c. SAM d. RAM

44. Which is an item of storage medium in the form of circular plate?
a. **Disk**✓ b. CPU c. Printer d. ALU

45. Which of the following items are examples of storage devices?
a. Floppy/hard disks b. CD-ROMs c. Tape devices d. **All of the above**✓

46. Which term is used to describe RAM?
a. Dynamic RAM (DRAM) b. Static RAM (SRAM)
c. Video RAM (VRAM) d. **All of the above**✓

47. Which is the type of memory for information that does not change on your computer?
a. RAM b. **ROM**✓ c. ERAM d. RW / RAM

48. What type of memory is not directly addressable by the CPU and requires special software called EMS?
a. Extended b. **Expanded**✓ c. Base d. Conventional

49. Before a disk can be used to store data. It must be
a. **Formatted**✓ b. Reformatted
c. Addressed d. None of the above

50. The memory which is programmed at the time it is manufactured
a. **ROM**✓ b. RAM c. PROM d. EPROM

51. Which of the following memories must be refreshed many times per second?
a. Static RAM b. **Dynamic RAM**✓ c. EPROM d. ROM

52. Tape speed is measured in
a. Feet per second b. **Inch per second**✓
c. Meter per second d. Centimeter per second

53. Magnetic disks are the most popular medium for
a. Direct access b. Sequential access
c. **Both of above**✓ d. None of above

54. Storage capacity of magnetic disk depends on
a. tracks per inch of surface b. bits per inch of tracks
c. disk pack in disk surface d. **All of above**✓

55. Reading data is performed in magnetic disk by
a. **Read/write leads**✓ b. Sectors
c. Track d. Lower surface

56. Floppy disks are available in
a. Single side single density b. Single side double density
c. **Both of above**✓ d. None of above

57. Floppy disks typically in diameter
a. 3" b. 5.25" c. 8" d. **All of above**✓

58. Hard disk is coated in both side above
a. **Magnetic metallic oxide**✓ b. Optical metallic oxide
c. Carbon layer d. All of the above

59. CD-ROM is a
a. Semiconductor memory b. Memory registers
c. Magnetic memory d. **None of above**✓

60. Which of the following is not a primary storage device?
a. Magnetic tape b. Magnetic disk c. Optical disk d. **None of above**✓

61. A name or number used to identify a storage location device?
a. A byte b. A record c. **An address**✓ d. All of above

62. Which of the following is a secondary memory device?
a. Keyboard b. **Disk**✓ c. ALU d. All of the above

63. The difference between memory and storage is that memory is ___ and storage is ___
a. **Temporary, permanent**✓ b. Permanent, temporary
c. Slow, fast d. All of above

64. A floppy disk contains
a. Circular tracks only b. Sectors only
c. **Both circular tracks and sectors**✓ d. All of the above

65. Which of the following is the largest manufacturer of Hard Disk Drives?
a. IBM b. **Seagate**✓ c. Microsoft d. 3M

66. Which of the following storage devices can store maximum amount of data?
a. Floppy Disk b. **Hard Disk**✓ c. Compact Disk d. Magneto Optic Disk

67. High density double sided floppy disks could store ____ data.
a. 1.40 MB b. 1.44 GB c. 1.40 GB d. **1.44 MB**✓

68. Which memory is non-volatile and may be written only once?
a. RAM b. EP-ROM c. SRAM d. **PROM**✓

69. The number of tracks on a 1/2 inch wide magnetic tape is
a. 7 b. **9**✓ c. 18 d. 16

70. What is the most common speed in rpm at which the hard disk usually rotate
a. 2400 b. **7200**✓ c. 4700 d. 1600

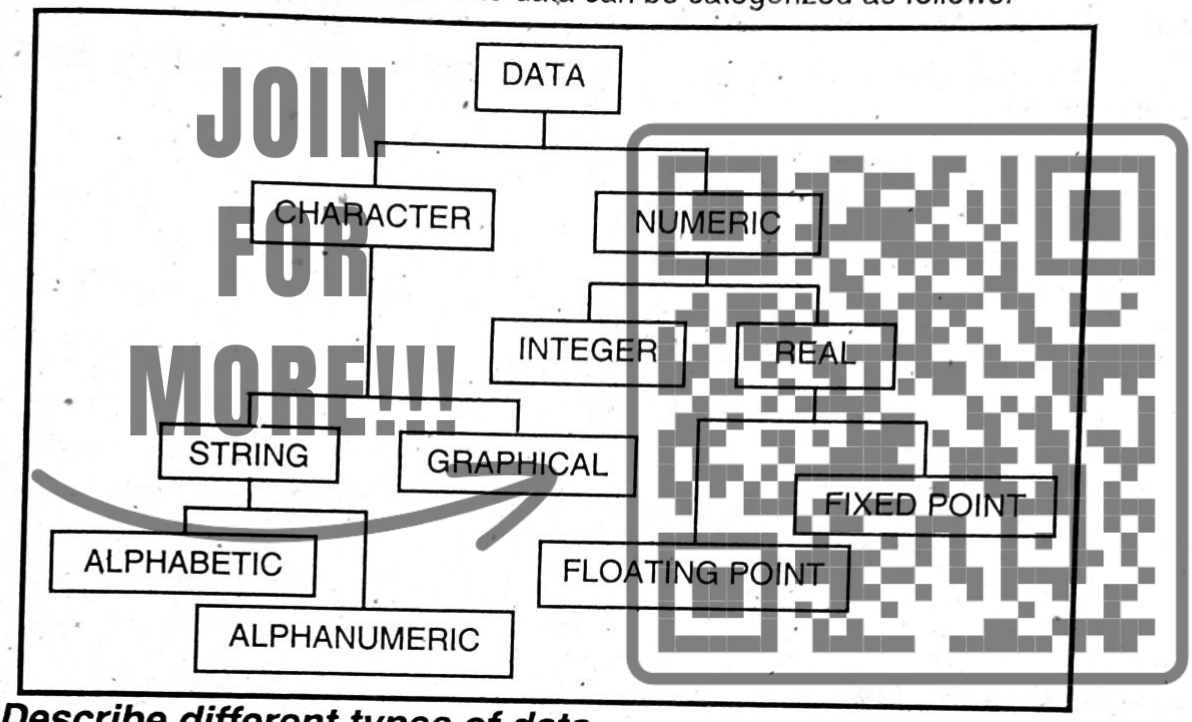
71. The _____ is a sequence of instructions that tells the computer how to process the user's data:
a. Assembler b. **Program**✓ c. Monitor d. Linker

DATA REPRESENTATION

Q.1. Define data.

DATA

The collection of facts and figures is called data. For example marks, names, addresses, salaries, sales reports, inventory figures or anything like this. Even we may consider pictures, photos, drawings and maps as data. The data can be categorized as follows.



Q.2. Describe different types of data.

1. NUMERIC DATA

The data which is represented in the form of numbers is known as Numeric data. This includes 0 to 9 digits, a decimal point (.), positive or negative sign (+ or -) and the letters 'E' or 'D'. The Numeric data is further divided into two groups, namely:

a) Integer data
b) Real data

a) INTEGER DATA

- Integer data is in the form whole numbers.
- It does not contain a decimal point
- It may be a Positive or a Negative number e.g. 3056, – 231, + 540 etc.

b) REAL DATA

- Real data is in the form of fractional numbers.

- It contains a decimal point.
- It can also be a Positive or a Negative number.
- Real data is further divided into two types, namely:
  i. Fixed point data
  ii. Floating point data

i. FIXED POINT DATA

- Fixed point data may include digits from 0 to 9
- Decimal point (.)
- Positive or negative (+ or –) sign e.g. 27.34, –956.225, + 200.5 etc

ii. FLOATING POINT DATA

The data, which is in the exponential form, can be represented in the floating point notation.

Floating point data may include:

- Digits from 0 to 9
- a decimal point (.)
- Positive or negative (+ or –) sign
- Letter 'D' or 'E'
- e.g. 1.602×10^{-19} or we can feed this value into computer as 1.602E– 19.

2. CHARACTER DATA

Character data consists of any combination of letters, symbols, pictures and numeric characters. Character data falls into two groups, namely:

a) Graphical data
b) String data

a) GRAPHICAL DATA

- The pictures, charts, maps can be treated as graphical data.
- The scanner is normally used to enter this type of data.

b) STRING DATA

- String data consists of the sequence of characters.
- Characters may be Alphabets, numbers or space.
- The string data further divided into two groups as:
  i. Alphabetic data
  ii. Alphanumeric data.

i. ALPHABETIC DATA

- The data, which is composed of English alphabets as well as space between two words, is called Alphabetic data
- e.g. ALI, MINA, Karachi, Cricket match etc.

ii. ALPHANUMERIC DATA

- The data, which is composed of English alphabets as well as numerals and some special characters, is called alphanumeric data
- e.g. CD 70, Street #3, Nazimabad-4 etc.

Q.3. What is information?

INFORMATION

- Any type of processed data is called information.
- Information is depends on data like, numbers, names, scores etc.
- A group of data which makes news is called Informationsuch as "Abdullah, 10th, 850, 700; A1" is a group of data items, while "Abdullah, a student of class 10th, got 700 marks out of 850 marks and secured A1 Grade " is information.

Q.4. What is the difference between Data and Information?

DIFFERENCE BETWEEN DATA AND INFORMATION

DATA	INFORMATION
1. Data is used as input for the computer system	1. Information is the output of data
2. Data is unprocessed facts and figures	2. Information is processed data
3. Data doesn't depend on information	3. Information depends on data
4. Data is not specific	4. Information is specific
5. Data is a single unit	5. A group of data which carries news are meaning is called Information
6. Data doesn't carry a meaning	6. Information must carry a logical meaning
7. Data is the raw material	7. Information is the product

Q.5. What is number system?

NUMBER SYSTEM

- The number system is the system of counting and calculation.
- Number system is based on some characters called digits.
- The number of digits a system is uses is called its base or radix.For example number system we use in daily life is called decimal number system.
- The base of decimal numbers is 10, which means that is uses 10 digits from 0 to 9.

Q.6. Describe various types of number system?

TYPES OF NUMBER SYSTEM

There are four types of number system used in computer operations.

1. Decimal
2. Binary
3. Octal
4. Hexadecimal

1. DECIMAL NUMBER SYSTEM

Decimal number system is most familiar to us. We use this number system in our daily life for counting and calculations.

In decimal system we count in 'Tens' using the digits from 0 to 9 to represent the value. So the base of this number system is 10.

The weights are based on the powers of 10 as follows:

5^{th}	4^{th}	3^{rd}	2^{nd}	1^{st}	position
$10^4 = 10000$	$10^3 = 1000$	$10^2 = 100$	$10^1 = 10$	$10^0 = 1$	Weight & Value

2. BINARY NUMBER SYSTEM

Binary number system is based on two digits 0 and 1represent its numeric values, therefore the base of this system is 2.

The weights are based on the powers of 2 as follows:

5^{TH}	4^{TH}	3^{RD}	2^{ND}	1^{ST}	POSITION
$2^4 = 16$	$2^3 = 8$	$2^2 = 4$	$2^1 = 2$	$2^0 = 1$	Weight & Value

3. OCTAL NUMBER SYSTEM

Octal number system has 8 digits from 0 to 7, so the base of this number system is 8.

The weights of digit position are as under:

5^{TH}	4^{TH}	3^{RD}	2^{ND}	1^{ST}	POSITION
$8^4 = 4096$	$8^3 = 512$	$8^2 = 64$	$8^1 = 8$	$8^0 = 1$	Weight & Value

4. HEXADECIMAL NUMBER SYSTEM

Hexadecimal means 16, so the base of this number system is 16.

It has 16 digits from 0 to 9 (10 digits) and the rest of 6 digits are A, B, C, D, E and F. The letters A to F represents the decimal numbers 10 to 15.

The weights of digit position are as under:

5^{TH}	4^{TH}	3^{RD}	2^{ND}	1^{ST}	POSITION
$16^4 = 65536$	$16^3 = 4096$	$16^2 = 256$	$16^1 = 16$	$16^0 = 1$	Weight & Value

NUMBERS EQUIVALENT IN A CHART

Decimal	Binary	Octal	Hexadecimal
0	0	0	0
1	1	1	1
2	10	2	2
3	11	3	3
4	100	4	4
5	101	5	5
6	110	6	6
7	111	7	7

Decimal	Binary	Octal	Hexadecimal
8	1000	10	8
9	1001	11	9
10	1010	12	A
11	1011	13	B
12	1100	14	C
13	1101	15	D
14	1110	16	E
15	1111	17	F

CONVERSION OF NUMBER SYSTEM

The number systems, Decimal, Binary, Octal and Hexadecimal have relationship with each other. We can convert a number to its equivalent another number system by the following method:

Q.7. How can you convert other number system to decimal number system?

CONVERSION FROM OTHER SYSTEM TO DECIMAL

We can convert other number system to decimal number systems by multiply each digit of the given number by its positional weigh and then add all results of multiplication of each position to get the final result.

➢ BINARY TO DECIMAL

For example number $\mathbf{10101_2}$ can be expressed in decimal as:

$$10101_2 = 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$$
$$= 1 \times 16 + 0 \times 8 + 1 \times 4 + 0 \times 2 + 1 \times 1$$
$$= 16 + 0 + 4 + 0 + 1$$
$$= 21$$

Answer $(10101)_2 = (21)_{10}$

➢ OCTAL TO DECIMAL

For example number 1573_8 can be expressed in decimal as:

$$1573_8 = 1 \times 8^3 + 5 \times 8^2 + 7 \times 8^1 + 3 \times 8^0$$
$$= 1 \times 512 + 5 \times 64 + 7 \times 8 + 3 \times 1$$
$$= 512 + 320 + 56 + 3$$
$$= 891$$

Answer $(1573)_8 = (891)_{10}$

➢ HEXADECIMAL TO DECIMAL

For example number $\mathbf{1573_{16}}$ can be expressed in decimal as:

$$1573_{16} = 1 \times 16^3 + 5 \times 16^2 + 7 \times 16^1 + 3 \times 16^0$$
$$= 1 \times 4096 + 5 \times 256 + 7 \times 16 + 3 \times 1$$
$$= 4096 + 1280 + 112 + 3$$
$$= 5491$$

Answer $(1573)_{16} = (5491)_{10}$

Q.8. How can you convert decimal number system to other number system?

CONVERSION FROM DECIMAL TO OTHER SYSTEM

We can convert a decimal number to other systems is by successive division by the required base and the remainders of these divisions are arranged in reverse order.

➢ DECIMAL TO BINARY

To convert a decimal number into binary, we can divide the decimal number by 2, which is base of (required) binary number.

Example: convert a decimal number 93_{10} into equivalent binary number.

Solution:

2	93
2	46-- 1 ← Rightmost
2	23 -- 0
2	11 -- 1
2	5 -- 1
2	2 -- 1
2	1 -- 0
	↑ Leftmost

Answer $(93)_{10} = (1011101)_2$

➢ DECIMAL TO OCTAL

To convert a decimal number into octal, we can divide the decimal number by 8, which is base of (required) octal number.

Example: convert a decimal number 3456_{10} into equivalent octal number.

Solution:

8	3456
8	432 -- 0 ← Rightmost
8	54 -- 0
8	6 -- 6
	↑ Leftmost

Answer $(3456)_{10} = (6600)_8$

➢ DECIMAL TO HEXADECIMAL

To convert a decimal number into hexadecimal, we can divide the decimal number by 16, which is base of (required) hexadecimal number.

Example: convert a decimal number 34568_{10} into equivalent hexadecimal number.

Solution:

16	34588
16	2161-- C ← Rightmost
16	135 -- 1
16	8 -- 7
	↑ Leftmost

Answer $(34588)_{10} = (871C)_{16}$

Q.9. How can you convert a binary number into octal and octal number into binary?

CONVERSION BETWEEN BINARY AND OCTAL

Any Octal number (from 0 to 7) can be represented by three binary digits as shown in the given table.

Octal	Binary
0	000
1	001
2	010
3	011
4	100
5	101
6	110
7	111

➢ BINARY TO OCTAL

The binary digits are split into groups of three digits, starting from right to left.

Zeros can be added at the left end to make a complete group of three digits if required.

Each group is represents an equivalent octal digit.

Example: convert a binary number 10111011010101 into octal number system.

Solution:

Binary number	010	111	011	010	101
Octal number	2	7	3	2	5

Answer $(10111011010101)_2 = (27325)_8$

➢ OCTAL TO BINARY

An Octal number can be easily converted into binary digits by replacing each octal digit with its equivalent three binary digits.

Example: convert an octal 76432_8 into binary number system.

Solution:

Octal number	7	6	4	3	2
Binary number	111	110	100	011	010

Answer $(76432)_8 = (111110100011010)_2$

Q.10. How can you convert a binary number into hexadecimal and hexadecimal number into binary?

CONVERSION BETWEEN BINARY AND HEXADECIMAL NUMBER SYSTEM

Any Hexadecimal number (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F) can be represented by four binary digits as shown in the given table.

Binary	Hexadecimal
0000	0
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9
1010	A
1011	B
1100	C
1101	D
1110	E
1111	F

➢ BINARY TO HEXADECIMAL

The binary digits are split into groups of four digits, starting from right to left. Zeros can be added at the left end to make a complete group of four digits if required. Each group is represents an equivalent hexadecimal digit.

Example: Convert a binary number 1011101100010101111_2 into octal number system.

Solution:

Binary number	0101	1101	1000	1010	1111
Hexadecimal number	5	D	8	A	F

Answer $(1011101100010101111)_2 = (5D8AF)_{16}$

➢ HEXADECIMAL TO BINARY

Hexadecimal number can be easily converted into binary digits by replacing each hexadecimal digit with its equivalent four binary digits.

Example: convert hexadecimal number $A5F90_{16}$ into binary.

Solution:

Hexadecimal number	A	5	F	9	0
Binary number	1010	0101	1111	1001	0000

Answer $(A5F90)_{16} = (10100101111110010000)_2$

Q.11. How can you convert hexadecimal number into octal and octal number into hexadecimal?

Table for conversion from Hexadecimal to Octal and Octal to Hexadecimal

Octal to Binary and Binary to Octal		Hexadecimal to Binary and Binary to Hexadecimal	
OCTAL	**BINARY**	**HEXADECIMAL**	**BINARY**
0	000	0	0000
1	001	1	0001
2	010	2	0010
3	011	3	0011
4	100	4	0100
5	101	5	0101
6	110	6	0110
7	111	7	0111
		8	1000
		9	1001
		A	1010
		B	1011
		C	1100
		D	1101
		E	1110
		F	1111

Conversion between Octal and Hexadecimal number system

➢ HEXADECIMAL TO OCTAL

Hexadecimal number can be easily converted into octal number in two steps:

STEP-1 By replacing each hexadecimal digit with its equivalent four binary digits and then combine the resulting binary digits.

STEP-2 Combination of resulting binary digits split into groups of three digits, starting from right to left. Zeros can be added at the left end to make a complete group of three digits if required. Each group is represents an equivalent octal digit.

Example: convert hexadecimal number $A5F90_{16}$ into octal number system.

Solution:

STEP-1

Hexadecimal number		A	5	F	9	0
Binary number		1010	0101	1111	1001	0000

Combination of resulting binary digits 10100101111110010000

STEP-2

Binary number	010	100	101	111	110	010	000
Octal number	2	4	5	7	6	2	0

Answer $(A5F90)_{16} = (2457620)_8$

➢ OCTAL TO HEXADECIMAL

Octal number can be easily converted into Hexadecimal number in two steps:

STEP-1 By replacing each octal digit with its equivalent three binary digits and then combine the resulting binary digits.

STEP-2 Combination of resulting binary digits split into groups of four digits, starting from right to left. Zeros can be added at the left end to make a complete group of four digits if required. Each group is represents an equivalent hexadecimal digit.

Example: convert an octal 76432_8 into hexadecimal number system.

Solution:

STEP-1

Octal number	7	6	4	3	2
Binary number	111	110	100	011	010

Combination of resulting binary digits 111110100011010

STEP-2

Binary number	0111	1101	0001	1010
Hexadecimal number	7	D	1	A

Answer $(76432)_8 = (7D1A)_{16}$

Q.12. How can you find 1's and 2's complement of a binary number?

1's AND 2's COMPLEMENTS

The 1's complement of a binary number system is found by replacing series of binary digits 0's to 1's and 1's to 0's.For example:-

Binary number = 1 0 1 1 0 1 0 1 0 0

1's complement = 0 1 0 0 1 0 1 0 1 1

The 2's complement of a binary number system is found by adding 1 in 1's complement.

For example:-

Binary number = 1 0 1 1 1 1 0 0 1 0

1's complement = 0 1 0 0 0 0 1 1 0 1

Add 1 + 1

2's complement = 0 1 0 0 0 0 1 1 1 0

Q.13. What is Sign-bit in binary number system?

THE SIGN BIT

The leftmost bit in a signed binary number is the sign bit, which tells you whether the number is positive (+) or negative (-). Leftmost 0 is represents positive value while leftmost 1 is represents negative value.

For example, the decimal number +45 is expressed as an 8-bit signed binary number as 00101101, leftmost 0 is the sign bit. The decimal number -45 is expressed as 10101101.

BINARY ARITHMETIC

Q.14. Give the rules for binary addition.

BINARY ADDITION

For the addition of binary numbers, first we need to know how the binary digits (bits) are added.

0+0 = 0, with no carry

1+0 = 1, with no carry

0+1 = 1, with no carry

1+1 = 0, and you carry a 1

1+1+1 = 1, and you carry a 1.

Example: Add binary numbers 11010101 and 1101101.
Solution:

```
  11010101
+  1101101
----------
 101000010
```


Q.15. Give the rules for binary subtraction.

BINARY SUBTRACTION

For the subtraction of binary numbers, first we need to know the following subtraction rules.

0 – 0 = 0, borrow 0

1 – 0 = 1, borrow 0

1 – 1 = 0, borrow 0

0 – 1 = 1, borrow 1 from digits to left of current digit.

Example: subtract binary numbers 1101101 from 11010101.
Solution:

```
  11010101
- 1101101
----------
  1101000
```

Q.16. Give the rules for binary multiplication.

BINARY MULTIPLICATION

Binary multiplication can be achieved in a similar fashion to multiplying decimal values, using the long multiplication method by multiplying each digit in turn, and then adding the values together. The rules for multiplication are:

0 x 0 = 0, with no carry
1 x 0 = 0, with no carry
0 x 1 = 0, with no carry
1 x 1 = 1, with no carry

Example: Multiply binary numbers 1011 and 1010.

Solution:

$$\begin{array}{r} 1011 \\ \times\ 1010 \\ \hline 0000 \\ 1011x \\ 0000xx \\ +1011xxx \\ \hline 1101110 \end{array}$$

Q.17. Give the rules for binary division.

BINARY DIVISION

Like multiplication, dividing binary values is the same as long division in decimal.

Example: Divide binary numbers 1001 by 11 (decimal 9÷ 3)

Solution:

$$\begin{array}{r} 11 \\ 11\overline{)1001} \\ 11 \\ \hline 11 \\ 11 \\ \hline xx \end{array}$$

$(11)_2$ Ans

Q.18. Define Code. Describe different types of codes which are used in computer system.

CODE

When numbers, letters and words are represented by special group of symbols, we say they are being encoded and the group of symbols is called "CODE".

TYPES OF CODES

There are three basic types of codes used in our computer systems namely:

1. Binary codes
2. BCD codes
3. Alphanumeric codes

1. BINARY CODES

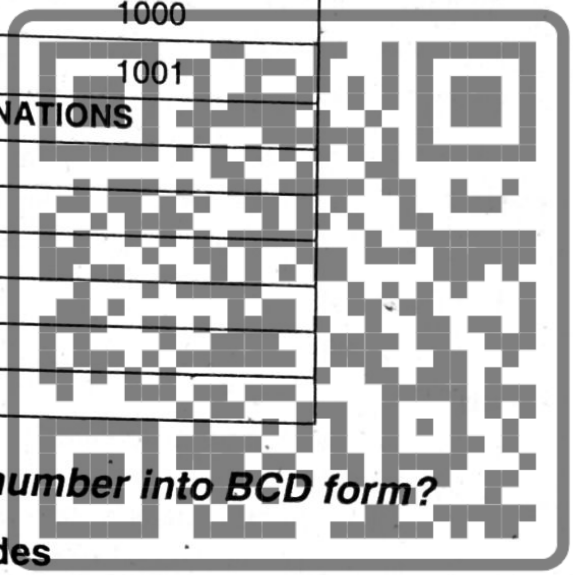
Special binary codes have been designed to represent decimal numbers. The group of 0s and 1s in the binary number is called Binary codes.

2. BINARY DECIMAL CODE (BCD)

BCD is a method of using binary digits to represent the decimal digits. It is an '8421' code. In this code, each of the decimal digits (0-9) is represented by a four-bit binary code.

Recall that with 4 bits the number of unique representations is 2^4=16. In this way there are 6 invalid four-bit combinations for the BDC code.

BCD CODES IN TABLE	
Decimal	BCD
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
INVALID COMBINATIONS	
	1010
	1011
	1100
	1101
	1110
	1111



Q.19. How can you convert a decimal number into BCD form?

➢ **Conversion from DECIMAL to BCD Codes**

BCD is different from converting a decimal number to binary. For example 45, when converted to binary, is 101101, when represented in BCD is 01000101.

Examples:

Convert the DECIMAL numbers into equivalent BCD codes

A) $(546)_{10}$

B) $(23.8)_{10}$

C) $(5139)_{10}$

A) **5** = 0101, **4** = 0100 and **6**=0110

Thus $(546)_{10} = (0101\ 0100\ 0110)_{BCD}$

B) $(23.8)_{10} = (0010\ 0011.\ 1000)_{BCD}$

C) $(5139)_{10} = (0101\ 0001\ 0011\ 1001)_{BCD}$

Q.20. How can you convert a BCD code into decimal number?

➢ Conversion from BCD codes to DECIMAL

To convert BCD codes to decimal, break the binary digits into groups of four binary digits starting from right side and convert each group into its appropriate BCD digit.

Examples:

Convert each of the following BCD codes below o their DECIMAL equivalent

A) 001110000111

B) 01100111.0100

A) $(001110000111)_{BCD} = 0011\ \ 1000\ \ 0111 = (387)_{10}$

B) $(01100111.0100)_{BCD} = 0110\ \ 0111.\ 0100 = (67.4)_{10}$

3. ALPHANUMERIC CODES

The alphanumeric codes generally include the upper and lower case of alphabetic letters like:

- Alphabets: from A to Z and from a to z
- Numbers from 0 to 9
- Various types of special characters or symbols such as @, #, $, +, <, and = etc.
- Alphanumeric codes may also include Non-English alphabets, such as é or ç.

TYPES OF ALPHANUMERIC CODES

Two well-known alphanumeric codes are:

i. EBCDIC

ii. ASCII codes

i. EBCDIC

- EBCDIC stands for **E**xtended **B**inary **C**oded **D**ecimal **I**nterchange **C**ode, pronounced as eb-see-dik.
- EBCDIC is an IBM code for representing characters as numbers.
- It is an eight bit code and defines 256 symbols.
- EBCDIC is widely used on large IBM computers and mini computers
- EBCDIC only allows machines to process English Alphabets in capital letters.

ii. ASCII CODE

The American Standard Code for Information Interchange, or ASCII code, was created in 1963 by "American National Standards Institute" or "ANSI".

Features of ASCII Codes

- ASCII has 256 symbols and characters represented by an 8 bit code series.
- First 32 ASCII codes represent the control characters that are not printed or displayed.
- The other graphics symbols and characters can be printed or displayed.
- Printable or displayable symbols and characters are:
  - English alphabets (lower and upper case),
  - Ten decimal digits from 0 to 9
  - Punctuation sign and other commonly used symbols.

EXERCISE

Answer the following questions?

1. What is Data?

Ans. See Q. 1

2. Define various types of Data?

Ans. See Q. 2

3. Differentiate between Data and Information.

Ans. See Q. 4

4. What is a number system?

Ans. See Q. 5

5. How many types of number systems do you know?

Ans. See Q. 6

6. Which number system computer used for processing of data and why?

Ans. See Q. 6

7. How many types of "Codes" are used in computer system?

Ans. See Q. 18

8. Define the various coding schemes used in the computer system?

Ans. See Q.

9. How a Floating-point number is represented in the computer?

Ans. See Q.

10. What is Complement of a number? How 1's and 2's complements are represented in computers? See Q. 12

Q-11 Convert the following Decimal numbers into Binary numbers.

(i) 45 (ii) 126 (iii) 425 (iv) 628 (v) 814
(vi) 1089 (vii) 1706 (viii) 3578 (ix) 5138 (x) 4653

(i)

2	45
2	22 — 1
2	11 — 0
2	5 — 1
2	2 — 1
	1 — 1

$(45)_{10} = (101101)_2$

(ii)

2	126
2	63 — 0
2	31 — 1
2	15 — 1
2	7 — 1
2	3 — 1
	1 — 1

$(126)_{10} = (1111110)_2$

(iii)

2	425
2	212 — 1
2	106 — 0
2	53 — 0
2	26 — 1
2	13 — 0
2	6 — 1
2	3 — 0
	1 — 1

$(425)_{10} = (110101001)_2$

(iv)

2	628
2	314 — 0
2	157 — 0
2	78 — 1
2	39 — 0
2	19 — 1
2	9 — 1
2	4 — 1
2	2 — 0
	1 — 0

$(628)_{10} = (1001110100)_2$

(v)

2	814
2	407 — 0
2	203 — 1
2	50 — 1
2	25 — 0
2	12 — 1
2	6 — 0
2	3 — 0
	1 — 1

$(814)_{10} = (1100101110)_2$

(vi)

2	1089
2	544 — 1
2	272 — 0
2	136 — 0
2	68 — 0
2	34 — 0
2	17 — 0
2	8 — 1
2	4 — 0
2	2 — 0
	1 — 0

$(1089)_{10} = (10001000001)_2$

(vii)

2	1076
2	853 — 0
2	426 — 1
2	213 — 0
2	106 — 1
2	53 — 0
2	26 — 1
2	13 — 0
2	6 — 1
2	3 — 0
	1 — 1

$(1076)_{10} = (11010101010)_2$

(viii)

2	3578
2	1789 — 0
2	894 — 1
2	447 — 0
2	223 — 1
2	111 — 1
2	55 — 1
2	27 — 1
2	13 — 1
2	6 — 1
2	3 — 0
	1 — 1

$(3578)_{10} = (110111111010)_2$

(ix)

2	5138
2	2569 — 0
2	1284 — 1
2	642 — 0
2	321 — 0
2	160 — 1
2	80 — 0
2	40 — 0
2	20 — 0
2	10 — 0
2	5 — 0
2	2 — 1
	1 — 0

$(5138)_{10} = (1010000010010)_2$

(x)

2	4653
2	2326 — 1
2	1163 — 0
2	581 — 1
2	290 — 1
2	145 — 0
2	72 — 1
2	36 — 0
2	18 — 0
2	9 — 0
2	4 — 1
2	2 — 0
	1 — 0

$(4653)_{10} = (1001000101101)_2$

Q-12 Convert the following Binary numbers into Decimal numbers.

(i) 101 (ii) 1101
(iii) 11100 (iv) 11001
(v) 100011 (vi) 100111
(vii) 1001010 (viii) 1111000
(ix) 10001100 (x) 1001110011

(i) $(101)_2 = (?)_{10}$

$= 1 \times 22 + 0 \times 21 + 1 \times 20$

$= 1 \times 4 + 0 \times 2 + 1 \times 1$

$= 4 + 0 + 1$

$= 5$

$(101)_2 = (5)_{10}$

(ii) $(1101)_2 = (?)_{10}$

$= 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$

$= 1 \times 8 + 1 \times 4 + 0 \times 2 + 1 \times 1$

$= 8 + 4 + 0 + 1$

$= 13$

$(1101)_2 = (13)_{10}$

(iii) $(11100)_2 = (?)_{10}$

$= 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 0 \times 2^0$

$= 1 \times 16 + 1 \times 8 + 1 \times 4 + 0 \times 2 + 0 \times 1$

$= 16 + 8 + 4 + 0 + 0$

$= 28$

$(11100)_2 = (28)_{10}$

(iv) $(11001)_2 = (?)_{10}$

$= 1 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$

$= 1 \times 16 + 1 \times 8 + 0 \times 4 + 0 \times 2 + 1 \times 1$

$= 16 + 8 + 0 + 0 + 1$

$= 25$

$(11001)_2 = (25)_{10}$

(v) $(100011)_2 = (?)_{10}$

$= 1 \times 2^5 + 0 \times 2^4 + 0 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$

$= 1 \times 32 + 0 \times 16 + 0 \times 8 + 0 \times 4 + 1 \times 2 + 1 \times 1$

$= 32 + 0 + 0 + 0 + 2 + 1$

$= 35$

$(100011)_2 = (35)_{10}$

(vi) $(100111)_2 = (?)_{10}$

$= 1 \times 2^5 + 0 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$

$= 1 \times 32 + 0 \times 16 + 0 \times 8 + 1 \times 4 + 1 \times 2 + 1 \times 1$

$= 32 + 0 + 0 + 4 + 2 + 1$

$= 39$

$(100111)_2 = (39)_{10}$

(vii) $(1001010)_2 = (?)_{10}$

$= 1 \times 2^6 + 0 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$

$= 1 \times 64 + 0 \times 32 + 0 \times 16 + 1 \times 8 + 0 \times 4 + 1 \times 2 + 0 \times 1$

$= 64 + 0 + 0 + 8 + 0 + 2 + 0$

$= 74$

$(1001010)_2 = (74)_{10}$

(viii) $(1111000)_2 = (?)_{10}$

$= 1 \times 2^6 + 1 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 0 \times 2^0$

$= 1 \times 64 + 1 \times 32 + 1 \times 16 + 1 \times 8 + 0 \times 4 + 0 \times 2 + 0 \times 1$

$= 64 + 32 + 16 + 8 + 0 + 0 + 0$

$= 120$

$(1111000)_2 = (120)_{10}$

(ix) $(10001100)_2 = (?)_{10}$

$= 1 \times 2^7 + 0 \times 2^6 + 0 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 0 \times 2^0$

$= 1 \times 128 + 0 \times 64 + 0 \times 32 + 0 \times 16 + 1 \times 8 + 1 \times 4 + 0 \times 2 + 0 \times 1$

$= 128 + 0 + 0 + 0 + 8 + 4 + 0 + 0$

$= 140$

$(10001100)_2 = (140)_{10}$

(x) $(1001110011)_2 = (?)_{10}$

$= 1 \times 2^9 + 0 \times 2^8 + 0 \times 2^7 + 1 \times 2^6 + 1 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$

$= 1 \times 512 + 0 \times 256 + 0 \times 128 + 1 \times 64 + 1 \times 32 + 1 \times 16 + 0 \times 8 + 0 \times 4 + 1 \times 2 + 1 \times 1$

$= 512 + 0 + 0 + 64 + 32 + 16 + 0 + 0 + 2 + 1$

$= 627$

$(1001110011)_2 = (627)_{10}$

Q-13 Convert the following Decimal numbers into Octal numbers.

(i) 482 (ii) 232 (iii) 750 (iv) 1200 (v) 854
(vi) 2560 (vii) 1802 (viii) 9543 (ix) 8086 (x) 11456

(i)

8	482
8	60 — 2
	7 — 4

$(482)_{10} = (742)_2$

(ii)

8	232
8	29 — 0
	3 — 5

$(232)_{10} = (350)_8$

(iii)

8	750
8	93 — 6
8	11 — 5
	1 — 3

$(750)_{10} = (1356)_8$

(iv)

8	1200
8	150 — 0
8	18 — 6
	2 — 2

$(1200)_{10} = (2260)_8$

(v)

8	854
8	106 — 6
8	13 — 2
	1 — 5

$(854)_{10} = (1526)_8$

(vi)

8	2560
8	320 — 0
8	40 — 0
	5 — 0

$(2560)_{10} = (5000)_8$

(vii)

8	1802
8	225 — 2
8	28 — 1
	3 — 4

$(1802)_{10} = (3412)_8$

(viii)

8	9543
8	1192 — 7
8	149 — 0
8	18 — 5
	2 — 2

$(9543)_{10} = (22507)_8$

(ix)

8	8086
8	1010 — 6
8	126 — 2
8	15 — 6
	1 — 7

$(8086)_{10} = (17626)_8$

(x)

8	11456
8	1432 — 0
8	179 — 0
8	22 — 3
	2 — 6

$(11456)_{10} = (23600)_8$

Q-14 Convert the following Octal numbers into Decimal numbers.

(i) 65 (ii) 132 (iii) 655 (iv) 763 (v) 454
(vi) 4550 (vii) 1006 (viii) 7540 (ix) 4463 (x) 10654

(i) $(65)_8 = (?)_{10}$

$= 6 \times 8^1 + 5 \times 8^0$

$= 6 \times 8 + 5 \times 1$

$= 48 + 5$

$= 53$

$(65)_8 = (53)_{10}$

(ii) $(132)_8 = (?)_{10}$

$= 1 \times 8^2 + 3 \times 8^1 + 2 \times 8^0$

$= 1 \times 64 + 3 \times 8 + 2 \times 1$

$= 64 + 24 + 2$

$= 90$

$(132)_8 = (90)_{10}$

(iii) $(655)_8 = (?)_{10}$

$= 6 \times 8^2 + 5 \times 8^1 + 5 \times 8^0$

$= 6 \times 64 + 5 \times 8 + 5 \times 1$

$= 384 + 40 + 5$

$= 429$

$(655)_8 = (429)_{10}$

(iv) $(763)_8 = (?)_{10}$

$= 7 \times 8^2 + 6 \times 8^1 + 3 \times 8^0$

$= 7 \times 64 + 6 \times 8 + 3 \times 1$

$= 448 + 48 + 3$

$= 499$

$(763)_8 = (499)_{10}$

(v) $(454)_8 = (?)_{10}$

$= 4 \times 8^2 + 5 \times 8^1 + 4 \times 8^0$

$= 4 \times 64 + 5 \times 8 + 4 \times 1$

$= 256 + 40 + 4$

$= 300$

$(454)_8 = (300)_{10}$

(vi) $(4550)_8 = (?)_{10}$

$= 4 \times 8^3 + 5 \times 8^2 + 5 \times 8^1 + 0 \times 8^0$

$= 4 \times 512 + 5 \times 64 + 5 \times 8 + 0 \times 1$

$= 2048 + 320 + 40 + 0$

$= 2408$

$(4550)_8 = (2408)_{10}$

(vii) $(1006)_8 = (?)_{10}$

$= 1 \times 8^3 + 0 \times 8^2 + 0 \times 8^1 + 6 \times 8^0$

$= 1 \times 512 + 0 \times 64 + 0 \times 8 + 6 \times 1$

$= 512 + 0 + 0 + 6$

$= 518$

$(1006)_8 = (518)_{10}$

(viii) $(7540)_8 = (?)_{10}$

$= 7 \times 8^3 + 5 \times 8^2 + 4 \times 8^1 + 0 \times 8^0$

$= 7 \times 512 + 5 \times 64 + 4 \times 8 + 0 \times 1$

$= 3584 + 320 + 32 + 0$

$= 3936$

$(7540)_8 = (3936)_{10}$

(ix) $(4463)_8 = (?)_{10}$

$= 4 \times 8^3 + 4 \times 8^2 + 6 \times 8^1 + 3 \times 8^0$

$= 4 \times 512 + 4 \times 64 + 6 \times 8 + 3 \times 1$

$= 2048 + 256 + 48 + 3$

$= 2355$

$(4463)_8 = (2355)_{10}$

(x) $(10654)_8 = (?)_{10}$

$= 1 \times 8^4 + 0 \times 8^3 + 6 \times 8^2 + 5 \times 8^1 + 4 \times 8^0$

$= 1 \times 4096 + 0 \times 512 + 6 \times 64 + 5 \times 8 + 4 \times 1$

$= 4096 + 0 + 384 + 40 + 4$

$= 4524$

$(10654)_8 = (4524)_{10}$

Q-15 Convert the following Decimal numbers into Hexa-Decimal numbers.

(i) 425 (ii) 1780 (iii) 3250 (iv) 11809 (v) 22583

(vi) 55887 (vii) 90082 (viii) 12443 (ix) 329600 (x) 200455

(i)

16 | 425	
16 | 26	— 9
	1 — A

$(425)_{10} = (1A9)_{16}$

(ii)

16 | 1780	
16 | 111	— 4
	6 — F

$(1780)_{10} = (6F4)_{16}$

(iii)

16 | 3250	
16 | 203	— 2
	12 — B

Because C = 12

$(3250)_{10} = (CB2)_{16}$

(iv)

16 | 11809	
16 | 738	— 1
16 | 46	— 2
	2 — E

$(11809)_{10} = (2E21)_{16}$

(v)

16 | 22582	
16 | 1411	— 7
16 | 88	— 3
	5 — 8

$(22582)_{10} = (5837)_{16}$

(vi)

16 | 55887	
16 | 3492	— F
16 | 218	— 4
	13 — A

Because D = 13

$(55887)_{10} = (DA4F)_{16}$

(vii)

16 | 90082	
16 | 5630	— 2
16 | 351	— E
16 | 21	— F
	1 — 5

$(90082)_{10} = (15FE2)_{16}$

(viii)

16 | 12443	
16 | 777	— B
16 | 48	— 9
	3 — 0

$(12443)_{10} = (309B)_{16}$

(ix)

16 | 329600	
16 | 20600	— 0
16 | 1287	— 8
16 | 80	— 7
	5 — 0

$(329600)_{10} = (50780)_{16}$

(x)

16 | 200455	
16 | 12528	— 8
16 | 783	— 0
16 | 48	— F
	3 — 0

$(200445)_{10} = (30F07)_{16}$

Q-16 Convert the following Hexadecimal into Decimal numbers.

(i) 1420 (ii) 2210 (iii) A109 (iv) 5D60 (v) 60805
(vi) CD550 (vii) ABCD9 (viii) 126A2 (ix) 6FB9E (x) 5C464F

(i) $(1420)_{16} = (?)_{10}$

$= 1 \times 16^3 + 4 \times 16^2 + 2 \times 16^1 + 0 \times 16^0$

$= 1 \times 4096 + 4 \times 256 + 2 \times 16 + 0 \times 1$

$= 4096 + 1024 + 32 + 0$

$= 5152$

$(1420)_{16} = (5152)_{10}$

(ii) $(2210)_{16} = (?)_{10}$

$= 2 \times 16^3 + 2 \times 16^2 + 1 \times 16^1 + 0 \times 16^0$

$= 2 \times 4096 + 2 \times 256 + 1 \times 16 + 0 \times 1$

$= 8192 + 512 + 16 + 0$

$= 8720$

$(2210)_{16} = (8720)_{10}$

(iii) $(A109)_{16} = (?)_{10}$

$= A \times 16^3 + 1 \times 16^2 + 0 \times 16^1 + 9 \times 16^0$

$= 10 \times 4096 + 1 \times 256 + 0 \times 16 + 9 \times 1$

$= 40960 + 256 + 0 + 9$

$= 41225$

$(A109)_{16} = (41225)_{10}$

(iv) $(5D60)_{16} = (?)_{10}$

$= 5 \times 16^3 + D \times 16^2 + 6 \times 16^1 + 0 \times 16^0$

$= 5 \times 4096 + 13 \times 256 + 6 \times 16 + 0 \times 1$

$= 20480 + 3328 + 96 + 0$

$= 23904$

$(5D60)_{16} = (23904)_{10}$

(v) $(60805)_{16} = (?)_{10}$

$= 6 \times 16^4 + 0 \times 16^3 + 8 \times 16^2 + 0 \times 16^1 + 5 \times 16^0$

$= 6 \times 65536 + 0 \times 4096 + 8 \times 256 + 0 \times 16 + 5 \times 1$

$= 393216 + 0 + 2048 + 0 + 5$

$= 395269$

$(60805)_{16} = (395269)_{10}$

(vi) $(CD550)_{16} = (?)_{10}$

$= C \times 16^4 + D \times 16^3 + 5 \times 16^2 + 5 \times 16^1 + 0 \times 16^0$

$= 12 \times 65536 + 13 \times 4096 + 5 \times 256 + 5 \times 16 + 0 \times 1$

$= 786432 + 53248 + 1280 + 80 + 0$

$= 841040$

$(CD550)_{16} = (841040)_{10}$

(vii) $(ABCD9)_{16} = (?)_{10}$

$= A \times 16^4 + B \times 16^3 + C \times 16^2 + D \times 16^1 + 9 \times 16^0$

$= 10 \times 65536 + 11 \times 4096 + 12 \times 256 + 13 \times 16 + 9 \times 1$

$= 655360 + 45056 + 3072 + 208 + 9$

$= 703705$

$(ABCD9)_{16} = (703705)_{10}$

(viii) $(126A2)_{16} = (?)_{10}$

$= 1 \times 16^4 + 2 \times 16^3 + 6 \times 16^2 + A \times 16^1 + 2 \times 16^0$

$= 1 \times 65536 + 2 \times 4096 + 6 \times 256 + 10 \times 16 + 2 \times 1$

$= 65536 + 8192 + 1536 + 160 + 2$

$= 75426$

$(126A2)_{16} = (75426)_{10}$

(ix) $(6FB9E)_{16} = (?)_{10}$

$= 6 \times 16^4 + F \times 16^3 + B \times 16^2 + 9 \times 16^1 + E \times 16^0$

$= 6 \times 65536 + 15 \times 4096 + 11 \times 256 + 9 \times 16 + 14 \times 1$

$= 393216 + 61440 + 2816 + 144 + 14$

$= 457630$

$(6FB9E)_{16} = (457630)_{10}$

(x) $(5C464F)_{16} = (?)_{10}$

$= 5 \times 16^5 + C \times 16^4 + 4 \times 16^3 + 6 \times 16^2 + 4 \times 16^1 + F \times 16^0$

$= 5 \times 1048576 + 12 \times 65536 + 4 \times 4096 + 6 \times 256 + 4 \times 16 + 15 \times 1$

$= 5242880 + 786432 + 16384 + 1536 + 64 + 15$

$= 6047311$

$(5C464F)_{16} = (6047311)_{10}$

Q-17 Convert the following Hexadecimal into Binary numbers.

(i) A35 (ii) 8066 (iii) 50DC (iv) 15B8 (v) 44F6E
(vi) 22EE (vii) 80A5C (viii) 33C5D (ix) 78AA0 (x) ADF64

(i) $(A35)_{16} = (?)_2$

A	3	5
1010	0011	0101

$(A35)_{16} = (101000110101)_2$

(ii) $(8066)16 = (?)2$

8	0	6	6
1000	0000	0110	0110

$(8066)_{16} = (1000000001100110)_2$

(iii) $(50DC)_{16} = (?)_2$

5	0	D	C
0101	0000	1101	1100

$(50DC)_{16} = (0101000011011100)_2$

(iv) $(15B8)_{16} = (?)_2$

1	5	B	8
0001	0101	1011	1000

$(15B8)_{16} = (0001010110111000)_2$

(v) $(44F6E)_{16} = (?)_2$

4	4	F	6	E
0100	0100	1111	0110	1110

$(44FE6)_{16} = (01000100111101101110)_2$

(vi) $(22EE)_{16} = (?)_2$

2	2	E	E
0010	0010	1110	1110

$(22EE)_{16} = (0010001011101110)_2$

(vii) (80A5C)16 = (?)2

8	0	A	5	C
1000	0000	1010	0101	1100

$(80A5C)_{16} = (10000000101001011100)_2$

(viii) (33C5D)16 = (?)2

3	3	C	5	D
0011	0011	1100	0101	1101

$(33C5D)_{16} = (00110011110001011101)_2$

(ix) $(78AA0)_{16} = (?)_2$

7	8	A	A	0
0111	1000	1010	1010	0000

$(78AA0)_{16} = (01111000101010100000)_2$

(x) $(ADF64)_{16} = (?)_2$

A	D	F	6	4
1010	1101	1111	0110	0100

$(ADF64)_{16} = (10101101111101100100)_2$

Q-18 Convert the following octal numbers into Binary numbers.

(i) 453 (ii) 126 (iii) 165 (iv) 2274 (v) 1104
(vi) 3420 (vii) 4060 (viii) 2647 (ix) 231560 (x) 147235

(i) $(453)_8 = (?)_2$

4	5	3
100	101	011

$(453)_8 = (100101011)_2$

(ii) $(126)_8 = (?)_2$

1	2	6
001	010	110

$(126)_8 = (001010110)_2$

(iii) $(165)_8 = (?)_2$

1	6	5
001	110	101

$(165)_8 = (001110101)_2$

(iv) $(2274)_8 = (?)_2$

2	2	7	4
010	010	111	100

$(2277)_8 = (010010111100)_2$

(v) $(1104)_8 = (?)_2$

1	1	0	4
001	001	000	100

$(1104)_8 = (001001000100)_2$

(vi) $(3420)_8 = (?)_2$

3	4	2	0
011	100	010	000

$(3420)_8 = (011100010000)_2$

(vii) $(4060)_8 = (?)_2$

4	0	6	0
100	000	110	000

$(4060)_8 = (100000110000)_2$

(viii) $(2647)_8 = (?)_2$

2	6	4	7
010	110	100	111

$(2647)_8 = (010110100111)_2$

(ix) $(231560)_8 = (?)_2$

2	3	1	5	6	0
010	011	001	101	110	000

$(231560)_8 = (010011001101110000)_2$

(x) $(147235)_8 = (?)_2$

1	4	7	2	3	5
001	100	111	010	011	101

$(147235)_8 = (001100111010011101)_2$

Q-19 Convert the following Binary numbers into Octal numbers.

(i) 1110 (ii) 101010 (iii) 1001001 (iv) 11110011
(v) 100101010 (vi) 101001 (vii) 1000110 (viii) 1111000
(ix) 10000111 (x) 101011110

(i) $(1110)_2 = (?)_8$

$\frac{001}{1}\ \frac{110}{6}$

$(1110)_2 = (16)_8$

(ii) $(101010)_2 = (?)_8$

$\frac{101}{5}\ \frac{010}{2}$

$(101010)_2 = (52)_8$

(iii) $(1001001)_2 = (?)_8$

$\frac{001}{1}\ \frac{001}{1}\ \frac{001}{1}$

$(1001001)_2 = (111)_8$

(iv) $(11110011)_2 = (?)_8$

$\frac{011}{3}\ \frac{110}{6}\ \frac{011}{3}$

$(11110011)_2 = (363)_8$

(v) $(100101010)_2 = (?)_8$

$\frac{100}{4}\ \frac{101}{5}\ \frac{010}{2}$

$(100101010)_2 = (452)_8$

(vi) $(101001)_2 = (?)_8$

$\frac{101}{5}\ \frac{001}{1}$

$(101001)_2 = (51)_8$

(vii) $(1000110)_2 = (?)_8$

$\frac{001}{1}\ \frac{000}{0}\ \frac{110}{6}$

$(1000110)_2 = (106)_8$

(viii) $(1111000)_2 = (?)_8$

$\frac{001}{1}\ \frac{111}{7}\ \frac{000}{0}$

$(1111000)_2 = (170)_8$

(ix) $(10000111)_2 = (?)_8$

$\frac{010}{2}\ \frac{000}{0}\ \frac{111}{7}$

$(10000111)_2 = (207)_8$

(x) $(101011110)2 = (?)_8$

$\frac{101}{5}\ \frac{011}{3}\ \frac{110}{6}$

$(101011110)_2 = (536)_8$

Q-20 Convert the following Binary numbers into Hexadecimal numbers.

(i) 11011 (ii) 1110100 (iii) 1101101 (iv) 11000111
(v) 1001011110 (vi) 110011 (vii) 1010110 (viii) 1011001
(ix) 11110111 (x) 101011110011

(i) $(11011)_2 = (?)_{16}$

$\frac{0001}{1}\ \frac{1011}{B}$

$(11011)_2 = (1B)_{16}$

(ii) $(1110100)_2 = (?)_{16}$

$\frac{0111}{7}\ \frac{0100}{4}$

$(1110100)_2 = (74)_{16}$

(iii) $(1101101)_2 = (?)_{16}$

$\frac{0110}{6}\ \frac{1101}{D}$

$(1101101)_2 = (6D)_{16}$

(iv) $(11000111)_2 = (?)_{16}$

$\frac{1100}{C}\ \frac{0111}{7}$

$(11000111)_2 = (C7)_{16}$

(v) $(1001011110)_2 = (?)_{16}$

$\frac{0010}{2}\ \frac{0101}{5}\ \frac{1110}{E}$

$(1001011110)_2 = (25E)_{16}$

(vi) $(110011)_2 = (?)_{16}$

$\frac{0011}{3}\ \frac{0011}{3}$

$(110011)_2 = (33)_{16}$

(vii) $(1010110)_2 = (?)_{16}$

$\frac{0101}{5}\ \frac{0110}{6}$

$(1010110)_2 = (56)_{16}$

(viii) $(1011001)_2 = (?)_{16}$

$\frac{0101}{5}\ \frac{1001}{9}$

$(1011001)_2 = (59)_{16}$

(ix) $(11110111)_2 = (?)_{16}$

$\frac{1111}{F}\ \frac{0111}{7}$

$(11110111)_2 = (F7)_{16}$

(x) $(101011110011)_2 = (?)_{16}$

$\frac{1010}{A}\ \frac{1111}{F}\ \frac{0011}{3}$

$(10101110011)_2 = (AF3)_{16}$

Q-21 Convert the following Octal numbers into Hexadecimal numbers.

(i) 117 (ii) 205 (iii) 4235 (iv) 66442 (v) 112534
(vi) 1035 (vii) 3344 (viii) 20062 (ix) 55100 (x) 2670123

(i) $(117)_8 = (?)_{16}$

$\frac{1}{001}\ \frac{1}{001}\ \frac{7}{111}$

$(001001111)_2$

$\frac{0000}{0}\ \frac{0100}{4}\ \frac{1111}{F}$

$(117)_8 = (04F)_{16}$

(ii) $(205)_8 = (?)_{16}$

$\frac{2}{010}\ \frac{0}{000}\ \frac{5}{101}$

$(010000101)_2$

$\frac{0000}{0}\ \frac{1000}{8}\ \frac{0101}{5}$

$(205)_8 = (085)_{16}$

(iii) $(4235)_8 = (?)_{16}$

$\frac{4}{100}\ \frac{2}{010}\ \frac{3}{011}\ \frac{5}{101}$

$(100010011101)_2$

$\frac{1000}{8}\ \frac{1001}{9}\ \frac{1101}{D}$

$(4236)_8 = (89D)_{16}$

(iv) $(66442)_8 = (?)_{16}$

$\frac{6}{110}\ \frac{6}{110}\ \frac{4}{100}\ \frac{4}{100}\ \frac{2}{010}$

$(110110100100010)_2$

$\frac{0110}{6}\ \frac{1101}{D}\ \frac{0010}{2}\ \frac{0010}{2}$

$(66442)_8 = (6D22)_{16}$

(v) $(112534)_8 = (?)_{16}$

$\frac{1}{001}\ \frac{1}{001}\ \frac{2}{010}\ \frac{5}{101}\ \frac{3}{011}\ \frac{4}{100}$

$(001001010101011100)_2$

$\frac{0000}{0}\ \frac{1001}{9}\ \frac{0101}{5}\ \frac{0101}{5}\ \frac{1100}{C}$

$(112534)_8 = (0955C)_{16}$

(vi) $(1035)_8 = (?)_{16}$

$\frac{1}{001}\ \frac{0}{000}\ \frac{3}{011}\ \frac{5}{101}$

$(001000011101)_2$

$\frac{0010}{2}\ \frac{0001}{1}\ \frac{1101}{D}$

$(1035)_8 = (21D)_{16}$

(vii) $(3344)_8 = (?)_{16}$

$\frac{3}{011}\ \frac{3}{011}\ \frac{4}{100}\ \frac{4}{100}$

$(011011100100)_2$

$\frac{0110}{6}\ \frac{1110}{E}\ \frac{0100}{4}$

$(3344)_8 = (6E4)_{16}$

(viii) $(20062)8 = (?)_{16}$

$\frac{2}{010}\ \frac{0}{000}\ \frac{0}{000}\ \frac{6}{110}\ \frac{2}{010}$

$(010000000110010)_2$

$\frac{0010}{2}\ \frac{0000}{0}\ \frac{0011}{3}\ \frac{0010}{2}$

$(20062)_8 = (2032)_{16}$

(ix) $(55100)_8 = (?)_{16}$

5	5	1	0	0
101	101	001	000	000

$(101101001000000)_2$

0101	1010	0100	0000
5	A	4	0

$(55100)_8 = (5A40)_{16}$

(x) $(2670123)_8 = (?)_{16}$

2	6	7	0	1	2	3
010	110	111	000	001	010	011

$(010110111000001010011)_2$

0000	1011	0111	0000	0101	0011
0	B	7	0	5	3

$(2670123)_8 = (0B7053)_{16}$

Q-22 Convert the following Hexadecimal numbers into Octal numbers.

(i) 4A2 (ii) 1242 (iii) 60FC (iv) 7350 (v) AA100
(vi) 806C (vii) 44CD (viii) EE600 (ix) 556BB (x) 698DB2

(i) $(4A2)_{16} = (?)_8$

4	A	2
0100	1010	0010

$(010010100010)_2$

010	010	100	010
2	2	4	2

$(4A2)_{16} = (2242)_8$

(ii) $(1242)_{16} = (?)_8$

1	2	4	2
0001	0010	0100	0010

$(0001001001000010)_2$

000	001	001	001	000	010
0	1	1	1	0	2

$(1242)_{16} = (011102)_8$

(iii) $(60FC)16 = (?)8$

6	0	F	C
0110	0000	1111	1100

$(0110000011111100)_2$

000	110	000	011	111	100
0	6	0	3	7	4

$(60FC)_{16} = (060374)_8$

(iv) $(7350)_{16} = (?)_8$

7	3	5	0
0111	0011	0101	0000

$(0111001101010000)_2$

000	111	001	101	010	000
0	7	1	5	2	0

$(7350)_{16} = (071520)_8$

(v) $(AA100)_{16} = (?)_8$

A	A	1	0	0
1010	1010	0001	0000	0000

$(10101010000100000000)_2$

010	101	010	000	100	000	000
2	5	2	0	4	0	0

$(AA100)_{16} = (2520400)_8$

(vi) $(806C)_{16} = (?)_8$

8	0	6	C
1000	0000	0110	1100

$(1000000001101100)_2$

001	000	000	001	101	100
1	0	0	1	5	4

$(806C)_{16} = (100154)_8$

(vii) $(44CD)_{16} = (?)_8$

4	4	C	D
0100	0100	1100	1101

$(0100010011001101)_2$

000	100	010	011	001	101
0	4	2	3	1	5

$(44CD)_{16} = (042315)_8$

(viii) $(EE600)_{16} = (?)_8$

E	E	6	0	0
1110	1110	0110	0000	0000

$(11101110011000000000)_2$

011	101	110	011	000	000	000
3	5	6	3	0	0	0

$(EE600)_{16} = (3563000)_8$

(ix) $(556BB)16 = (?)8$

5	5	6	B	B
0101	0101	0110	1011	1011

$(01010101011010111011)_2$

011	010	101	011	010	111	011
1	2	5	3	2	7	3

$(698DB2)_{16} = (32306662)_8$

(x) $(698DB2)_{16} = (?)_8$

6	9	8	D	B	2
0110	1001	1000	1101	1011	0010

$(011010011000110110110010)_2$

011	010	011	000	110	110	110	010
3	2	3	0	6	6	6	2

$(698DB2)_{16} = (32306662)_8$

Q-23 Determine the 1's complement of each binary numbers.

(i) 1010 (ii) 1100 (iii) 10111 (iv) 100011 (v) 00111010

Note: The 1's complement of a binary number is formed by changing all 1's with 0's and all 0's with 1's.

(i) Binary number 1010
1's complment 0101

(ii) Binary number 1100
1's complment 0011

(iii) Binary number 10111
1's complment 01000

(iv) Binary number 100011
1's complment 011100

(v) Binary number 00111010
1's complment 11000101

Q-24 Determine the 2's complement of each binary numbers.

(i) 1110 (ii) 1000 (iii) 01110 (iv) 1100011 (v) 011000101

Formula for 2's complement:
1's complement + 1 = 2's complement

(i) Binary number 1110
1's complement 0001
Add 1 +1
2's complement 0010

(ii) Binary number 1000
1's complement 0111
Add 1 + 1
2's complement 1000

(iii) Binary number 01110
1's complement 10001
Add 1 + 1
2's complement 10010

(iv) Binary number 1100011
1's complement 0011100
Add 1 +1
2's complement 0011101

(v) Binary number 011000101
1's complement 100111010
Add 1 + 1
2's complement 100111011

Q-25 Express each decimal number as an 8-bits number in the 1's complement system.

(I) – 24 (II) +67 (III) - 88 (IV) + 112 (V) – 225

(I) – 24

11000 = +24

00011000 = +24 in 8-bit representation

11100111 = 1's complement

(II) +67

1000011 = +67

01000011 = +67 in 8-bit representation

Note: Given number is positive, therefore its 1's complement is remains same.

01000011 = 1's complement

(III) – 88

1011000 = +88

01011000 = +88 in 8-bit representation

10100111 = 1's complement

(IV) +112

1110000 = +112

01110000 = +112 in 8-bit representation

Note: Given number is positive, therefore its 1's complement is remains same.

01110000 = 1's complement

(V) – 225

11100001 = +225

00011110 = +225 in 8-bit representation

00011110 = 1's complement

Rough Work

(I)

2	24
2	12 — 0
2	6 — 0
2	3 — 0
	1 — 1

$(24)_{10} = (11000)_2$

(II)

2	67
2	33 — 1
2	16 — 1
2	8 — 0
2	4 — 0
2	2 — 0
	1 — 0

$(67)_{10} = (1000011)_2$

(III)

2	88
2	44 — 0
2	22 — 0
2	11 — 0
2	5 — 1
2	2 — 1
	1 — 0

$(88)_{10} = (1011000)_2$

(IV)

2	112
2	56 — 0
2	28 — 0
2	14 — 0
2	7 — 0
2	3 — 1
	1 — 1

$(112)_{10} = (1110000)_2$

(II)

2	225
2	112 — 1
2	56 — 0
2	28 — 0
2	14 — 0
2	7 — 0
2	3 — 1
	1 — 1

$(225)_{10} = (11100001)_2$

Q-26 Express each decimal number as an 8-bits number in the 2's complement system.

(i) + 15 (ii) – 56 (iii) + 103 (iv) – 145 (v) + 160

(i) +15

1111 = +15

00001111 = +15 in 8-bit representation

Note: Given number is positive, therefore its 2's complement is remains same.

00001111 = 2's complement

(ii) – 56

111000 = +56

00111000 = +56 in 8-bit representation

11000111 = 1's complement

+1 = add 1 in 1's complement

11001000 = 2's complement

(iii) + 103

1100111 = + 103

01100111 = + 103 in 8-bit representation

Note: Given number is positive, therefore its 2's complement is remains same.

01100111 = 2's complement

(iv) – 145

10010001 = +145

10010001 = +145 in 8-bit representation

01101110 = 1's complement

+1 = add 1 in 1's complement

01101111 = 2's complement

(v) +160

10100000 = +160

10100000 = +160 in 8-bit representation

Note: Given number is positive, therefore its 2's complement is remains same.

10100000 = 2's complement

Rough Work

(i)

2	15
2	7 — 1
2	3 — 1
	1 — 1

$(15)_{10} = (1111)_2$

(ii)

2	56
2	28 — 0
2	14 — 0
2	7 — 0
2	3 — 1
	1 — 1

$(56)_{10} = (111000)_2$

(iii)

2	103
2	51 — 1
2	25 — 1
2	12 — 1
2	6 — 0
2	3 — 0
	1 — 1

$(103)_{10} = (1100111)_2$

(iv)

2	145
2	72 — 1
2	36 — 0
2	18 — 0
2	9 — 0
2	4 — 1
2	2 — 0
	1 — 0

$(145)_{10} = (10010001)_2$

(v)

2	160
2	80 — 0
2	40 — 0
2	20 — 0
2	10 — 0
2	5 — 0
2	2 — 1
	1 — 0

$(160)_{10} = (1010000)_2$

Q-27 Add the following Binary numbers.

(i) 101 + 011 (ii) 1001 + 1010 (iii) 101011 + 110011

(iv) 111100 + 10110 (v) 10001111 + 110010

(i) 101 + 001

$$\begin{array}{r} 101 \\ +\ 011 \\ \hline 1000 \end{array}$$

(ii) 1001 + 1010

$$\begin{array}{r} 1001 \\ +\ 1010 \\ \hline 10011 \end{array}$$

(iii) 101011 + 110011

$$\begin{array}{r} 101011 \\ +\ 110011 \\ \hline 1011110 \end{array}$$

(iv) 101 + 001

$$\begin{array}{r} 111100 \\ +\ 10110 \\ \hline 1010010 \end{array}$$

(v) 10001111 + 110010

$$\begin{array}{r} 10001111 \\ +\ 110010 \\ \hline 11000001 \end{array}$$

Q-28 Perform the subtraction on the following numbers.

(i) 111 – 100 (ii) 1101 – 1011 (iii) 111001 – 10111

(iv) 101100 – 11110 (v) 1001101 – 110110

(i) 111 – 100

$$\begin{array}{r} 111 \\ -\ 100 \\ \hline 011 \end{array}$$

(ii) 1101 – 1011

$$\begin{array}{r} 1101 \\ -\ 1011 \\ \hline 0010 \end{array}$$

(iii) 111001 – 10111

$$\begin{array}{r} 111001 \\ -\ 10111 \\ \hline 100010 \end{array}$$

(iv) 101100 – 11110

$$\begin{array}{r} 101100 \\ -\ 11110 \\ \hline 001110 \end{array}$$

(v) 1001101 – 110110

$$\begin{array}{r} 1001101 \\ -\ 110110 \\ \hline 010111 \end{array}$$

Q-29 Multiply the following Binary numbers.

(i) 1110×10 (ii) 1001×101 (iii) 1010011×1001

(iv) 111001×111 (v) 1011010×100

(i) 1110×10

$$\begin{array}{r} 1110 \\ \times\ 10 \\ \hline 0000 \\ +\ 1110\times \\ \hline 11100 \end{array}$$

(ii) 1001×101

$$\begin{array}{r} 1001 \\ \times\ 101 \\ \hline 1001 \\ 0000\times \\ +\ 1001\times\times \\ \hline 101101 \end{array}$$

(iii) 1010011×1001

$$\begin{array}{r} 1010011 \\ \times\ 1001 \\ \hline 1010011 \\ 0000000\times \\ 0000000\times\times \\ +\ 1010011\times\times\times \\ \hline 1011101011 \end{array}$$

(iv) 1110001×111

$$\begin{array}{r} 1110001 \\ \times\ 111 \\ \hline 1110001 \\ 1110001x \\ +\ 1110001xx \\ \hline 1100011111 \end{array}$$

(v) 11011010×100

$$\begin{array}{r} 11011010 \\ \times\ 100 \\ \hline 00000000 \\ 00000000x \\ +\ 11011010xx \\ \hline 1101101000 \end{array}$$

Q-30 Divde the Binary numbers ad indicated.

(i) 1100 ÷ 10 (ii) 1001 ÷ 11 (iii) 110011 ÷ 100

(iv) 110010 ÷ 101 (v) 1011110 ÷ 1001

(i) 1100 ÷ 10

$$\begin{array}{r|l} & 110 \\ \hline 10 & 1100 \\ & 10 \\ \hline & 10 \\ & 10 \\ \hline & x0 \end{array}$$

$(110)_2$

(ii) 1001 ÷ 11

$$\begin{array}{r|l} & 11 \\ \hline 11 & 1001 \\ & 11 \\ \hline & 11 \\ & 11 \\ \hline & x \end{array}$$

$(11)_2$

(iii) 110011 ÷ 100

$$\begin{array}{r|l} & 1100.11 \\ \hline 100 & 110011 \\ & 100 \\ \hline & 100 \\ & 100 \\ \hline & 0110 \\ & 100 \\ \hline & 100 \\ & 100 \\ \hline & xx \end{array}$$

$(1100.11)_2$

(iv) 110010 ÷ 101

$$\begin{array}{r|l} & 1010 \\ \hline 101 & 110010 \\ & 101 \\ \hline & 101 \\ & 101 \\ \hline & xx0 \end{array}$$

$(1010)_2$

(v) 1011110 ÷ 1001

$$\begin{array}{r|l} & 1010.1 \\ \hline 1001 & 1011110 \\ & 1001 \\ \hline & 1011 \\ & 1001 \\ \hline & 10000 \\ & 10001 \\ \hline & 111 \end{array}$$

$(1010.1)_2$

Q31. Convert each of the decimal numbers to 8421 BCD.

(i) 15 (ii) 25 (iii) 38 (iv) 74 (v) 197

(i) 15

$\frac{1}{0001}$ $\frac{5}{0101}$

$(11011)_2 = (15)_{BCD}$

(ii) 25

$\frac{2}{0010}$ $\frac{5}{0101}$

$(15)_{10} = (00100101)_{BCD}$

(iii) 38

$\frac{3}{0011}$ $\frac{8}{1000}$

$(38)_{10} = (00111000)_{BCD}$

(iv) 74

$\frac{7}{0111}$ $\frac{4}{0100}$

$(74)_{10} = (01110100)_{BCD}$

(v) 197

$\frac{1}{0001}$ $\frac{9}{1001}$ $\frac{7}{0111}$

$(197)_{10} = (000110010111)_{BCD}$

Q32. Convert each of the BCD numbers to decimal.

(i) 100000 (ii) 00100011001 (iii) 101011110000

(iv) 100011110010101 (v) 00101110101111

(i) 10000

$\frac{0010}{2}$ $\frac{0000}{0}$

$(100000)_{BCD} = (20)_{10}$

(ii) 00100011001

$\frac{0001}{1}$ $\frac{0001}{1}$ $\frac{1001}{9}$

$(00100011001)_{BCD} = (119)_{10}$

(iii) 101011110000

$\frac{1010}{10}$ $\frac{1111}{15}$ $\frac{0000}{0}$

$(101011110000)_{BCD}$

Invalid BCD

Because the largest BCD is equivalent 9 in decimal

(iv) 100011110010101

$\frac{0100}{4}$ $\frac{0111}{7}$ $\frac{1001}{9}$ $\frac{0101}{5}$

$(100011110010101)_{BCD} = (119)_{10}$

(v) 00101110101111

$\frac{0000}{0}$ $\frac{1011}{11}$ $\frac{1010}{10}$ $\frac{1111}{15}$

$(00101110101111)_{BCD}$

Invalid BCD

Because the largest BCD is equivalent 9 in decimal

Q. 33 Fill in the blanks.

i) The data, which consists of alphabets as well as numbers, is known as Alphanumeric.

ii) The number, which is in the exponential form, is called Floating Point.

iii) The information is a meaningful, useful and processed form of data.

iv) Eight (8) is a base of octal system.

v) The maximum digit of hexadecimal number system is 16.

vi) ASCII stands for American Standard Code for Information Interchange.

vii) A floating-point number consists of two parts known as Mantissaand Exponent.

viii) The method of 2's complement arithmetic is commonly used in computers to handle negative numbers.

ix) In BCD code each decimal digit is represented by a binary code of four bits.

x) Computers can recognize a total of 356 different characters.

Q. 34 Tick the correct answer.

i) The data, which consist of whole numbers, is known as:
(a) real (b) **integer✓** (c) fixed-point (d) string

ii) The number, which has a decimal point, is:
(a) Integer (b) character (c) **fixed-point✓** (d) string

iii) The number, which is in the exponential form, is:
(a) Real (b) fixed-point (c) **floating point✓** (d) integer

iv) The data which can be a picture, drawing, map is:
(a) Alphabetic (b) alphanumeric (c) **graphical✓** (d) string

v) The processed form of data is known as:
(a) String (b) **information✓** (c) graphics (d) binary

vi) How many types of number systems are used in computers?
(a) 2 (b) 3 (c) **4✓** (d) 5

vii) Which number system is ideal for the internal working of electronic computers?
(a) **Binary✓** (b) decimal (c) octal (d) Hexadecimal

viii) The base of hexadecimal number system is:
(a) 10 (b) 8 (c) **16✓** (d) 2

ix) The equivalent of decimal number 10 in binary is:
(a) 1100 (b) **1010✓** (c) 1011 (d) 10

x) The complement of 100110 is:
(a) 110011 (b) 100010 (c) 011100 (d) **011001✓**

MCQ's

1. The Data which consists of alphabets as well as numbers is known as
   a. Numeric data b. **Alphanumeric data✓**
   c. Alphabetic data d. None of the above
2. The Data which consists of whole numbers is known as
   a. Fixed point b. Floating point c. Real d. **Integer✓**
3. The numbers in the exponential form is called
   a. **Floating point✓** b. Mid-point
   c. Fixed point d. None of the above
4. Meaningful, useful and processed form of data is
   a. Alphanumeric b. Numeric
   c. Alphabetic d. **None of the above✓**
5. The method of 2's complement arithmetic is commonly used in computer to handle
   a. Positive number b. **Negative number✓**
   c. Equal number d. Binary number
6. An eight bits sequence is called
   a. Word b. Cell c. Nibble d. **Byte✓**
7. The number which has no decimal point is
   a. **Integer✓** b. Character c. Real Fixed d. String
8. Unprocessed facts, including text, numbers, alphabets, images and sounds is a/an
   a. Information b. **Data✓** c. Document d. Software
9. The term gigabyte refers to
   a. 1024 bytes b. 1024 kilobytes
   c. **1024 megabytes✓** d. 1024 gigabyte

10. A byte consists of
a. One bit b. Four bits c. **Eight bits✓** d. Sixteen bits

11. The data, which consists of whole numbers, is known as:
a. Real b. **integer✓** c. fixed-point d. string

12. The number, which has a decimal point, is:
a. Integer b. character c. **fixed-point✓** d. string

13. The number, which is in the exponential form, is:
a. Real b. Fixed-point c. **Floating point✓** d. Integer

14. The data which can be a picture, drawing, map is:
a. Alphabetic b. alphanumeric
c. **graphical✓** d. string

15. The processed form of data is known as:
a. String b. **information✓**
c. Graphics d. binary

16. How many types of number systems are used in computers?
a. 2 b. 3 c. **4✓** d. 5

17. Which number system is ideal for the internal working of electronic computers?
a. **Binary✓** b. decimal c. octal d. hexadecimal

18. The base of hexadecimal number system is:
a. 10 b. 8 c. **16✓** d. 2

19. The equivalent of decimal number 10 in binary is:
a. 1100 b. **1010✓** c. 1011 d. 10

20. The complement of 100110 is:
a. 110011 b. 100010 c. 011100 d. **011001✓**

21. Add 11111 + 10001 + 1011
a. 111110 b. 110110 c. **111011✓** d. 1010011

22. Add 11111 + 11001 + 11011
a. 111110 b. 110110 c. 111011 d. **1010011✓**

23. Add 11111 + 111 + 1111+11
a. **111000✓** b. 1100 c. 100100 d. 1111

24. Add 111 +101
a. 111000 b. **1100✓** c. 100100 d. 1111

25. Multiply 1111 by 11
a. **101101✓** b. 1111 c. 1001001001 d. 1111101

26. Multiply 101 by 11
a. 101101 b. **1111✓** c. 1001001001 d. 1111101

27. Multiply 101101 by 1101
a. 101101 b. 1111 c. **1001001001✓** d. 1111101

28. Multiply 11001 by 101
a. 101101 b. 1111 c. 1001001001 d. **1111101✓**

29. Convert the following decimal number into binary 45
a. **$(101101)_2$✓** b. $(1111110)_2$ c. $(110101001)_2$ d. $(1001110100)_2$

30. Convert the following decimal number into binary 126
a. $(101101)_2$ b. **$(1111110)_2$✓** c. $(110101001)_2$ d. $(1001110100)_2$

31. Convert the following decimal number into binary 425
a. $(101101)_2$ b. $(1111110)_2$ c. **$(110101001)_2$✓** d. $(1001110100)_2$

32. Convert the following decimal number into binary 628
a. $(101101)_2$ b. $(1111110)_2$ c. $(110101001)_2$ d. **$(1001110100)_2$✓**

33. Convert the following Binary number into decimal 101
a. **5✓** b. 74 c. 28 d. 35

34. Convert the following Binary number into decimal. 11100
a. 5 b. 74 c. **28✓** d. 35

35. Convert the following Binary number into decimal. 100011
a. 5 b. 74 c. 28 d. **35✓**

36. A 32 bit microprocessor has the word length equal to
a. 2 byte b. 32 byte c. **4 byte✓** d. 8 byte

37. Which number system is commonly used as a shortcut notation for groups of four binary digits?
a. Binary b. Decimal c. Octal d. **Hexadecimal✓**

38. Properly arranged data is called
a. Field b. Words c. **Information✓** d. File

39. The octal equivalence of 111010 is
a. 81 b. **72✓** c. 71 d. None of above

40. Which statement is valid?
a. **1KB = 1024 bytes✓** b. 1 MB=2048 bytes
c. 1 MB = 1000 kilobytes d. 1 KB = 1000 bytes

41. DBMS stand for
a. database marketing system b. database management studies
c. **database management system✓** d. database marketing strategies

42. Convert the following Binary number into decimal. 1001010
a. 5 b. **74✓** c. 28 d. 35

43. If in a computer, 16 bits are used to specify address in a RAM, the number of addresses will be
a. 216 b. **65,536✓** c. 64K d. Any of the above

BOOLEAN ALGEBRA

Q.1. Define Boolean algebra.

BOOLEAN ALGEBRA

Boolean algebra is a convenient and systematic way of expressing and analyzing the operation of logic circuits. In 1850s, an English mathematician George Boole developed a mathematical system for formulating logical statements with symbols, so that problems can be written and solved in a manner similar to ordinary algebra.

Characteristics

1. Boolean algebra provides the operations and the rules for working with the binary digits 0s and 1s.
2. Boolean algebra has been fundamental in the development of computer science and digital logic. It is also used in set theory and statistics.
3. Electronic and optical switches can be studied using set of {0,1} and use the rules of Boolean algebra.

Q.2. State the terms used in Boolean algebra.

BOOLEAN ALGEBRAIC TERMS

To understand Boolean algebra following terms must be known.

➢ **Boolean Constant**

Boolean algebra uses binary values 0s and 1s as constants.

➢ **Variables**

Boolean algebra uses English alphabets **A, B, C, X, Y, Z** etc. as variables, and each variable having with one of two and only two distinct possible values 0 and 1.

➢ **Complement**

The complement of a variable is the inverse of the variable and is indicated with a bar (¯) or prime (') over the variable. For example, complement of A is $\overline{A}$.

➢ **Truth table**

Truth table can be defined as a table representing the condition of input and output circuit involving two or more variables.

➢ **Logical Operators**

The basic logical operators in Boolean algebra are used for logical addition, logical multiplication and negation.

Boolean algebra uses three basic logical operators namely:

1. OR 2. AND 3. NOT.

1. OR

- OR operations are represented by ' + ' signs.

- It is used for logical addition or Boolean sums.
- It may be noted that as there are two variables A and B so only 4 or 2^2 combinations of inputs are possible as shown in the truth table.

INPUTS		OUTPUT
A	B	A+B
0	0	0
0	1	1
1	0	1
1	1	1

2. AND

- AND operations are represented by dot (.) or the absence of an operator.
- It is used for logical multiplication.
- The logical AND operator is shown in the following Truth table.

INPUTS		OUTPUT
A	B	A.B
0	0	0
0	1	0
1	0	0
1	1	1

3. NOT

- NOT operator is represented by a bar ($\bar{}$) or prime (') over the variable.
- It is used for complement or negation operation.

INPUTS	OUTPUT
A	$\bar{A}$
0	1
1	0

➢ Boolean Expression

A Boolean expression is an arrangement of variables and logical operators used to express the operation of a logic circuit. For example:

X+Y=Z, X+XY, (X+Y) (X+Z) = X + YZ

➢ Boolean Function

A Boolean function is an expression formed with variables, logical operators, parentheses and equal sign, like A = B.(C+D).

Q.3. What are the Laws of Boolean algebra?

LAWS OF BOOLEAN ALGEBRA

There are certain well-defined rules and laws that must be followed in order to properly apply Boolean algebra. Three basic laws of Boolean algebra are as follows:

1. Commutative laws
2. Associative laws
3. Distributive laws

1. Commutative Laws

The "**Commutative Laws**" just mean that you can **swap numbers** over and still get the same answer when you **add**, or when you **multiply**.

$$A + B = B + A$$
$$A \times B = B \times A$$

Examples:

You can swap when you add:	**3 + 6 = 6 + 3**
You can swap when you multiply:	**2 × 4 = 4 × 2**

2. Associative Laws

The "Associative Laws" mean that it doesn't matter how you group the numbers (i.e. which you calculate first) when you **add**, or when you **multiply**.

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

Examples:

This:	**(2 + 4) + 5 = 6 + 5 = 11**
Has the same answer as this:	**2 + (4 + 5) = 2 + 9 = 11**
This:	**(3 × 4) × 5 = 12 × 5 = 60**
Has the same answer as this:	**3 × (4 × 5) = 3 × 20 = 60**

3. Distributive Law

The "**Distributive Law**" is the BEST one of all, but needs careful attention. It means you get the same answer when you:

- **add** up some numbers then do a **multiply**, or
- do each **multiply** separately then **add** them

Like this: $(A + B) \times C = A \times C + B \times C$

Examples:

This:	**(2 + 4) × 5 = 6 × 5 = 30**
Has the same answer as this:	**2×5 + 4×5 = 10 +20 = 30**

Q.4. Define different Rules of Boolean algebra.

RULES OF BOOLEAN ALGEBRA

Rules of Boolean algebra are useful in manipulating and simplifying expression.

➢ **Rule 1: A+0 = A**

A variable ORed with 0 is always equal to the variable.

Prove:

For A = 0

L.HS. = 0 + 0
= 0
= **A (R.H.S)**

For A = 1

L.H.S = 1 + 0
= 1
= **A (R.H.S)**

➢ **Rule 2: A+1 = 1**

A variable ORed with 1 is always equal to 1.

Prove:

For A = 0

L.H.S = 0 + 1
= 1
= **R.H.S**

For A = 1

L.H.S = 1 + 1
= 1 = **R.H.S**

➢ **Rule 3: A.0 = 0**

A variable ANDed with 0 is always equal to 0.

Prove:

For A = 0

L.H.S = 0 . 0
= 0
= R.H.S

For A = 1

L.H.S = 1 . 0
= 0
= R.H.S

➢ **Rule 4: A.1 = A**

A variable ANDed with 1 is always equal to the variable.

Prove:

For A = 0

L.H.S = 0 . 1
= 0
= A (R.H.S)

For A = 1

L.H.S = 1 . 1
= 1
= A (R.H.S)

➢ **Rule 5: A+A = A**

A variable ORed with itself is always equal to the variable.

Prove:

For A = 0

L.H.S = 0 + 0
= 0
= A (R.H.S)

For A = 1

L.H.S = 1 + 1
= 1
= A (R.H.S)

➢ **Rule 6: A.A = A**

A variable ANDed with itself is always equal to the variable.

Prove:

For A = 0

L.H.S = 0 . 0
= 0
= A (R.H.S)

For A = 1

L.H.S = 1 . 1
= 1
= A (R.H.S)

➢ **Rule 7: $A + \bar{A} = 1$**

A variable ORed with its complement is always equal to 1.

Prove:

For A = 0

L.H.S = 0 + 1
= 1
= R.H.S

For A = 1

L.H.S = 1 + 0
= 1
= R.H.S

➢ **Rule 8: $A . \bar{A} = 0$**

A variable ANDed with its complement is always equal to 0.

Prove:

For A = 0

L.H.S = 0 . 1
= 0
= R.H.S

For A = 1

L.H.S = 1 . 0
= 0
= R.H.S

➢ **Rule 9: $\bar{\bar{A}} = A$**

Prove:

For A = 0

L.H.S $\bar{A} = 1$, $\bar{\bar{A}} = 0$
= A
= R.H.S

For A = 1

L.H.S $\bar{A} = 0$, $\bar{\bar{A}} = 1$
= A
= (R.H.S)

The Prove is also shown by given truth table

INPUTS	OUTPUTS	
A	$\bar{A}$	$\bar{\bar{A}}$
0	1	0
1	0	1

Equal

- **Rule 10: A+A.B = A**

Prove:

A+A.B = A(1+B) Factoring A (Distributive law)

L.H.S = A.1 Rule 2: B+1= 1

= A (R.H.S Rule 4: A.1 = A

The prove is also shown by given truth table

A	B	A.B	A+A.B
0	0	0	0
0	1	0	0
1	0	0	1
1	1	1	1

Equal

- **Rule 11: A + $\bar{A}$.B = A+B**

Prove:

= A+$\bar{A}$.B

= (A + A.B) + $\bar{A}$.B Rule 10: A = A+A.B

= (A.A + A.B)+ $\bar{A}$.B Rule 6: A.A = A

= A.A + A.B + A.$\bar{A}$ + A.B Rule 8: Adding A. $\bar{A}$ = 0

= (A + $\bar{A}$)(A + B) Factoring

= 1.(A + B) Rule 7: A + $\bar{A}$ = 1

= A + B Rule 4: A.1 = A

The prove is shown by given truth table

A		B	$\bar{A}$.B	A + $\bar{A}$.B	A+B
0	1	0	0	0	0
0	1	1	1	1	1
1	0	0	0	1	1
1	0	1	0	1	1

Equal

➢ **Rule 12: (A+B)(A+C) = A+BC**

Prove:

=	(A+B)(A+C)	
=	AA + AC +AB + BC	Distributive law
=	A + AC +AB + BC.	Rule 6: A.A = A
=	A(1+C) + AB + BC	Factoring (Distributive law)
=	A.1+ AB + BC	Rule 2: 1+C = 1
=	A(1+B) + BC	Factoring (Distributive law)
=	A.1+ BC	Rule 2: 1+B = 1
=	A+BC	Rule 4: A.1 = A

- The prove is shown by given truth table

A	B	C	A+B	A+C	BC	(A+B)(A+C)	A+BC
0	0	0	0	0	0	0	0
0	0	1	0	1	0	0	0
0	1	0	1	0	0	0	0
0	1	1	1	1	1	1	1
1	0	0	1	1	0	1	1
1	0	1	1	1	0	1	1
1	1	0	1	1	0	1	1
1	1	1	1	1	1	1	1

Equal

Q.5. State and prove De-Morgan's theorems.

DEMORGAN'S THEOREMS

DeMorgan's, a mathematician, who knew Boole, proposed two theorems that are important part of Boolean algebra. They help in simplifying complicated logical expression.

1. $\overline{A \cdot B} = \overline{A} + \overline{B}$
2. $\overline{A + B} = \overline{A} \cdot \overline{B}$

1. $\overline{A \cdot B} = \overline{A} + \overline{B}$

- The complement of product of variables is always equal to the sum of the complements of the variables.

Prove:

Theorems can be proved by the truth table:

A	B	A . B	$\overline{A \cdot B}$	$\overline{A}$	$\overline{B}$	$\overline{A} + \overline{B}$
0	0	0	1	1	1	1
0	1	0	1	1	0	1
1	0	0	1	0	1	1
1	1	1	0	0	0	0

Equal

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

The complement of a sum of variables is always equal to the product of the complements of the variables.

Prove:

Theorems can be proved by the truth table:

A	B	A+B	$\overline{A+B}$	$\bar{A}$	$\bar{B}$	$\bar{A} \cdot \bar{B}$
0	0	0	1	1	1	1
0	1	1	0	1	0	0
1	0	1	0	0	1	0
1	1	1	0	0	0	0

Equal

Q.6. How can you simplify an expression using Boolean algebraic techniques?

SIMPLIFICATION USING BOOLEAN ALGEBRA

A simplified Boolean expression uses the few rules, laws and theorems to implement a given expression.

Example

Using Boolean algebra techniques, simplify the following expression:

AB + A (B + C) + B (B + C)

Solution

Step 1: Apply the distributive law to the second and third terms in the Expression, as follows:

AB + AB + AC + BB + BC

Step 2: Apply rule 6 (BB = B) to the fourth term.

AB + AB + AC + B + BC

Step 3: Apply rule 5 (AB + AB = AB) to the first two terms.

AB + AC + B + BC

Step 4: Apply rule 10 (B + BC = B) to the last two terms.

AB + AC + B

Step 5: Apply rule 10 (AB + B = B) to the first and third terms.

B+AC

At this point the expression is simplified as much as possible.

Q.7. What are the standard forms of Boolean expression?

STANDARD FORM OF BOOLEAN EXPRESSIONS

All Boolean expressions regardless of their form can be converted into either of two standard forms:

1. The sum of products (SOP)
2. The products of sum (POS)

1. Sum of Product (SOP)

When two or more product terms are summed by Boolean addition, the resulting expression is Sum of Product (SOP).

Examples: $XY + XYZ + Y$

$ABC + ACD + BCD$

$AB + ABC + AC$

An algebraic expression can be changed into SOP form by applying Boolean algebraic techniques. For example, the expression **A(B + C + BC)** can be converted in SOP form with the help of distributive law.

Examples: $A(B + C + BC)$

Solution: $= AB + AC + ABC$

2. Product of Sum (POS)

When two or more sum term is multiplied by Boolean multiplication, the resulting expression is a Product of Sum (POS).

Examples: $(A+B)(A+C)$

$(PQ+R)(P+Q+R)(P+QR)$

$(A+\bar{A}B)(A+B)$

Q.8. What is Karnaugh Map? How can Karnaugh Map help in simplifying a Boolean expression?

KARNAUGH MAP (K-MAP)

Definition

A Karnaugh Map is a pictorial method used to minimize Boolean expressions without having to use Boolean algebra theorems and equation manipulations. It also called K-Map.

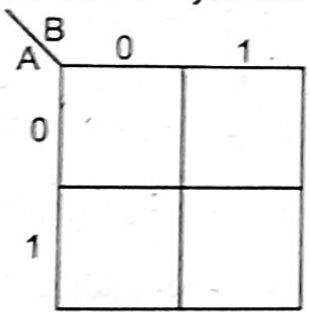
Characteristics

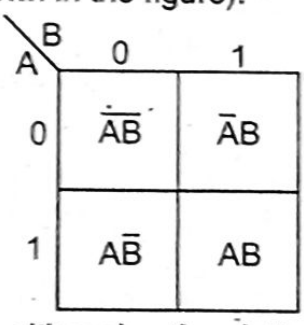
- A K-Map can be thought of as a special version of a truth table.
- Using a K-Map, expressions with two to four variables are easily minimized. Expressions with five to six variables are more difficult but achievable.
- Karnaugh map is an array of cells in which each cell represents a binary value of input variable.

Q.9. What is a 2-variables K-Map?

The 2-Variable K-Map

- The 2-Variable is an array of four cells (Shown in the figure).



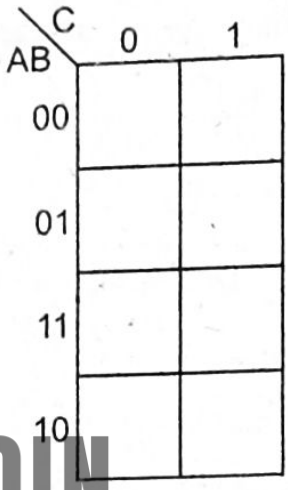


- In this case A and B variables are used, although other letters could be used as variable.
- Binary value of variable A is along the left side of Map and the value of variable B is across the top of Map.

Q.10. What is a 3-variables K-Map?

The 3-Variable K-Map

- The 3-Variable is an array of eight cells (Shown in the figure).



AB \ C	0	1
00	$\bar{A}\bar{B}\bar{C}$	$\bar{A}\bar{B}C$
01	$\bar{A}B\bar{C}$	$\bar{A}BC$
11	$AB\bar{C}$	ABC
10	$A\bar{B}\bar{C}$	$A\bar{B}C$

- In this case A, B and C variables are used, although other letters could be used as variable.
- Binary value of variable A, B is along the left side of Map and the value of variable C is across the top of Map.

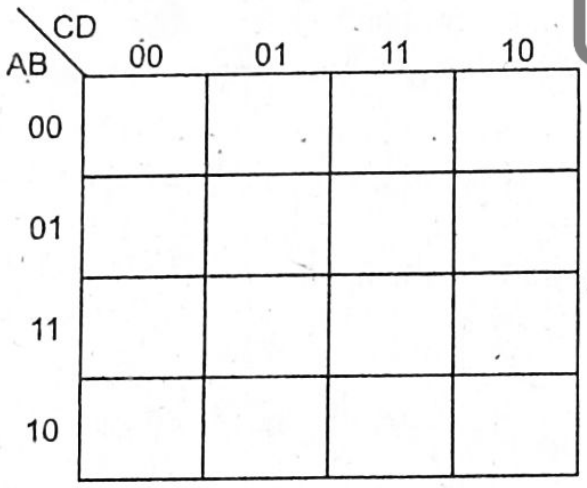
  The value of given cell is binary values of A and B at the left in the same row combined with the value of C at the top in the same column.

  For example, the cell in the upper left corner has a binary value of 000 and the cell in the lower right corner has binary value 101.

Q.11. What is a 4-variables K-Map?

The 4-Variable K-Map

- The 4-Variable is an array of sixteen cells (Shown in the figure).



AB \ CD	00	01	11	10
00	$\bar{A}\bar{B}\bar{C}\bar{D}$	$\bar{A}\bar{B}\bar{C}D$	$\bar{A}\bar{B}CD$	$\bar{A}\bar{B}C\bar{D}$
01	$\bar{A}B\bar{C}\bar{D}$	$\bar{A}B\bar{C}D$	$\bar{A}BCD$	$\bar{A}BC\bar{D}$
11	$AB\bar{C}\bar{D}$	$AB\bar{C}D$	$ABCD$	$ABC\bar{D}$
10	$A\bar{B}\bar{C}\bar{D}$	$A\bar{B}\bar{C}D$	$A\bar{B}CD$	$A\bar{B}C\bar{D}$

- In this case A, B, C and D variables are used, although other letters could be used as variable.
- Binary value of variable A, B is along the left side of Map and the value of variable C and D is across the top of Map.

  The value of given cell is binary values of A and B at the left in the same row combined with the value of C and D at the top in the same column.

  For example, the cell in the upper left corner has a binary value of 0000 and the cell in the lower right corner has binary value 1010.

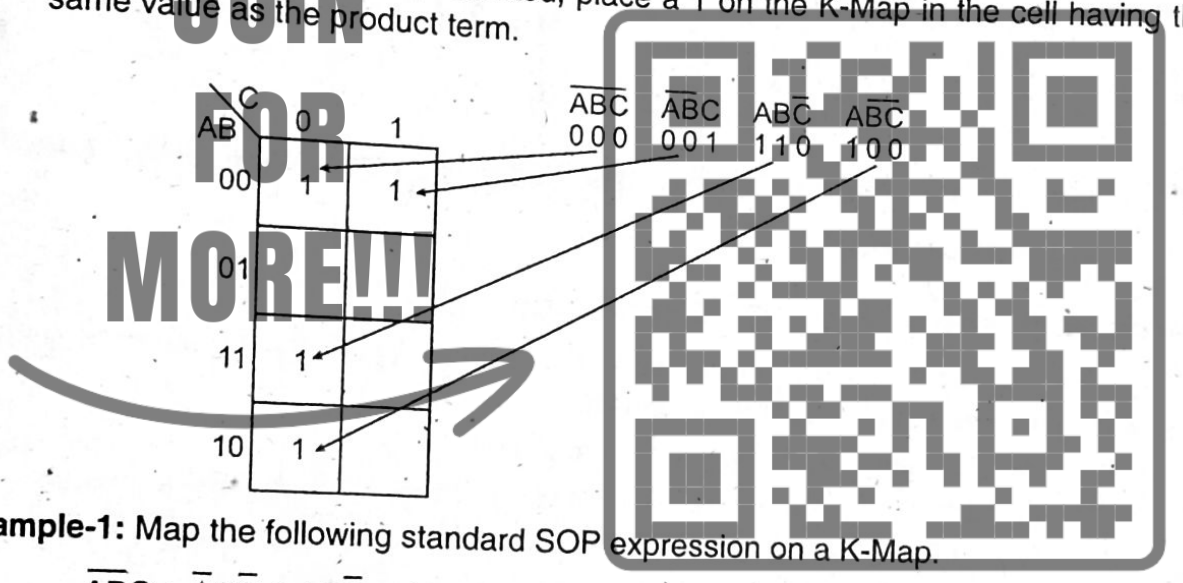
Q.12. How can you Map a Standard SOP expression?

Mapping a Standard SOP Expression

- For an SOP expression in standard form, a 1 is placed on the K-Map for each product term in the expression.
- Each 1 is placed in a cell corresponding to the value of a product term. For example, for the product term ABC, a 1 goes in the cell 111 ell on a 3-variable K-Map.
- When an SOP expression is completely mapped, there will be a number of 1s on the K-Map equal to the number of product terms in the standard SOP expression.
- The cells that do not have a 1 are the cells for which the expression is 0.
- Usually, when working with SOP expression, the 0s are left of the map.
- The following steps and the illustration in figure show the mapping process.

Step-1: Determining the binary value of each product term in the standard SOP expression.

Step-2: As each product term is evaluated, place a 1 on the K-Map in the cell having the same value as the product term.



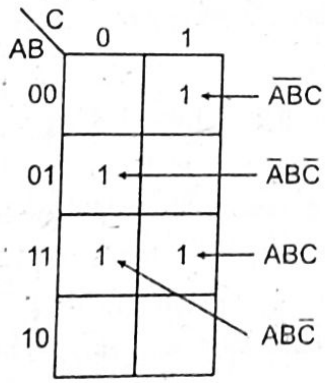
Example-1: Map the following standard SOP expression on a K-Map.

$\overline{A}\overline{B}C + \overline{A}B\overline{C} + AB\overline{C} + ABC$

Solution: The expression is evaluated as shown below. A "1" is placed on the three variables K-Map for each standard product term in the expression.

$\overline{A}\overline{B}C + \overline{A}B\overline{C} + AB\overline{C} + ABC$

001 010 110 111

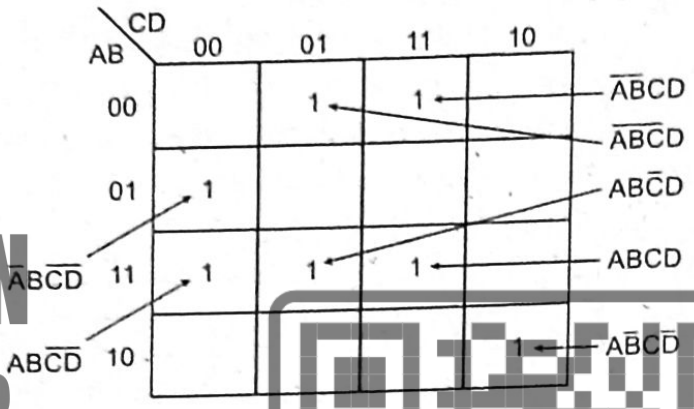


Example-2: Map the following standard SOP expression on a K-Map.

$$A\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}D + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}CD + A\bar{B}C\bar{D} + ABCD$$

Solution:

$$A\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}\bar{D} + A\bar{B}C\bar{D} + \bar{A}\bar{B}C\bar{D} + \bar{A}\bar{B}CD + A\bar{B}C\bar{D} + ABCD$$
$$1100 \quad 0100 \quad 1101 \quad 0001 \quad 0011 \quad 1010 \quad 1111$$



Q.13. How can you simplify the SOP expression with the help of Karnaugh Map?

K-Map simplification of SOP Expression

The process that results in an expression containing the fewest possible terms with the fewest possible variables is called minimization.

After an SOP expression has been mapped.

There are three steps in the process of obtaining a minimum SOP expression:

1. Grouping the 1s.
2. Determining the minimum SOP expression from Map.
3. Summing the resulting product term.

1. Grouping the 1s

You can group 1s on the K-Map according to the following rules by enclosing those adjacent cells containing 1s.

The goal is to maximize the size of the groups and to minimize the number of groups.

Rules of grouping the 1s

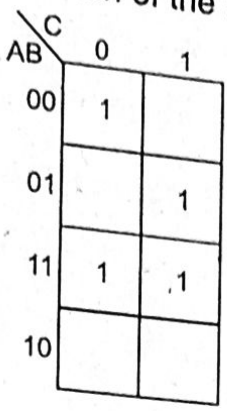
i. A group must contain either 1,2,4,8 or 16 cells.

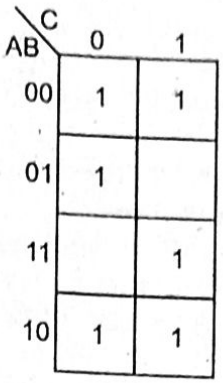
ii. Each cell in a group must be adjacent to one or more cells in that same group, but all cells in the group do not have to be adjacent to each other.

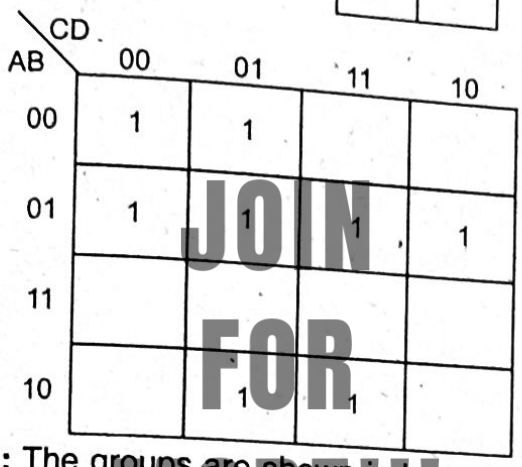
iii. Always include the largest possible number of 1s in a group.

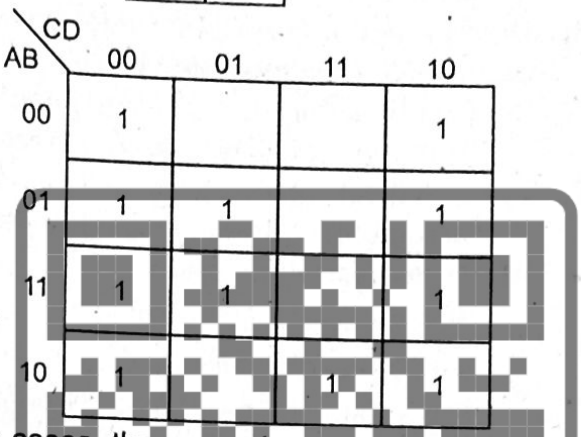
iv. Each 1 on the map must be included in at least one group. The 1s already in a group can be included to another group as long as the overlapping groups include non-common 1s.

Example: Groups the 1s in each of the K-Map.

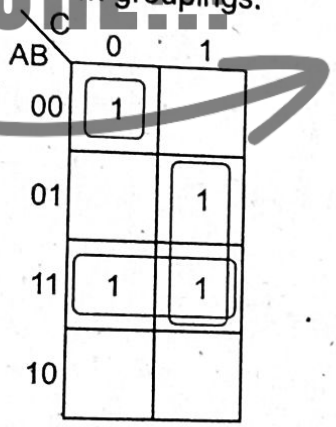


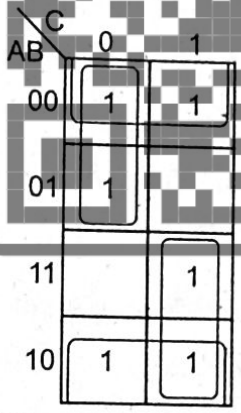


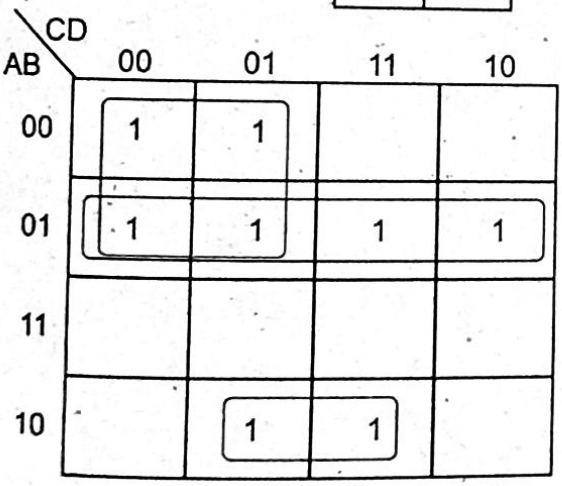


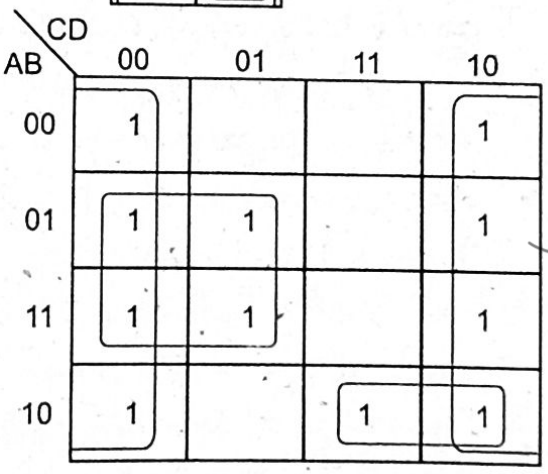


Solution: The groups are shown in here. In some cases, there may be more than one way to group the 1s to form maximum groupings.









2. DETERMINING THE MINIMUM SOP EXPRESSION FROM MAP

When all the 1's representing the standard product terms in an expression are properly mapped and grouped, the process of determining the resulting minimum SOP expression begins. The following rules are applied to find the minimum product terms and the minimum SOP expression.

Rules to find minimum Product terms and SOP expression:

i. Group the cells that have 1s.

Each group of cells containing 1s create one product term composed of all variables that occur in only one form (either complemented or un-complemented within the group). Variables that occur both complemented and un-complemented within the group are eliminated.

ii. Determine the Product term for each Group.

a) For a 3-variables map:

- A group of 1 cell yields a 3-variables product term.
- A group of 2 cells yields a 2-variables product term.
- A group of 4 cells yields a 1-variable product term.
- A group of 8 cells yields a value of 1 for the expression.

b) For a 4-variables map:

- A group of 1 cell yields a 4-variables product term.
- A group of 2 cells yields a 3-variables product term.
- A group of 4 cells yields a 2-variables product term.
- A group of 8 cells yields a 1-variable product term.
- A group of 16 cells yields a value of 1 for the expression.

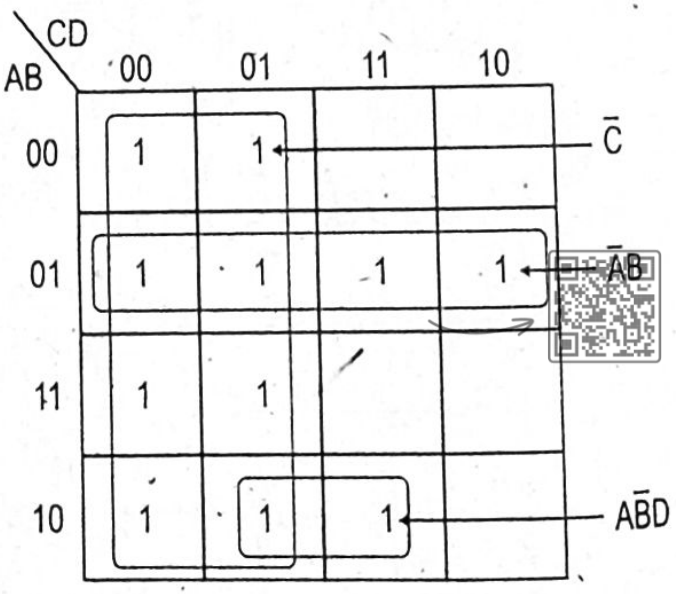
3. SUMMING THE RESULTING PRODUCT TERM.

When all the minimum product terms are derived from the K-Map, they are summed to form the minimum SOP expression.

Example1: Determine the Product term for the K-Map in the following figure and write the result in minimum SOP expression.

Solution: In this figure:

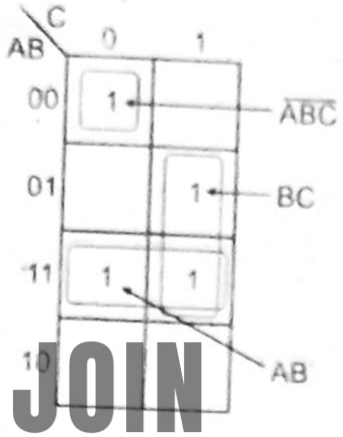
- The product term for the 8-cells group is $\bar{C}$ because the cells within that group contains both A and $\bar{A}$, B and $\bar{B}$, and D and $\bar{D}$, so these variables are eliminated. The common item is $\bar{C}$.
- The 4-cells group contains C, $\bar{C}$, D and $\bar{D}$, leaving the product term $\bar{A}B$.
- The 2-cells group contains C and $\bar{C}$, leaving $A\bar{B}D$ as the product term.
- The resulting minimum SOP expression is the sum of these product terms.



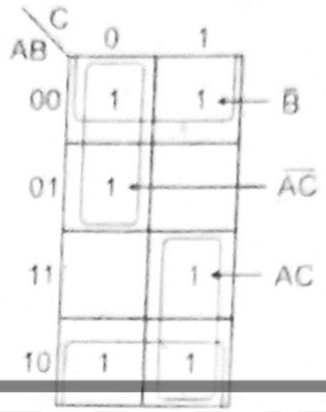
$\bar{C} + \bar{A}B + A\bar{B}D$

Example2: Determine the product term for each of the Karnaugh map in figure and write the resulting minimum SOP expression.

(a) $AB + BC + A\bar{B}\bar{C}$

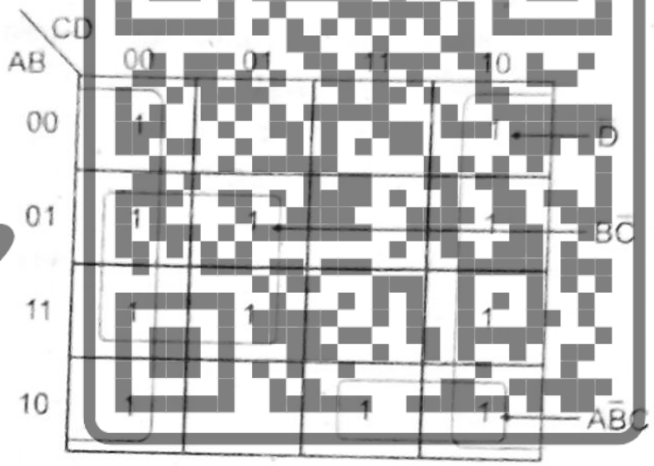


(b) $\bar{B} + \bar{A}\bar{C} + AC$



(c) $\bar{A}B + \bar{A}\bar{C} + A\bar{B}D$

(d) $\bar{D} + A\bar{B}C + B\bar{C}$



EXERCISE

Answer the following questions?

1. What is Boolean algebra?

Ans. See Q# 1

2. Define the following terms of Boolean algebra?
   (a) Constants (b) Variables (c) Truth table (d) Complement
   (e) Logical operators (f) Boolean expression

   See Q # 2

3. What are the laws of Boolean algebra?

Ans. See Q # 3

4. Define and prove the different rules of Boolean algebra used to simplify an expression?

Ans. See Q # 4

5. State and prove De-Morgan's theorems?

Ans. See Q # 5

6. What are the standard forms of Boolean expression?

Ans. See Q # 7

7. What is Karnaugh map? How can Karnaugh map help in simplifying a Boolean expression?

Ans. See Q # 8

8. Tick the correct answer?

i) The complement of a variable is always
(a) 0 (b) 1 (c) equal to the variable
(d) **The inverse of the variable**✓

ii) The Boolean expression $A + \bar{B} + C$ is:
(a) **a sum term**✓ (b) a literal term
(c) a product term (d) a complemented term

iii) The Boolean expression $\bar{A}\bar{B}CD$ is
(a) a sum term (b) **a product term**✓ (c) a literal term (d) always 1

iv) According to the commutative law of addition:
(a) $AB = BA$ (b) $A = A + A$ (c) $A + (B + C) = (A + B) + C$
(d) $\mathbf{A + B = B + A}$✓

v) According to the associative law of multiplication:
(a) $B = BB$ (b) $\mathbf{A(BC) = (AB)C}$✓ (c) $A + B = B + A$ (d) $B + B(B + 0)$

vi) According to the distributive law:
(a) $\mathbf{A(B + C) = AB + AC}$✓ (b) $A(BC) = ABC$
(c) $A(A + 1) = A$ (d) $A + AB = A$

vii) Which one of the following is not a valid rule of Boolean algebra?
(a) $A + 1 = 1$ (b) $\mathbf{A = A}$✓ (c) $AA = A$ (d) $A + 0 = A$

viii) A 3-variable Karnaugh map has:
(a) **Eight cells**✓ (b) three cells (c) sixteen cells (d) four cells

Q-9 Apply DeMorgan's theorems as much as possible using Boolean algebra techniques.

(i) $\overline{A + \bar{B}}$ (ii) $\overline{\bar{A}B}$ (iii) $\overline{A + B + C}$ (iv) $\overline{ABC}$
(v) $\overline{A + (B + C)}$ (vi) $\overline{AB + CD}$ (vii) $(A + \bar{B})(\bar{C} + D)$ (viii) $\overline{AB(CD + EF)}$

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

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

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

(iv) $\overline{ABC}$
$= \bar{A} + \bar{B} + \bar{C}$

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

(vi) $\overline{AB + CD}$
$= (\bar{A} + \bar{B}) \cdot (\bar{C} + \bar{D})$

(vii) $(A + \bar{B})(\bar{C} + D)$

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

$= A \cdot \bar{B} + C + D$

(viii) $\overline{AB\,(CD + EF)}$

$= (\bar{A} + \bar{B}) + (\bar{C} + \bar{D}) \cdot (\bar{E} + \bar{F})$

Q-10 Simplify the following expressions as much as possible using Boolean algebra technique

(i) $A(A + B)$ **(ii)** $A(\bar{A} + AB)$ **(iii)** $BC + \bar{B}C$

(iv) $A(A + AB)$ **(v)** $A\bar{B}C + \bar{A}BC + \overline{AB}C$ **(vi)** $\overline{AB} + ABC + A$

(i) $A(A + B)$

$= A.A + A.B$ Distributive law

$= A + A.B$ Rule 6: A.A=A

$= A(1+B)$ Taking common A

$= A.1$ Rule 2: 1 + B = 1

$= A$ Rule 4: A.1 = A

(ii) $A(\bar{A} + AB)$

$= A\bar{A} + AAB$ Distributive law

$= AAB$ Rule 8: $A\bar{A}=0$

$= AB$ Rule 6: A.A=A

(iii) $BC + \bar{B}C$

$= C(B + \bar{B})$ Taking common C

$= C.1$ Rule 7: $B + \bar{B} = 1$

$= C$ Rule 4: C.1 = C

(iv) $A(A + AB)$

$= AA + AAB$ Distributive law

$= A + AAB$ Rule 6: A.A=A

$= A + AB$ Rule 6: A.A=A

$= A(1+B)$ Taking common A

$= A1$ Rule 2: 1+B = 1

$= A$ Rule 4: A.1 = A

(v) $A\bar{B}C + \bar{A}BC + \bar{A}\bar{B}C$

$= A\bar{B}C + \bar{A}C(B + \bar{B})$ Taking common $\bar{A}C$

$= A\bar{B}C + \bar{A}C.1$ Rule 7: $B + \bar{B} = 1$

$= A\bar{B}C + \bar{A}C$ Rule 4: $\bar{A}C.1 = \bar{A}C$

$= C(A\bar{B} + \bar{A})$ Taking common C

(vi) $\overline{AB} + ABC + A$

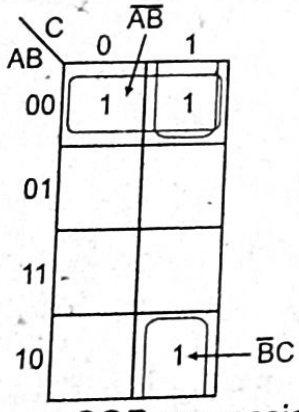
$= \overline{AB} + A(1+BC)$ Taking common A

$= \overline{AB} + A.1$ Rule 2: 1+BC = 1

$= \overline{AB} + A$ Rule 4: A.1 = A

Q-11 Use a Karnaugh map to simplify each expression to a minimum SOP form.

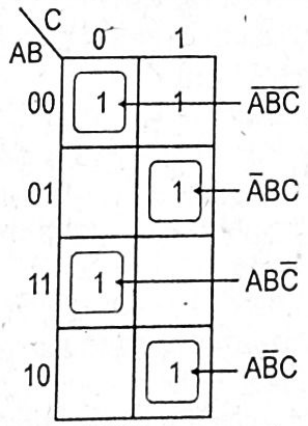
(i) $\overline{ABC} + \overline{AB}C + A\bar{B}C$



Minimum SOP expression is

$= \overline{AB} + \bar{B}C$

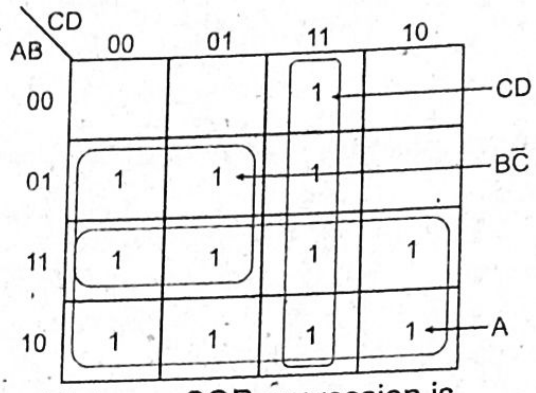
(ii) $\overline{ABC} + A\bar{B}C + \bar{A}BC + AB\bar{C}$



Minimum SOP expression is

$= \overline{ABC} + A\bar{B}C + \bar{A}BC + AB\bar{C}$

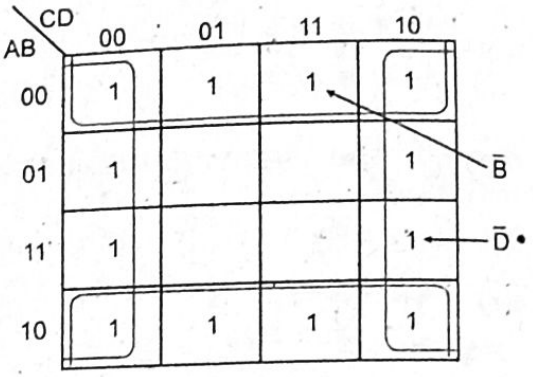
(iii) $A + B\bar{C} + CD$



Minimum SOP expression is

$= A + B\bar{C} + CD$

(iv) $\bar{A}\bar{B} + A\bar{B} + \bar{C}\bar{D} + C\bar{D}$



Minimum SOP expression is

$= \bar{B} + \bar{D}$

MCQ's

1. A two variable K-map has
   a. 2 cells b. **4 cells✓** c. 8 cells d. 16 cells
2. A three variable K-map has
   a. 2 cells b. 4 cells c. **8 cells✓** d. 16 cells
3. A four variable K-map has
   a. 2 cells b. 4 cells c. 8 cells d. **16 cells✓**
4. The Boolean expression ABC is a
   a. Sum term b. Literal term c. **Product term✓** d. Always 1
5. When two or more sum term are multiplied, the resulting expression is
   a. **POS✓** b. SOP c. POP d. None of them
6. The commutative law of multiplication is written as
   a. A+B = B+A b. **AB = BA✓**
   c. A (B+C) = AB + AC d. A + (B + C) = (A + B) + C
7. The Boolean expression A+B+C is a
   a. **Sum term✓** b. Literal term c. Product term d. Always 1
8. The complement of a variable is always
   a. 0 b. 1
   c. Equal to the variable d. **the inverse of the variable✓**
9. The Boolean expression A + B + C is:
   a. **a sum term✓** b. a literal term
   c. a product term d. a complemented term
10. The Boolean expression A.B.C.D is
    a. a sum term **b. a product term✓** c. a literal term d. Always 1
11. According to the commutative law of addition:
    a. AB = BA b. A = A + A
    c. A + (B + C) = (A + B) + C **d. A+B = B+A✓**
12. According to the associative law multiplication:
    a. B = BB b. **A (BC) = (AB)C✓** c. A + B = B + A d. B + B(B + 0)
13. According to the distributive law
    a. **A (B + C) = AB + AC✓** b. A (BC) = ABC
    c. A(A + 1) = A d. A + AB = A

14. Which one of the following is not a valid rule of Boolean algebra?
a. A + 1 = 1 b. **A = A✓** c. AA = A d. A + 0 = A

15. A 3-variable Karnaugh map has:
a. **eight cells✓** b. three cells c. sixteen cells d. four cells

16. _____provides a systematic method for simplifying Boolean expression and if properly used will produced the simplest SOP or POS expression possible.
a. **Karnaugh map✓** b. logical c. Boolean logic d. Karnaugh maps

17. A Boolean expression is an arrangement of variables and logical operators used to express the operation of a _____ circuit.
a. Karnaugh map b. **logical✓** c. Boolean logic d. Karnaugh maps

18. _____ is a complete system for logical operations
a. Karnaugh map b. logical c. **Boolean logic✓** d. Karnaugh maps

19. _____ makes use of the human brain's excellent pattern-matching capability to decide which terms should be combined to get the simplest expression.
a. Karnaugh map b. logical c. Boolean logic d. **Karnaugh maps✓**

20. Symbolic logic was discovered by
a. **George Boole✓** b. Herman Hollerith c. Van Neumann d. Basic Pascal

COMPUTER SOFTWARE

Q.1. What is Software?

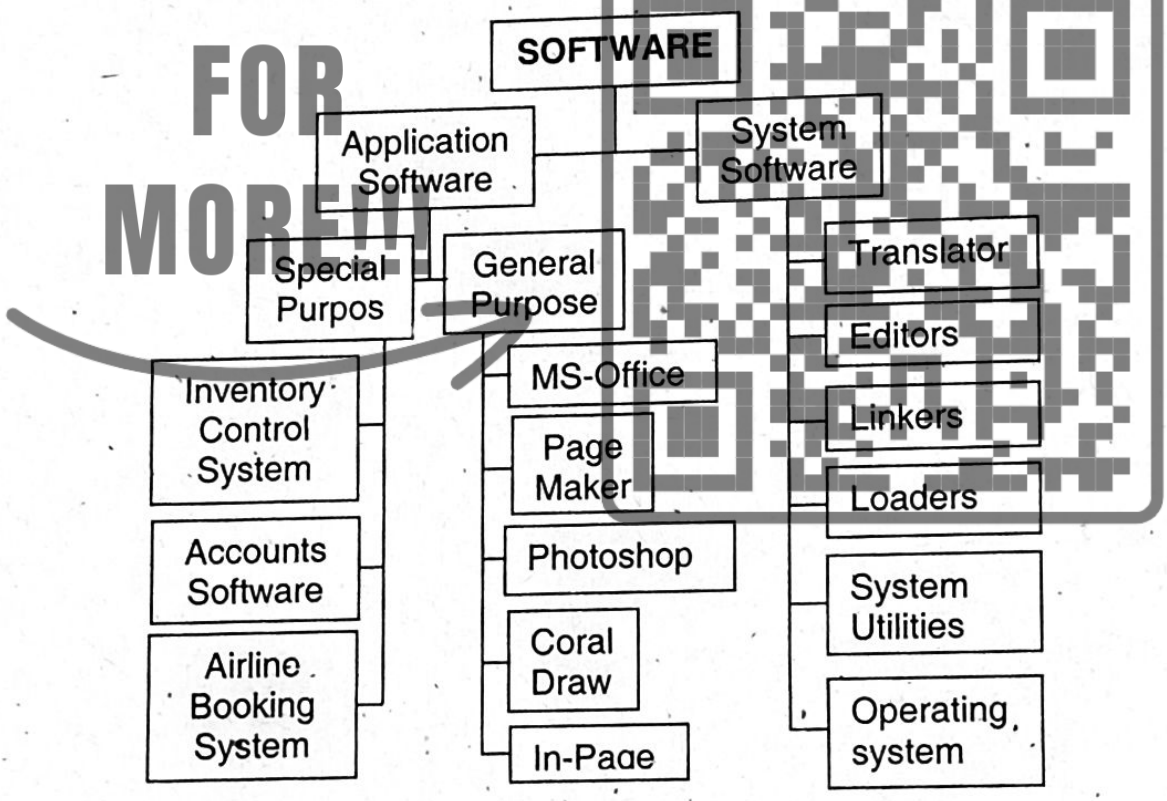
COMPUTER SOFTWARE

A set of instructions is called program that cause a computer to perform one or more tasks to do. Computers cannot do any useful work without instructions from software; thus a combination of software and hardware is necessary to do any computerized work.

Q.2. Describe various types of software.

TYPES OF SOFTWARE

The computer software may be grouped as follows:



Q.3. Describe system software.

SYSTEM SOFTWARE

- System software refers to the files and programs that make up your computer's operating system.
- System software provide basic functionality, and to provide a platform for running application software.
- System files include libraries of functions, system services, drivers for printers and other hardware, system preferences, and other configuration files.

PARTS OF SYSTEM SOFTWARE

The programs that are part of the system software include:

i. Operating system
ii. Language Translators
iii. Editors
iv. Linkers
v. Loaders
vi. Data-management software
vii. Utility software

Q.4. What is an operating system?

OPERATING SYSTEM

- Operating system software are the most important for the computer. It is a set of programs that control and supervises the hardware of computer and provides services to application software.
- Every type of computer has its own operating system. Operating system for mainframe and other large computer are very complex.
- Following are some of the popular operating systems used in personal computers:
  1. DOS
  2. Windows
  3. Unix
  4. Linux
  5. FreeDOS
  6. QNX
  7. Solaris

TASKS OF AN OPERATING SYSTEM

Operating system software are invisible inside the computer but they prove their existence by performing various tasks like:

- Process management
- Memory management
- Secondary storage management
- I/O management
- Command interpreter

Q.5. What are the advantages of an operating system?

ADVANTAGE OF OPERATING SYSTEM

- A computer can't do anything without operating system.
- The primary goal of an operating system is to make computer convenient to use.
- The secondary goal is to use the computer efficiently.

- A user cannot communicate directly with the computer hardware, so the operating system act as a translator between user and computer hardware.

Q.6. What are the language translators? Define each.

LANGUAGE TRANSLATORS

- The computer doesn't understand a programming language, because computer only knows the machine codes or binary codes.
- Translators are used to convert program into machine codes.
- There are three types of language translators:
  a) Interpreters
  b) Compilers
  c) Assemblers

TYPES OF LANGUAGE TRANSLATORS

a) INTERPRETER

- Interpreter is used to translate high level language program into machine language.
- It is suitable for short programs
- Interpreter translates one statement at a time and executes it.
- It does not store translated instruction or does not make any object file.
- Interpreter translates the program every time you will execute it.

b) COMPILER

- Compiler is a program that translates source code into object code.
- Compiler translates whole program into machine language at once and make a separate file called object program.
- Object program can execute without compilation.
- Each high level language has its own compiler.

c) ASSEMBLER

- Computer understands only machine language.
- Assembler is a program that converts an assembly language program into machine language.
- Assembly language facilitates to programmers to write programs easily but still it needs to convert an assembly language program into machine readable form. Assembler is used to fulfill the purpose.

Q.7. Write notes on the following System Software: Editors, Linkers, Loaders, Data-Management software and Utility software.

EDITORS

- Any type of program or simple text can be written in an editor, while it is possible that a particular programming language restrict to use its own editor.
- Usually each programming language has its separate editor to type a program.

LINKERS

- Linkers create a link between the parts of any object program according to specify memory for a particular computer.

LOADERS

- The loaders are used to load a program from external memory to internal memory for execution.
- Loaders manage memory allocation for program or data.

DATA-MANAGEMENT SOFTWARE

- Data-management software includes database and file management programs.
- Data-management software manages data for an operating system.
- They can organize, update and print data.

UTILITY SOFTWARE

- Utility software is used to give ease of work to the operator and increase the overall efficiency of computer. Utility software may include:
  - Debuggers
  - Memory managers
  - Disk Doublers
  - Disk cache system
  - Virus detectors

Q.8. What is application software?

APPLICATION SOFTWARE

- Application software is designed to perform general purpose tasks for the user. Application software includes:

i. Word processors
ii. Database programs
iii. Web browsers
iv. Development tools
v. Drawing
vi. Paint
vii. Image editing programs
viii. Communication programs

- Application software uses the services of the computer's operating system and other supporting applications.

Q.9. State the types of application software.

TYPES OF APPLICATION SOFTWARE

Application software can be grouped into two categories:

a) General purpose application software
b) Special purpose application software

a) GENERAL PURPOSE

- General purpose application software is used to fulfill our general needs.
- These general needs may include writing latter, writing reports, preparing accounts, design cards and posters etc.
- General purpose software includes:
  - PageMaker
  - MS-Office
  - Adobe-Photoshop
  - Coral Draw
  - In-Page

b) SPECIAL PURPOSE

- The software that is designed to perform a specific task is known as special purpose application software or Custom software.
- This software is very useful for a particular company for which they were developed.
- Special purpose application software is to process inventory control, software to maintain Bank Accounts, software used in Airline Booking System etc.

Q.10. What is the difference between system software and application software?

DIFFERENCE BETWEEN SYSTEM AND APPLICATION SOFTWARE

SYSTEM SOFTWARE	APPLICATION SOFTWARE
1. Programs which are directly related to the hardware of a computer system are known as System software.	1. Programs that allow the computer to perform a specific task are known as Application software.
2. System software is necessary to run a computer system.	2. Application software is optional to run a computer system.
3. It does not require Graphical User Interface (GUI).	3. Application software requires Graphical User Interface (GUI).
4. System software can run all alone.	4. Application software requires System software to run efficiently.
5. Operating system, Editors, Linkers, Loaders, Utilities are the examples of System software.	5. WORD, EXCEL, POWER POINT, Accounts software etc. are the examples of Application software.

Q.11. What is DOS? Write its characteristics?

DOS / CHARACTERISTICS OF DOS

- DOS stands for Disk Operating System.
- It is very easy to understand and use.
- DOS has number of commands to make it easier and user-friendly.

- DOS manages the routine work of a computer system.
- It controls everything from internal memory, monitor displays, keyboard input and external communication.

Booting: The process of loading the operating system into computer's memory is called "booting" or "bootstrapping".

DOS Prompt: After loading the computer with DOS, the characters "C:\>" appears on the screen, signaling to the user that the computer is ready to use, is called DOS prompt.

Q.12. What is a directory?

DIRECTORY

- An organizational unit, or container, used to organize folders and files. Directories contain book keeping information about files.
- You can think of a directory as a file cabinet that contains folders that contain files.

Q.13. What is a command?

DOS Commands

- The command is way of communicating with the computer.
- DOS command used to perform specific tasks (mostly related to hardware).

Q.14. What are the types of DOS commands?

TYPES OF DOS COMMANDS

DOS commands are divided into two groups namely:

1. Internal commands
2. External commands

1. Internal commands

- The internal commands are always stored in RAM at the time of start-up.
- Internal commands do not reside on disk.
- DOS has several internal commands such as:

  DIR, CLS, DATE, TIME, COPY, VER, VOL, DEL or ERASE, TYPE, REN or RENAME, PROMPT, MD or MKDIR, CD or CHDIR, RD or RMDIR and PATH etc.

2. External commands

- The external commands are loaded only when required.
- These commands are stored as separate files.
- Some of external commands are:

  FORMAT, CHKDSK, LABEL, DISKCOPY, PRINT, SYS, EDIT, XCOPY, DELTREE, DOSKEY

Q.15. Write some internal and external commands of DOS with purpose, syntax and examples.

INTERNAL COMMANDS

Command: **DIR**
Purpose: DIR command is used to displays a list of files of disk.
Syntax: DIR [drive:][path][file name][/W][/P]
Example: DIR (display whole directory)
DIR /W (display whole directory width wise)
DIR/P (display whole directory page wise)
DIR *.EXE (display list of files which extension is EXE)
DIR A*.* (display list of files which file name start with 'A')

Command: **CLS**
Purpose: CLS command is used to clear the display screen.
Syntax: CLS
Example: CLS

Command: **DATE**
Purpose: DATE command is used to display or change system date.
Syntax: DATE [date]
Example: DATE

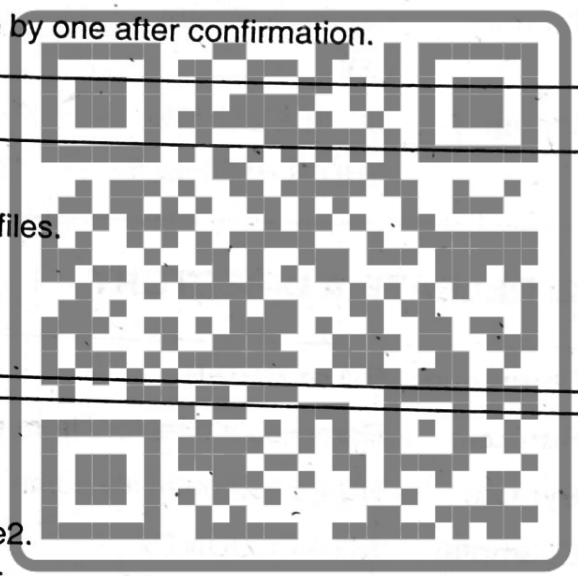
Command: **TIME**
Purpose: TIME command is used to display or change system time.
Syntax: TIME [time]
Example: TIME

Command: **COPY**
Purpose: To copies one or more files to another location.
Syntax: [drive:][path] file name [destination]
Example: COPY C:\DATA*.BAS D:

Command: **VER**
Purpose: To display version of operating system.
Syntax: VER
Example: VER

Command: **VOL**
Purpose: Displays the disk volume label and serial number, if they exist.
Syntax: VOL [drive:]
Example: VOL D:

Command: **DEL** or **ERASE**
Purpose: Deletes one or more files from secondary storage.
Syntax: DEL [drive:][path] file name [/p]
Example: DEL D:\TEMP*.* (delete all files of D:\TEMP after confirmation.
DEL A*.* (delete all files which start with 'A')
DEL C:*.*/P (delete all files one by one after confirmation.



Command: **TYPE**
Purpose: Displays the contents of a text file or files.
Syntax: TYPE [drive:][path]filename
Example: TYPE C:\MYFILE.TXT

Command: **REN**
Purpose: Renames a file or files.
Syntax: REN [drive:] [path] filename1 filename2.
Example: REN D:\FILE1.EXE ACCOUNTS.EXE

Command: **PROMPT**
Purpose: Prompt command is used to change DOS command prompt.
Syntax: PROMPT [TEXT][$Q][$$][$T][$D][$P][$V][$N][$G][$L][$_]
$Q = (equal sign) $$ $ (dollar sign)
$T Current time $D Current date
$P Current drive and path $V MS-DOS version number
$N Current drive $G > (greater-than sign)
$L < (less-than sign) $_ Carriage return and linefeed
Example: PROMPT COMPUTER (display prompt 'COMPUTER')
PROMPT PG (display prompt with path and greater than sign)

TO CREAT A NEW DIRECTORY

Command: **MD or MKDIR**

Purpose: Creates a new directory.

Syntax: MD [drive:] [path] directory name

Example:

MD ACCOUNTS	To create ACCOUNTS directory.
MKDIR BASFILES	To create BASFILES directory.

TO CHANGE A DIRECTORY

Command: **CD or CHDIR**

Purpose: Displays the name of or changes the current directory.

Syntax: CD [drive:][path]

CD[..]

Example:

CD ACCOUNTS	To enter in ACCOUNTS directory.
CHDIR BASFILES	To enter in BASFILES directory.

TO DELEATE A DIRECTORY

Command: **RD or RMDIR**

Purpose: Removes a directory from a directory structure.

Syntax: RD [drive:][path] file name

Example:

RD ACCOUNTS	To remove ACCOUNTS directory.
RMDIR BASFILES	To remove BASFILES directory.

Command: **PATH**

Purpose: Displays or sets a search path for executable files.

Syntax: PATH [[drive:] path [;...]]

PATH;

Example: PATH D:\ABC;C:DATA\ACCOUNT

To create a path for given directories, while semi colon (;) between directories changes root of a directory.

PATH To display all search-path settings

PATH; To clear all search-path settings.

EXTERNAL COMMANDS

Command: **FORMAT**

Purpose: To draw tracks and sectors in disk for storing data.

Syntax: FARMAT drive: [/Q][/S]/U]

Example: FORMAT A:/S Format with system files disk of drive 'A'

FORMAT D:/Q/U Quick and unconditionally format drive 'D'.

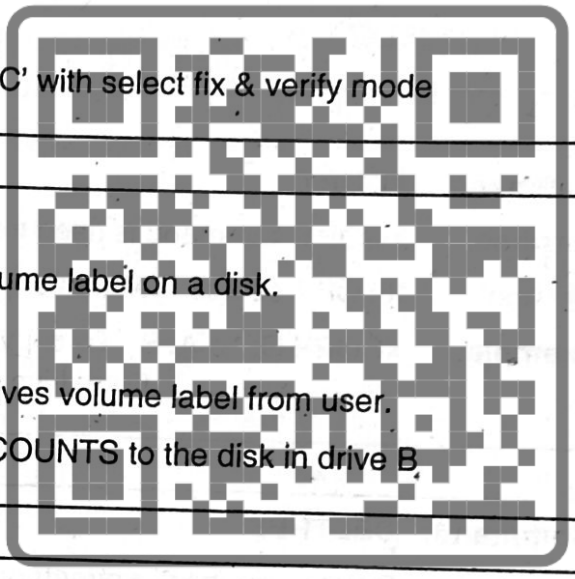
Command: **CHKDSK**

Purpose: Checks a disk and displays a status report.

Syntax: CHKDSK [drive:[path]] [/F] [/V]

Example: CHKDSK D

CHKDSK C:/F/V Checks the disk 'C' with select fix & verify mode



Command: **LABEL**

Purpose: To creates, changes, or deletes volume label on a disk.

Syntax: LABEL [drive:] [volume label]

Example: LABEL Computer receives volume label from user.

LABEL B:ACCOUNTS Labels ACCOUNTS to the disk in drive B.

Command: **DISKCOPY**

Purpose: Copies the contents of one floppy disk to another

Syntax: DISKCOPY [drive1: [drive2:]] [/V]

Example: DISKCOPY A: B: Copy a disk contents A to B.

DISKCOPY B:/V Copy a disk contents of B with verify mode

Command: **PRINT**

Purpose: PRINT command is used to prints a text file on paper thru printer

Syntax: PRINT [[drive:] [path] [file name]

Example: PRINT D:\TEMP\README.TXT To print README.TXT file.

Command: SYS

Purpose: To copies system files to the specify disk and make it Bootable.

Syntax: SYS drive:

Example: SYS A: Copies the system files on disk A.

Command: **EDIT**

Purpose: EDIT is a text editor. This command is used to create, print or changea text files.

Syntax: EDIT [[drive:] [path] [file name]

Example: EDIT D:\TEMP\README.TXT Open README.TXT file in editor.

EDIT Open editor to create a text file.

Command: **XCOPY**

Purpose: XCOPY command is used to copies files and directory trees.

Syntax: XCOPY source [destination] [/P] [/S] [/V]

Example: XCOPY C: *.* A:/S To copy all files and directories (except empty directories) from drive C to drive A

Command: **DELTREE**

Purpose: Deletes (erases) a directory including all files and subdirectoriesthat are in it.

Syntax: DELTREE [/Y] [drive:] path [...]

Example: DELTREE D:\ACCOUNTS To delete the directory ACCOUNTS including all files and subdirectories.

Command: **DOSKEY**

Purpose: It creates a special memory where all DOS commands being entered are stored. These commands are recalled by pressing UP (↑) or DOWN (↓) key.

Syntax: DOSKEY

Example: DOSKEY Install DOSKEY command in memory.

Q.16. Differentiate between internal and external commands.

DIFFERENCE BETWEEN INTERNAL AND EXTERNAL COMMANDS OF DOS

INTERNAL COMMANDS	EXTERNAL COMMANDS
1. The internal commands are loaded into RAM at the time of start-up.	1. External commands are loaded into RAM only when users use them.
2. Internal commands are a group of files of COMMAND.COM file.	2. External commands are separate files stored in the disk
3. Internal commands are limited.	3. External commands are not limited
4. Internal commands are depends on the version of Operating System.	4. External commands do not depend on the version of Operating System.
5. CLS, DATE, TIME, VER, VOL are the examples of internal commands.	5. FORMAT, DISKCOPY, XCOPY, SYS are the examples of external commands.

Q.17. What is a File? What are the rules for naming a file in DOS?

FILE

- We store all our work and programs in the form of files on storage devices.
- DOS has a naming convention for all files.

NAMING FILES IN DOS

- A file name can be up to eight characters long and have a three character extension representing the file type.
- A period is used to separate the file name from the extension.
- The total length of the DOS file name, plus the extension, cannot exceed 11 characters.
- The file extension is not necessary unless the file is associated with a particular function.

The list of common DOS files extension:

BAK	Backup file
BAT	File housing a sequence of commands
COM	Command program file
DOC	Document file. (Usually MS-Word)
EXE	Executable program file
SYS	System driver file
TXT	Text file

RULES FOR NAMING FILE

Following are rules that apply to DOS file and directory name creation:

- A file or directory name can be no more than eight characters long.
- An extension can be no more than three characters long.
- No spaces can be included in the file name, the extension or the directory name.
- Certain characters (? *, ; = + # >| [ ] / \ and space between file name) are illegal and cannot be used.

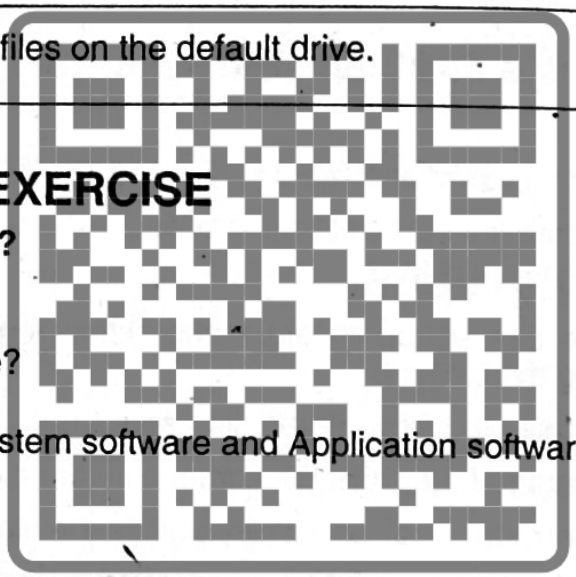
Q.18. What are wildcard characters? Why they are used?

WILDCARD CHARACTERS

- Wildcard characters are commonly used when searching, copying or deleting files on a dis
- The asterisk (*) and question mark (?) are used as wildcard characters, as they are in DO and Windows.
- The asterisk (*) matches any sequence of characters
- Whereas the question mark (?) matches any single character

For example

FILE?	Includes **FILE, FILES, FILE1, FILE2** but not the **FILE10** (it has an extra character)
***.DOC**	It refers to all files with .DOC extension.
A*.*	Includes all files whose name start with the letter "A".
.	Includes all files on the default drive.



EXERCISE

Answer the following questions?

1. What is software?
Ans. See Q # 1
2. Describe various types of software?
Ans. See Q # 2
3. What is the difference between System software and Application software?
Ans. See Q # 10
4. What is an operating system?
Ans. See Q # 4
5. What are language translators? Define each?
Ans. See Q # 6
6. What are the characteristics of Disk operating systems?
Ans. See Q # 11
7. What are the types of DOS commands?
Ans. See Q # 14
8. Differentiate between internal and external commands?
Ans. See Q # 16
9. What are wildcard characters? Why they are used?
Ans. See Q # 18
10. What is a Directory? What DOS command are used to create, change and delete a directory?
Ans. See Q # 12 & 15

Give the appropriate DOS command for the task given below?

i) Copy the entire contents of a disk to another disk.
Ans: DISKCOPY A: B:
ii) Create a prompt of your name with :\> symbols.
Ans: PROMPT UMER:\$G

iii) Show the list of all files whose name starts with the letter "A".
Ans: DIR A*.*
iv) Copy all those files from C: drive to A drive whose extension is .DOC
Ans: COPY C:*.DOC A:
v) Create a directory of your name on C drive.
Ans: MD C:ALI
vi) Delete all files from "A" drive with permission to delete each file.
Ans: DEL A:*.*/P
vii) Rename a file SAMPLE.TXT as TEST.TXT
Ans: REN SAMPLE.TXT TEST.TXT
viii) Display all the contents of a file PROFILE.TXT on monitor.
Ans: TYPE PROFILE.TXT
ix) Change directory from ABC to ROOT.
Ans: CD\
x) Remove a directory named XYZ from C drive.
Ans: RD C:XYZ
xi) Format a disk in drive "A" making it bootable.
Ans: FORMAT A:/S
xii) Check the contents of disk in drive A for possible errors.
Ans: CHKDSK A:
xiii) Label the disk in drive A with your name.
Ans: LABEL A:USMAN
xiv) Create a text file with any name.
Ans: EDIT ABDULLAH.TXT or COPY CON ANWAR.TXT
xv) Prepare a bootable floppy disk.
Ans: SYS A:
xvi) Copy all files with all subdirectories from SAMPLE directory of C: drive to A: drive.
Ans: XCOPY C:\SAMPLE*.* A:/S
xvii) Print a file XYZ.TXT to printer.
Ans: PRINT XYZ.TXT or TYPE XYZ.TXT > PRN
xviii) Delete the entire directory TEST.
Ans: DELTREE TEST
xix) Display volume label of C: drive.
Ans: VOL C:
xx) Check which version of DOS is running on your computer.
Ans: VER

Fill in the blanks.

i) DOS stands for **Disk Operating System**.
ii) Wildcard characters used in DOS are: **?** and *****.
iii) The **>** signals that system is waiting for you to give some commands.
iv) The loading of operating system into memory is called **booting or bootstrapping**.
v) **Operating system** is a set program that controls and supervises the operations of the computer.
vi) DOS commands are grouped into **internal** and **external**.
vii) **Compiler** translates the whole program at a time and stores the translated program on disk.
viii) **Command** is way of communicating with the computer.

ix) **TYPE** command displays the contents of a file.

x) The **PATH** command searches in a list of specified subdirectories for command or program files.

Tick the correct answer.

i) An operating system is a:
(a) Set of users (b) application program
(c) **Set of program**✓ (d) supervisor program

ii) The command that clears the screen is:
(a) CLEAR (b) **CLS**✓ (c) CLR (d) CLEAN

iii) The command that can show current date in a Prompt is:
(a) PROMPT $ date (b) PROMPT $t (c) PROMPT $p (d) **PROMPT $d**✓

iv) The command that displays the DOS version number is:
(a) VERS (b) VERSION (c) **VER**✓ (d) VOL

v) The command that copies full contents of a disk to another disk is:
(a) **DISKCOPY**✓ (b) COPY (c) XCOPY (d) DISKCOMP

vi) Which switch of the Format command copies system files on the disk and make it bootable?
(a) /p (b) /x (c) **/s**✓ (d) /o

vii) Which translator translates and executes each program statement one at a time.
(a) compiler (b) assemble (c) **interpreter**✓ (d) editor

viii) The root directory is indicated by:
(a) \✓ (b) / (c) $ (d) >

ix) The command that creates a new directory is:
(a) MAKEDIR (b) MDIR (c) **MKDIR**✓ (d) MKD

x) The command that deletes directories and their contents is:
(a) DEL *.* (b) RD (c) RMDIR (d) **DELTREE**✓

MCQ's

1. A program written in high level language is called
a. Hard program b. **Source program**✓
c. Correct program d. System program

2. _____ is a set of electronic instructions used to instruct the computer to do what is required.
a. High level language b. Programming
c. **Program**✓ d. Low level language

3. In _____ code, each decimal digit is represented by a binary code of four bits.
a. DCB b. LCD c. **BCD**✓
d. Low level language

4. Computer can recognize a total of _____ different characters.
a. 275 b. 255 c. 235 d. **256**✓

5. _____ is a set of programs that controls and supervises the operations of computer.
a. Disk Operating System b. **Operating System**✓
c. Programming System d. None of the above

6. The command that deletes directories and their contents is
   a. DEL *.* b. RDALL c. RMDIR d. **DELTREE✓**
7. The program directly related to the computer hardware, controlling and utilizing them are known as
   a. **System software✓** b. Operating System
   c. Application software d. Special purpose software
8. An operating system is a
   a. Set of Users b. Supervisor program
   c. **Application software✓** d. Set of programs
9. The command that create a new directory is
   a. MAKEDIR b. MDIR c. MKD d. **MKDIR✓**
10. The command in GWBASIC is used to execute the program
    a. LOAD b. LIST c. **RUN✓** d. SAVE
11. The category of computer application software is Computer hardware can't work without
    a. Mouse b. Keyboard
    c. **System software✓** d. Application software
12. EBCDIC stands for
    a. **Extended Binary Coded Decimal Interchange Code✓**
    b. Extended Bit Code Decimal Interchange Code
    c. Extended Bit Case Decimal Interchange Code
    d. Extended Binary Case Decimal Interchange Code
13. BCD is
    a. **Binary Coded Decimal✓** b. Bit Coded Decimal
    c. Binary Coded Digit d. Bit Coded Digit
14. ASCII stands for
    a. American Stable Code for International Interchange
    b. American Standard Case for Institutional Interchange
    c. **American Standard Code for Information Interchange✓**
    d. American Standard Code for Interchange Information
15. FORTRAN stands for
    a. File Translation b. Format Translation
    c. **Formula Translation✓** d. Floppy Translation
16. An error in software or hardware is called a bug. What is the alternative computer jargon for it?
    a. Leech b. Squid c. Slug d. **Glitch✓**
17. A computer program that converts an entire program into machine language is called a/an
    a. Interpreter b. Simulator c. **Compiler✓** d. Commander
18. Instructions and memory address are represented by
    a. Character code b. **Binary codes✓** c. Binary word d. Parity bit
19. Which of the following code used in present day computing was developed by IBM Corporation?
    a. ASCII b. Hollerith code c. Baudot Code d. **EBCDIC Code✓**
20. Programs designed to perform specific tasks is known as
    a. system software b. **application software✓**
    c. utility programs d. operating system

21. Time during which a job is processed by the computer
a. Delay times b. Real time c. **Execution time**✓ d. Down time

22. EBCDIC can code up to how many different characters?
a. **256**✓ b. 16 c. 32 d. 64

23. The computer code for the interchange of information between terminals is
a. **ASCII**✓ b. BCD c. EBCDIC d. All of above

24. An application program that helps the user to change any number and immediately see the result of that change is
a. Desktop publishing program b. Database
c. **Spreadsheet**✓ d. All of above

25. An operating system is a:
a. Set of users b. application program
c. Set of program d. **Supervisor program**✓

26. The command that clears the scree is
a. CLEAR b. **CLS**✓ c. CLR d. CLEAN

27. The command that can show current date in a prompt is.
a. Prompt $ date b. Prompt $t
c. **Prompt $d**✓ d. Prompt $d

28. The command that displays the DOS version number is.
a. VERS b. VERSION c. **VER**✓ d. VOL

29. The command that copies full contents of a disk to another disk is.
a. **DISKCOPY**✓ b. COPY c. XCOPY d. DISKCOMP

30. Which switch of the format command copies system files on the disk and make it bootable?
a. P b. X c. **s**✓ d. o

31. Which translator translates and executes each program statement one at a time.
a. Compiler b. assemble c. **interpreter**✓ d. editor

32. The root directory is indicated by
a. \✓ b. / c. $ d. >

33. The command that creates a new directory is:
a. MAKEDIR b. MDIR c. **MKDIR** **d. MKD**✓

34. The commands that deletes directories and their contents is
a. DEL *.* b. RD c. RMDIR d. **DELTREE**✓

35. Making illegal copies of copyrighted software is called:
a. **software piracy**✓ b. browsing
c. collaboration d. electronic distribution

36. Software considered to be in the public domain:
a. commercial b. packaged c. **freeware**✓ d. shareware

37. Software that allows the production of professional newsletters and reports:
a. database management b. groupware
c. spreadsheets d. **desktop publishing**✓

38. The type of software that can store, update, manipulate, and retrieve data:
a. desktop publishing b. spreadsheet
c. **database management**✓ d. graphics

39. Another name for available- for – purchase software is:
a. secondary software b. **packaged software**✓
c. systems software d. peripheral software

40. Permission for an organization to make copies of certain software:
a. application b. documentation
c. **site license**✓ d. copyright

41. A bundle of basic software designed to work together:
a. User friendly b. operating system
c. **suite**✓ d. browser

42. Another name for collaborative software:
a. **groupware**✓ b. browser c. freeware d. shareware

43. Another name for packaged software:
a. **commercial**✓ b. groupware c. freeware d. shareware

44. A computer professional who works with users to plan entire computer systems:
a. programmer b. **systems analyst**✓
c. operator d. CIO

45. Software used to access the Internet:
a. **browser**✓ c. packaged
b. spreadsheet d. public domain

46. Software written to fulfill the specific needs of a user:
a. freeware b. browser c. suite d. **custom**✓

47. A worker who catalogs and keeps secure disks and tapes:
a. programmer b. **librarian**✓ c. CIO d. operator

48. Software that can manipulate numbers in rows and columns:
a. groupware b. **spreadsheet**✓
c. word processing d. database management

49. Software designed specifically for a small business:
a. public domain b. shareware
c. **SOHO**✓ d. custom

50. An error in computer data is called
a. Chip b. **Bug**✓ c. CPU d. Storage device

51. The most commonly used standard data code to represent alphabetical, numerical and punctuation characters used in electronic data processing system is called
a. **ASCII**✓ b. EBCDIC c. BCD d. All of above

52. The two basic types of record access methods are:
a. **Sequential and random**✓ b. Sequential and indexed
c. Direct and immediate d. Online and real time

53. A computer program that converts an entire program into machine language at one time is called a/an
a. Interpreter b. CPU c. **Compiler**✓ d. Simulator

54. A computer Program that translates one program instruction at a time into machine language is called a/an
a. **Interpreter**✓ b. CPU c. Compiler d. Simulator

55. Software in computer
a. **Enhances the capabilities of the hardware machine**✓
b. Increase the speed of central processing unit
c. Both of above d. None of above

56. Which of the following is not computer language?
a. High level language
b. **Medium level language**✓
c. Low level language
d. All of the above

57. Which language is directly understood by the computer without translation program?
a. **Machine language**✓
b. Assembly language
c. High level language
d. None of above

58. Mnemonic a memory trick is used in which of the following language?
a. Machine language
b. **Assembly language**✓
c. High level language
d. None of above

59. The translator program used in assembly language is called
a. Compiler
b. Interpreter
c. **Assembler**✓
d. Translator

60. Easily readable language is
a. Machine language
b. Assembly language
c. **High level language**✓
d. Medium level language

61. Which of the following is called low level languages?
a. Machine language
b. Assembly language
c. **Both of the above**✓
d. None of above

62. Which of the following is problem oriented language?
a. **High level language**✓
b. Machine language
c. Assembly language
d. Low level language

63. A compiler is a translating program which
a. Translates instruction of a high level language into machine language
b. Translates entire source program into machine language program
c. It is not involved in program's execution
d. **All of above**✓

64. Which of the following is machine independence program?
a. **High level language**✓
b. Low level language
c. Assembly language
d. Machine language

65. Which statement is valid about interpreter?
a. **It translates one instruction at a time**✓
b. Object code is saved for future use
c. Repeated interpretation is not necessary
d. All of above

66. Which is the limitation of high level language?
a. **Lower efficiency**✓
b. Machine dependence
c. machine level coding
d. None of above

67. High level language is also called
a. Problem oriented language
b. Business oriented language
c. Mathematically oriented language
d. **All of the above**✓

68. A computer programmer
a. **Does all the thinking for a computer**✓
b. Can enter input data quickly
c. Can operate all types of computer equipment's
d. Can draw only flowchart

69. the most commonly used standard data code to represent alphabetical, numerical and punctuation characters
a. **ASCII**✓
b. EBCDIC
c. BCD
d. All of above

70. What does EBCDIC stand for?
   a. **Extended Binary Coded Decimal Interchange Code** ✓
   b. Extended Bit Code Decimal Interchange Code
   c. Extended Bit Case Decimal Interchange Code
   d. Extended Binary Case Decimal Interchange Code

71. What do you call the programs that are used to find out possible faults and their causes?
   a. Operating system
   b. Cookies
   c. **Diagnostic software** ✓
   d. Boot diskettes

72. LAN networking started from
   a. First generation
   b. **Second generation** ✓
   c. Third generation
   d. Fourth generation

73. The concept that many users can share a computer is called
   a. **time-sharing** ✓
   b. distributed processing
   c. parallel processing
   d. interpersonal relationship

74. Which of the following is a computer program?
   a. Utility software
   b. Application package
   c. Operating system
   d. **all of the above** ✓

75. An operating system
   a. is not required on large computers
   b. is always supply with computer
   c. is always written in BASIC
   d. **Consists of programs that help in the operation of computer** ✓

INTRODUCTION TO WINDOWS OPERATING SYSTEM

Q.1. What is Windows?

INTRODUCTION TO WINDOWS

- Windows Operating System introduced by Microsoft in the 1980s.
- Windows is a Graphical User Interface (GUI), which allows you to see better pictures a
- videos.
- Commands are selected by pointing the mouse arrow over the command (icon) a clicking with the mouse button.
- For the past two decades, Windows has been the most widely used operating system f personal computers.
- Microsoft Windows is designed for both home computing and professional purposes.

Q.2. Make a list of different version of Windows Operating System.

VERSIONS OF WINDOWS OPERATING SYSTEM

1. Windows home editions include Windows 3.0 introduce in 1990.
2. **Windows 3.1**introduce in **1992.**
3. **Windows 95**introduce in **1995.**
4. **Windows 98**released in **1998.**
5. **Windows Me**in the year of **2000.**
6. **Windows XP** in **2001.**
7. **Windows NT** in **2003**
8. **Windows Vista** in the year **2007.**
9. **Windows 7** was released in **2009.**
10. **Windows 8** was released in **2012.**
11. The current version **Windows 8.1** was released in **2013.**

Q.3. Define the properties of Windows Operating System.

PROPERTIES OF WINDOWS OPERATING SYSTEM

1. Windows provides a User-Friendly Environment
2. Windows provides colorful **Graphical User Interface**
3. Commands are located on the screen in the form icons
4. Windows provides Input / Output Manager
5. It has Object Manager

6. Windows provides Virtual Memory Manager
7. Provides Component Location Properties
8. Configuration Properties
9. Date, Time Properties
10. Feature Installation Options Properties
11. Hardware Properties
12. Installation Status Properties
13. Operating System Properties
14. Product Information Properties
15. Summary Information Update Properties
16. System Folder Properties
17. User Information Properties

Q.4. How can we start a computer with Windows Operating System?

STARTING THE COMPUTER WITH WINDOWS

1. Windows operating system is first installed in a hard disk.
2. When the installation is complete, the computer is ready to use this operating system.
3. To start Windows, switch on the computer and Windows will start to load in the computer's memory.
4. After loading the first screen that will be displayed is called "Desktop".
5. When Desktop appears the Windows is ready to be operational.

Q.5. Distinguish between DOS and Windows.

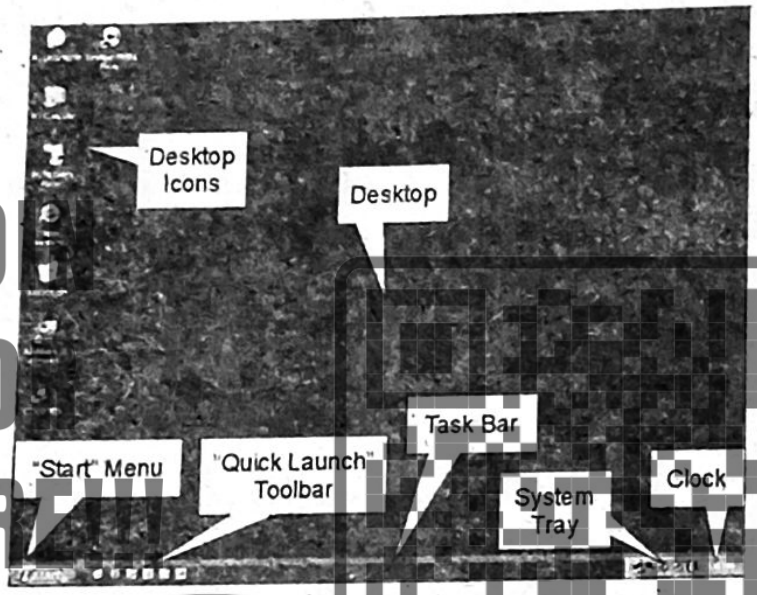
DIFFERENCE BETWEEN DOS & WINDOWS

DOS	WINDOWS
1. DOS is a Command Line Interface (CLI).	1. Windows is a Graphical User Interface (GUI).
2. We can do anything by type a command.	2. Mostly we can do anything by click a mouse button.
3. DOS is more reliable than Windows.	3. Windows is less reliable than DOS.
4. DOS run all alone.	4. Windows required DOS at backend.
5. DOS is not a user-friendly operating system.	5. Windows is a user-friendly operating system.
6. DOS is a single user operating system.	6. Windows is a multi-user operating system.
7. DOS can do one task at a time.	7. Windows can do more than one task at a time.
8. In DOS explorer support is not available.	8. Explorer support is available in Windows.
9. DOS 3.00, 3.30, 5.00 and 6.22 are the example of DOS.	9. Win-98, 2000, NT, XP Vista, 7, 8, and 8.1are the example of Windows.

Q.6. Define what is Desktop? What are the elements of Desktop?

WINDOWS DESKTOP

- The Desktop is like a board where your applications, folders and shortcuts are located in the form of icons Just like documents and other objects can be placed on the top of a physical desk.
- The Windows desktop provides an area where users can place their applications, files and folders.
- Windows Desktop contains the following items.
  - Icons
  - Task bar
  - Start button



Q.7. Write short notes on the following:

- **Icon, Taskbar, Window**

ICON

- Icon is a small colorful graphical picture that represents an object like a file, folder, program or any hardware component of the computer.
- Every Icon has a label, which identifies it.
- The labels can be changed.
- The Icons are provided by Windows are My Documents, My Computer, My Network Places, Recycle bin, Internet Explorer.

WORKING WITH ICONS

- **SELECTING AND ACTIVATING AN ICON**

1. Drag the mouse pointer to the Icon you want to select them.
2. Click left button of mouse. This will change the color of the Icon.
3. Double click the left button of mouse (in quick succession) to open the file, folder or program or single clicks the right button to open a menu then left click the open command.

- **CHANGING THE POSITION OF AN ICON**

1. Select the Icon whose position you want to change by left clicking with the mouse.

2. Hold down left button of mouse on an Icon while moving the pointer to new location of the Desktop or to Folder where you want to place the Icon.
3. Release the mouse button now.
4. Icon has been moved to new location.

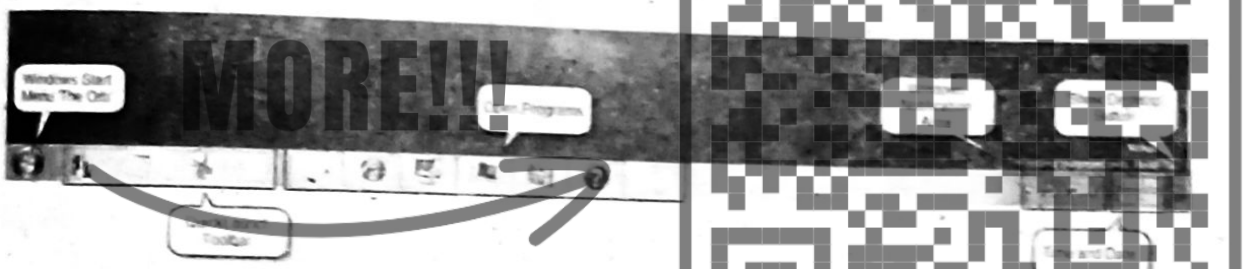
- **CHANGING THE NAME OR LABEL OF AN ICON**

1. Select the Icon whose name you want to change.
2. Click the right button of the mouse, a menu will appear.
3. Click on "Rename" command from it.
4. Label of the Icon will be highlighted and cursor flashes in it.
5. Now type new name for Icon and press enter to end.
6. Name of label of Icon has been changed.

- **DELETING AN ICON**

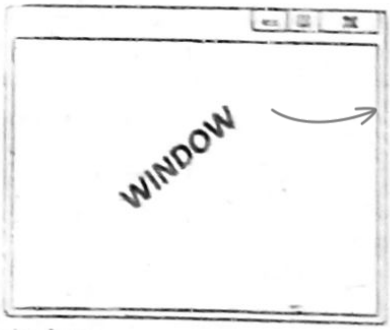
1. Select the Icon which you want to delete.
2. Click the right button of mouse on selected Icon, a menu will appear.
3. Click on the Delete command from it.
4. Icon will be deleted.

TASKBAR



- This is a bar that appears at the bottom of the Desktop in Windows.
- You can move it to top or either left or right side by clicking or dragging it to the new location.
- The bar contains Start button, Quick Launch Toolbar, System Tray and Clock.
  - i. The Start button, start which opens the Start menu.
  - ii. The Quick Launch toolbar, which lets you start programs with one click.
  - iii. The System Tray, which shows you which programs and documents you have opened and allows you to quickly switch between them.
  - iv. Clock is used to display or change system date and time

WINDOW



- Window is a rectangular area of screen that displays different information.
- In Windows every folder or application has a window.

Properties of a window

1. Every window has a Title bar, which display the name of the window.

2. A window can be resized, minimized and maximized by pressing the button at the top right corner of the Title bar.
3. A window can be maximized by pressing □ button, minimized by pressing _ and closed by pressing × button of the right of the Title bar.
4. A window can be moved at any location of the screen by holding left button of mouse on Title bar and move pointer and release button at selected location.

Q.8. What is the function of Start Button?

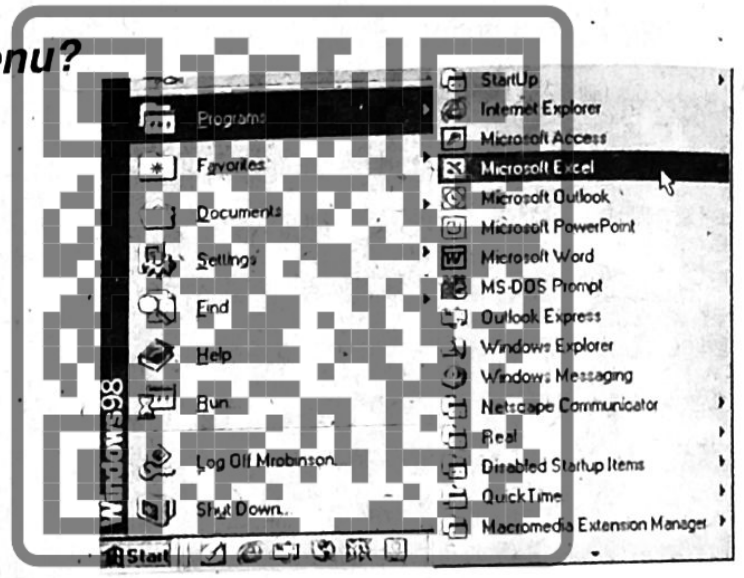
START BUTTON

- The Start Button allows users to access their computer programs or configure Microsoft Windows easily.
- Start Button located at the lower left corner of the screen.
- Click once the Start Button to open a menu of choices.
- We can use all the utilities available in the Start menu.
- We can shutdown, restart and/or standby the computer using Start Button.
- Start Button displays the menu of choices:

Q.9. What are the items of Start Menu?

START MENU CHOICES:

- Programs
- Favorites
- Documents
- Settings
- Find
- Help
- Run
- Shutdown



Programs

- Place the mouse pointer on **Programs** entry, a submenu will open and showing all programs or applications in a list form currently installed.
- To open a program, which has been installed on your computer, just click on it and the program will open.

Favorites

- Favorites menu display a list of the Internet addresses that you had added to your Internet Explorer Favorites list.

Documents

- The Documents menu displays the list of files you have recently worked on.
- You can open the most recently used document directly from here.
- To open a document directly from here, simply chick on it and the document will open.

Settings

- This menu provides the facility to change or configure the hardware or software settings of the computer. This menu leads to several choices.

i. Control Panel

- Control Panel enables a user to modify the computer's settings.
- It provides variety of tools to control the way your computer.
- We can Change the mouse settings, display settings, sound settings, and keyboard settings through control penal.

ii. Printers

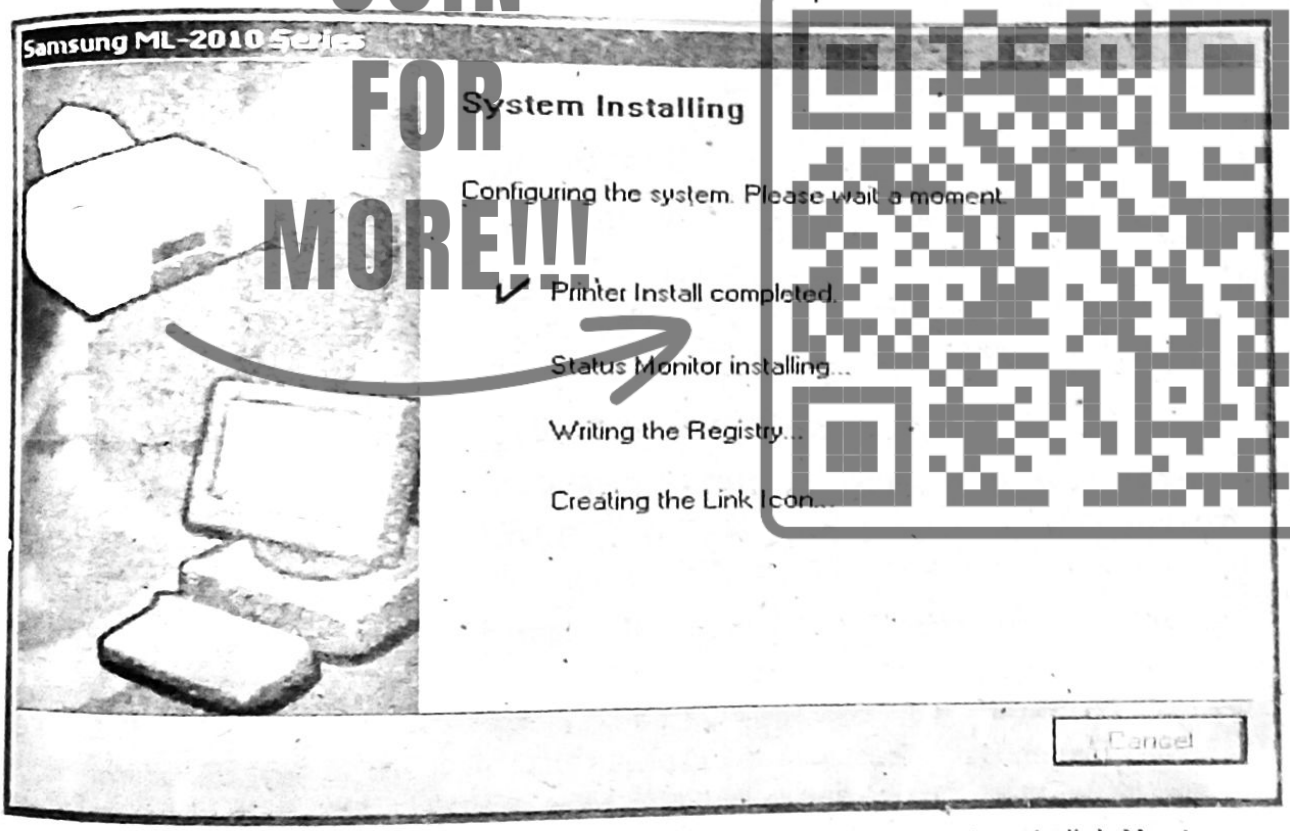
- This option gives you to access all the printers attached with computer and also let you add or configure a new printer and remove any printer from your system.

Q.10. How can you install a Printer?

PRINTER INSTALLATION

To install a new printer, follow these steps:

- Click the **Start button**, point to **Settings**, and then click **Printers**.
- Double-click on **Add Printer**, and then click **Next**.
- Click **Local Printer** and then click **Next**.
- Click the appropriate manufacturer and model of printer and then click **Next**.



- If you choose to install a **Local Printer**, click the correct port and click **Next**.
- Type a name for the printer (or accept the default name) and then click **Next**.
- To **print a test page**, click **Yes** and then Click **Finish**.

iii. Taskbar & Start menu

- The Taskbar and Start menu gives you another way to set Taskbar options.

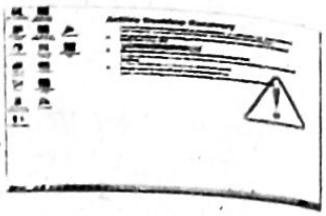
- With the help of Task bar and Start menu, we can add or remove items from the Start menu.

iv. Folder Option

- This option gives you another way to set folder option i.e. how the folder should behave.

v. Active Desktop

- A quick way to turn ON and OFF the Active Desktop

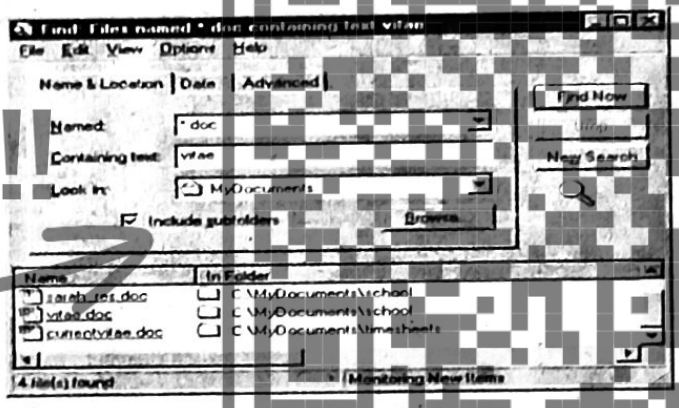


vi. Windows Update

- An Internet connection to Windows Operating System upgrades and fixes.

vii. Find / Search

- This option helps in finding files or folders on your hard disk or network.
- This command is very useful in case we forget location of file or folder we want to access.
- Find/ Search option include search based on name of file, type, size, and date and storage location of the file or folder.

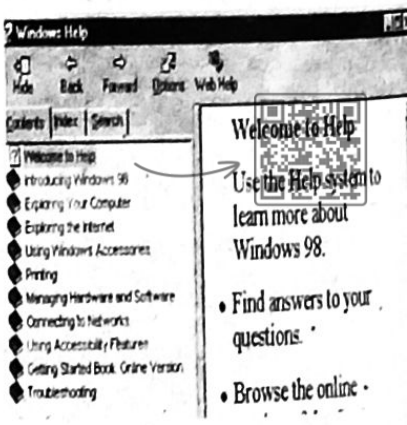


Q.11. How can you search a file or folder?

The procedure of finding a FILE or FOLDER

Click left button of mouse on **Find** option to appear **Find Dialog box.**

1. Enter the name of file or folder name in the **Named** text box.
2. Choose the location (from **Look in**) where the file or folder may be present.
3. Click on **Find Now**.
4. If find dialog box successfully searches the location of the desired file or folder, it will display it in the window below this dialog box.

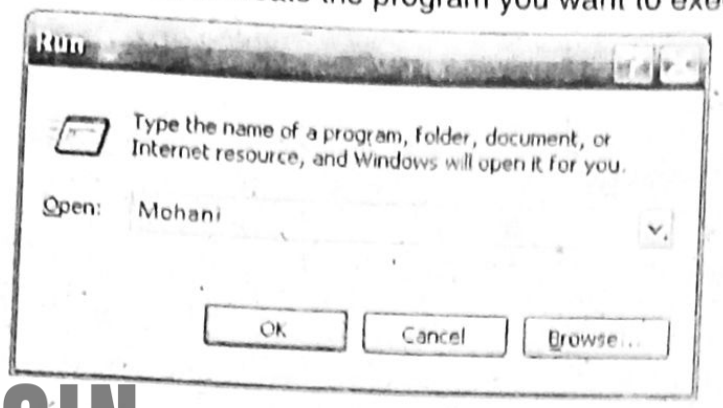


viii. Help

- To access the **Help** system of Windows, you can select **Help** from the Start menu.
- Help option helps us how to use the commands and menus and how to troubleshoot of any type of problems in Windows.

ix. Run

- This command is used to execute a command or program directly instead of using icon or program menu.
- Press the **Brows** button to locate the program you want to execute.



x. Shutdown

- Shutdown is a process in which computer closes all programs currently running and disconnects the devices connected with is and turns itself off.

Procedure of Shut-down the computer:

1. Click left button of mouse on **Start** menu to open menu.
2. Click on **Shutdown**, shutdown dialog box will appear.
3. Select the shutdown option from the list and click **Ok** button.

DESKTOP ICONS

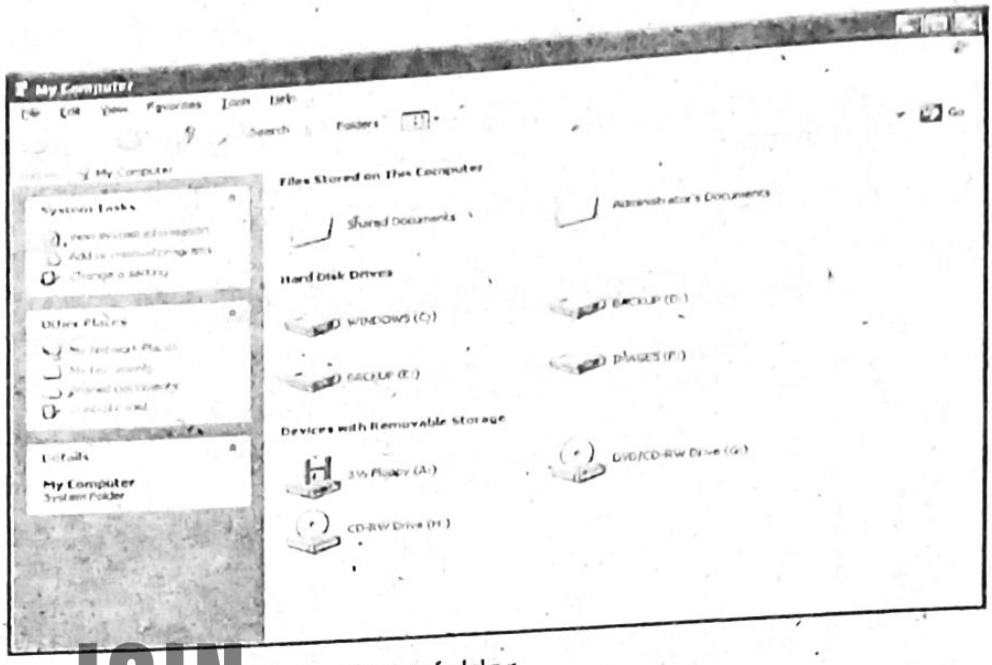
- Desktop icons are the most commonly recognized icons by most people.
- They are used to convey purpose of an available function on a computer.
- On a very graphic oriented Windows environment such as Windows XP the common desktop icons you might see are:
  1. My Computer
  2. My Documents
  3. My Network Places or Network neighborhood
  4. Recycle Bin

Q.12. Write short note on the following:

My Computer, My Documents, My Network Places or Network Neighborhood, Recycle bin

MY COMPUTER

- A folder on the desktop of Microsoft Windows that contains all the disk drives, the Control Panel, and other information about the system. Ordinarily, folders are directories.



- The root directory of a disk drive is also a folder.
- My Computer is a special folder that gives you access to the entire machine.

Tasks of My Computer:

1. Access information stored as different storage devices connected with the computer, such as hard disk, floppy disk, USB or CD-ROM.
2. Files, Folders or Programs can Create, Copy, Move, Delete or Rename easily from one disk to another disk.
3. Execute or run programs from the disk.
4. Configure devices of the computer.
5. Add or remove a printer.

Using My Computer through icon:

The following steps may be followed to work through this Icon:

1. Move mouse pointer to My Computer icon and then double click to open it.
2. My Computer window will display to view information from any of its icon, double click it to open.

MY DOCUMENTS

- My Documents is the folder where users normally save their documents, graphics or other files, so the user can access them quickly..
- On the Desktop, it is represented by a folder.
- When you save a file in a program such as Word document or Paint, the file is by default saved in My Documents folder unless you choose a different location.

To use the My Documents folder:

1. Move mouse pointer to My Documents folder.
2. Double click on it to open its window.
3. Double click to open on any item of this folder to open it.

MY NETWORK PLACES/ NETWORK NEIGHBORHOOD

- Network is a group of computers that are connected with each other to share data and information and resources of computer with each other.
- Resources like Printer, CD-ROM and software can be shared with other users on a Network.
- Network Neighborhood displays information about the network, with computer is connected to the network, lets you share files and folders etc.

RECYCLE BIN

- Recycle bin makes it easy to delete and undelete files and folders.
- When a file or folder is deleted from any location, Windows stores it in Recycle bin.
- If a file is deleted accidentally, you can move it back from the Recycle bin also we can empty Recycle bin to save disk space.

To delete or move a file to Recycle Bin:

1. Select the file or folder you want to delete.
2. Click the right mouse button on selected file or folder.
3. A menu will appear, choose **delete** from it.
4. Windows will make confirmation by displaying dialog box.
5. Click on **Yes** button.
6. File or folder will be deleted and moved to the Recycle Bin.

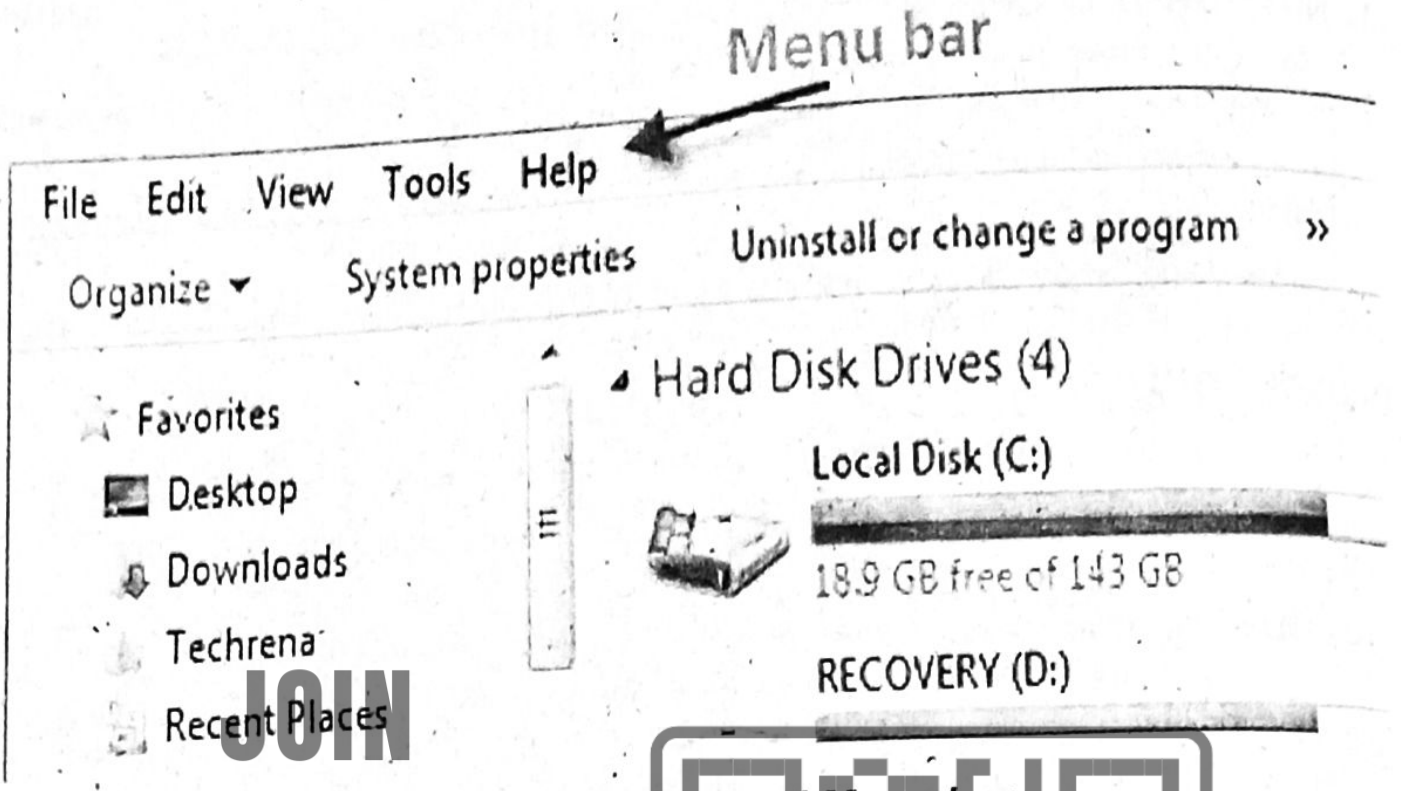
To undelete or Restore a file from Recycle Bin:

1. Open Recycle Bin Window by double clicking on its icon.
2. Select the file or folder you want to move back.
3. Click the right mouse button on it.
4. A menu will appear, choose **Restore** from it.
5. Windows will move the file or folder back to the location where it was deleted.

Q.13. What is Menu bar?

MENU BAR

- The menu bar in Microsoft Windows is usually anchored to the top of a window under the title bar; therefore, there can be many menu bars on screen at one time.
- Menus in the menu bar can be accessed through shortcuts involving the Alt key and the mnemonic letter that appears underlined in the menu title.
- Additionally, pressing Alt or F10 brings the focus on the first menu of the menu bar.



Q.14. Differentiate between Task bar and Menu bar.

DIFFERENCE BETWEEN TASK BAR AND MENU BAR

TASK BAR	MENU BAR
1. Task bar usually located at the bottom of the screen.	1. Menu bar usually appears on the top of the software using by the user.
2. Task bar display currently running name of files.	2. Menu bar display the list of commands available in software.
3. It can be made to disappear.	3. It cannot make to disappear.
4. It can be placed at any side of the screen.	4. It can be placed at anywhere of the screen
5. You can easily switch between programs.	5. You can only run the commands of software.

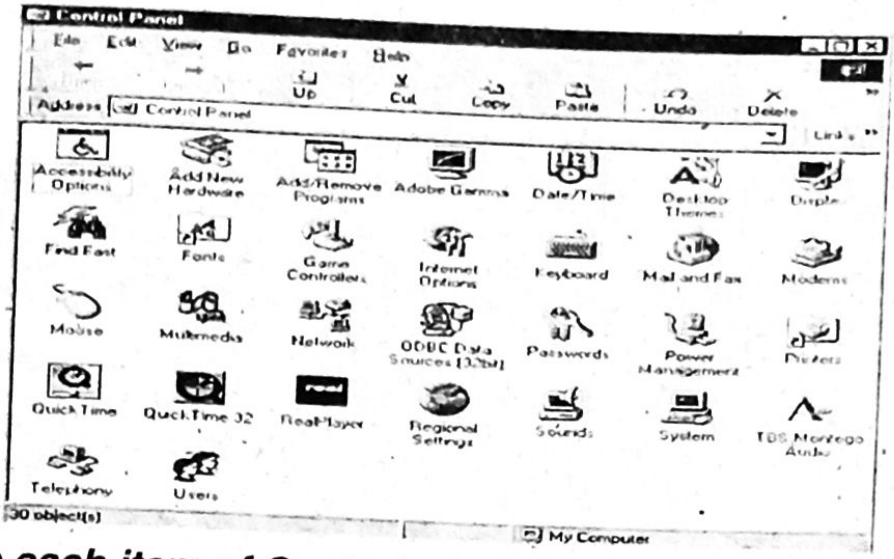
Q.15. What are the functions or Control panel?

CONTROL PANEL

- Control Penal provides the facility to change the way Windows looks and works.
- It controls a list of icons through which you can change the settings of computer.

To open Control Penal, follow the steps.

1. Click on Start button.
2. Start Menu will appear.
3. Choose Settings from it.
4. A submenu will appear.
5. Click on Control Panel to open it.



Q.16. Define each item of Control panel.

CONTROL PANEL ICONS

Control Panel contains a number of icons used to perform different settings of the computer system.

Frequently used icons are:

Accessibility Options

- The Accessibility options make it easier for people with disabilities to operate a computer without installing special software.
- Accessibility options such as Sticky keys, Show Sound and Mouse keys are designed to help users with specific disabilities take full advantages of the computer.

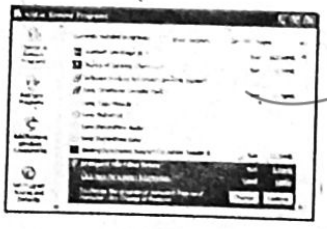
Add New Hardware

- Add New Hardware is used to install a new to the computer system.
- Every new hardware is comes with a device driver program that connects it to the computer.
- For example we can connect Web Cam, its driver support to connect it.

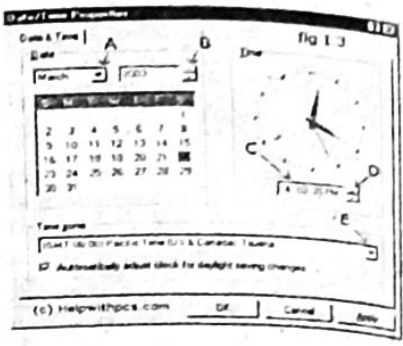
Add New Hardware

Add/Remove Programs

- We can install new software or remove software through this option.
- For example we can remove software; it lists all the programs currently installed on the computer system.
- Program should be removed or uninstalled through this icon.

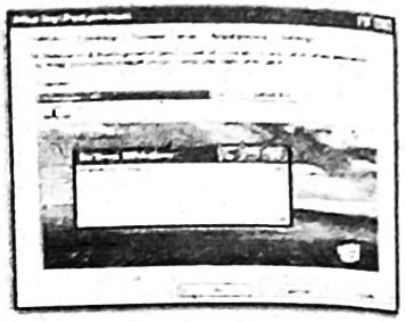


Date/Time



- . This option allows changing or setting the Date and Time of the computer system.
- The date and time are displayed on the right side of Taskbar, called **system tray**.
- We can also bring the Date and Time settings dialog box by double click on Time from the system tray.

Display

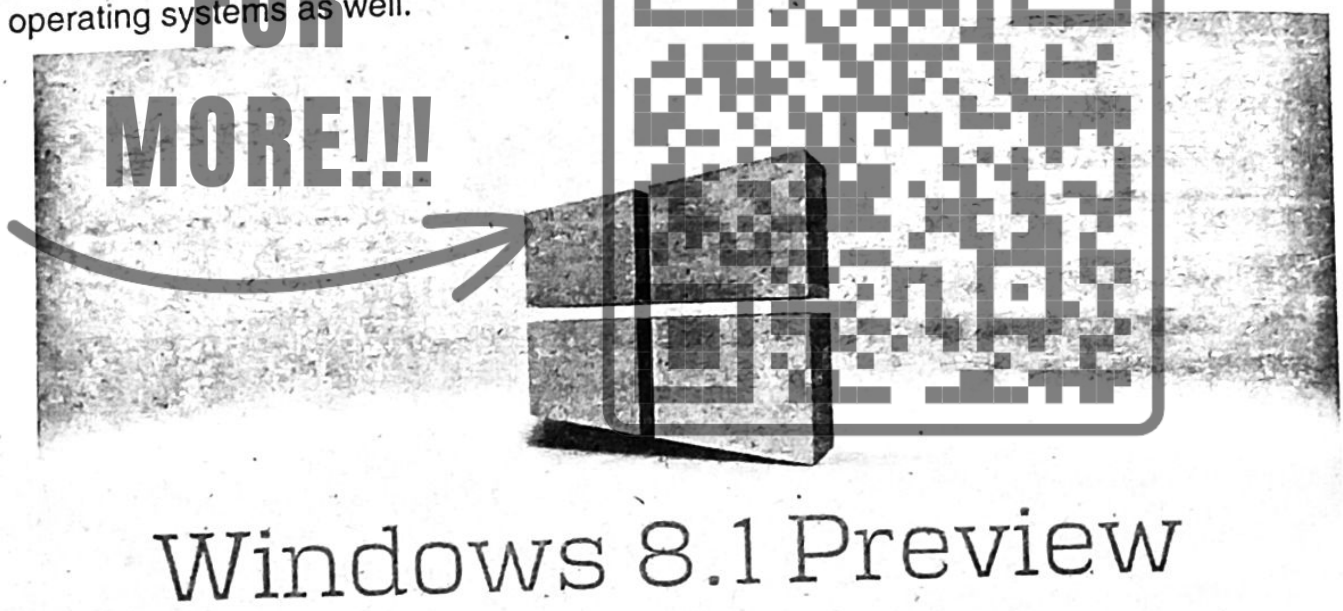


- It is used to change the display settings of Monitor.
- We can bring the Display properties dialog box right from the Desktop by clicking the right mouse button on any blank space and selecting properties from the menu.

Q.17. What is Wallpaper?

WALLPAPER

- Wallpaper is an image or color, set to the background on Desktop.
- Wallpaper is commonly used in Microsoft Windows, Macintosh Mac OS, Linux, and in other operating systems as well.



Q.18. How can you change a Wallpaper of Desktop?

WALL PAPER / BACKGROUND SETTINGS

Following steps are used to change or set the Wallpaper:

1. Click right mouse button on any blank space of Desktop.
2. A menu will appear, click on **properties**.
3. Properties dialog box will appear, click on **background** tab.
4. Select wallpaper from the list of currently available.
5. Click **Apply** and click **Ok**. Wallpaper has been changed.

Q.19. What is the procedure of setting of Screen saver?

SCREEN SAVER

- A screen saver is an animated image that is activated on a personal computer display when no user activity has been sensed for a certain time.
- Following steps are used to change the Screen Saver:

1. Click the right mouse button on any blank space of the Desktop, a menu will appear, click on **Properties**.
2. Display Properties dialog box will appear, click the **Screen Saver** tab.
3. Select a Screen Saver from drop down list.
4. Enter time in minutes you want to activate Screen Saver from **Wait** box.
5. To test a Screen Saver, click on **Preview** button.
6. Click the **Apply** and then click **Ok** to close the dialog box.

Fonts

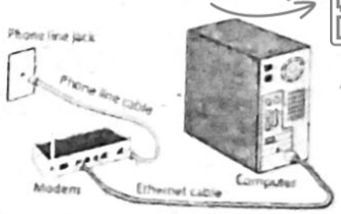
- This option can be used to add new fonts in the Fonts folder.
- We can also copy or remove fonts from this icon.

Internet Options

- It changes settings for the Web Browser software that is used in the Internet to open web pages.

Modems

- Modem enables the computer to make a dialup networking.
- By using this option we can add modem driver and change its settings.



Mouse

- By using this option we can change the mouse pointer style and button settings of the mouse.

Printer

- This option allows adding or removing a driver of the printer that is connected to the computer or on a network.

System

- This option provides us System Information about all the devices connected to the computer.

Users

- This option is helpful in managing different users of the same computer.

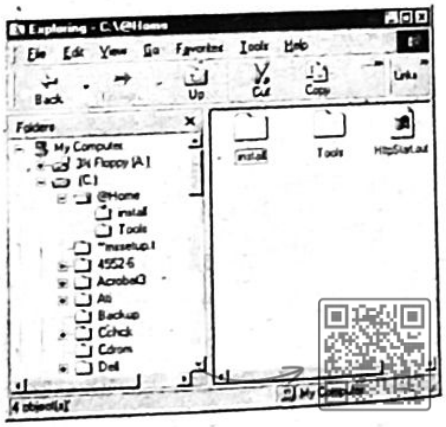
Q.20. What is the difference between Wall paper and Screen saver?

DIFFERENCE BETWEEN WALLPAPER AND SCREEN SAVER

WALLPAPER	SCREEN SAVER
1. Wallpaper is a picture or color, set the background, called desktop.	1. Screen saver is an animated picture or text set by the user, activated on screen after some specified time.
2. Wallpaper consumes computer's memory.	2. It doesn't consume computer's memory.
3. Wallpaper visible all the time.	3. Screen saver is not visible all the time.
4. Wallpapers are available by default.	4. The user has to set Screen saver.
5. Wallpapers are the graphic files having JPEG, BMP, GIF and other picture formats.	5. Screen saver can be SCR, HTML formats.

Q.21. Explain the function of Windows Explorer.

WINDOWS EXPLORER



- Windows Explorer is a program that allows a user to view the entire contents of computer on screen in a tree like structure.
- We can easily navigate between files and folders also we can open, move and delete files, folders and programs through Windows Explorer.

Follow these steps to open Windows Explorer:

1. Click the right mouse button on Start button or My Computer icon.
2. Click right mouse button.
3. A menu will be displayed, choose the **Explorer** option from it.
4. A Window Explorer will be opened.

OR

1. Click on Start button and select program.
2. From this submenu, select Accessories.
3. Click on Windows Explorer from Accessories sub menu.

Q.22. What is the difference between My Computer and Windows Explorer?

DIFFERENCE BETWEEN MY COMPUTER AND WINDOWS EXPLORER

MY COMPUTER	WINDOWS EXPLORER
1. My computer is used to explore the content that contains all the disk drives, Control Panel and other information of the system.	1. Windows Explorer is used to exploring the files, folders, drives and directories on the screen like a tree structure.
2. It enables the user to see what is in the computer as a disk drive form.	2. It enables the user to see what is in the computer in a tree like structure.
3. My Computer on the desktop can be opened by clicking My Computer icon.	3. Windows Explorer can be opened by select it from program menu.
4. File management is an easier task.	4. File management is a difficult task.

Q. 23. What is the difference between Documents and My Documents?

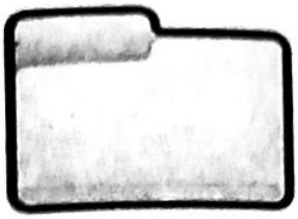
DIFFERENCE BETWEEN DOCUMENTS AND MY DOCUMENTS

DOCUMENTS	MY DOCUMENTS
1. It is a list of recently used Documents.	1. It is a folder that saves your file by default.
2. You can open the most recently used Document directly from here.	2. You have to open the My Document folder first to open any document saved in it.
3. It has extension like .DOC, .XLS etc.	3. It has no extension.
4. A Document cannot contain another Document.	4. My Document may contain other files and folders.
5. Word, Excel etc. are the example of Documents.	5. Example of My Document is an icon of My Document at the desktop.

Q.24. Write a note on File and Folder.

FILE

- A file contains data and information.
- Windows represents file with different icons.
- A file can be a document, reports, graphics, images, sounds, videos created using different software.



FOLDER

- A folder is like a subdirectory.
- The icon of a folder is yellow and looks like an office folder.
- In Windows, folder is used to store and manage files and also store more folders in it.
- Every folder is identifying with its name, called label.

Q.25. What are the operations performed on files and folders?

OPERATIONS PERFORMED ON FILES AND FOLDERS

Some of the common operations performed on files and folders are:

I. Creating copy of a disk

1. In My Computer or in the right pane of the Windows Explorer, click icon of the disk you want to copy.
2. On the **File** menu, click on the **Copy Disk**.
3. In **Copy From**, click on the drive you want to copy from.
4. In **Copy To**, click on the drive you want to copy to.
5. Click the **Start** button to start copying files.

II. Creating copy a File or Folder

1. In My Computer or Windows Explorer, click the file or folder you want to copy.
2. Click **Copy** button from the toolbar.
3. Open the folder or disk where you want to place the file or folder.
4. Press the **Paste** button from the toolbar.

III. Moving Files or Folders

1. In My Computer or Windows Explorer, click the file or folder you want to move.
2. Click **Cut** or Scissor button from the toolbar.
3. Open the folder or disk where you want to place the file or folder.
4. Press the **Paste** button from the toolbar.

Iv. Creating a Folder

1. In My Computer or Windows Explorer, select the drive where you want to create the new folder.
2. A menu will appear, click **New** and then click **Folder**.
3. The new folder will appear with the temporary name.
4. Type a suitable name and press Enter key.

DEMONSTRATION OF INSTALLATION PROCEDURE OF WINDOWS

Q.26. What are the necessary requirements or steps for installation of Windows Operating System?

REQUIREMENTS:

I. Minimum hardware

- Required Pentium-I with 32 MB RAM.
- Lesser machine will make the computer very slow work.

II. Preliminaries

- Before installing any of the versions of Windows, there are several tasks you need to undertake to ensure a smooth and safe installation.

- Some depend on whether you want to install previous version of Windows or perform a fresh installation.

iii. Boot Disk

- A boot disk is necessary only if you will be doing a clean installation of Windows.
- You can use either a bootable CD-ROM or Floppy disk. Windows installation CD is bootable.

iv. Create a Bootable disk

Follow these steps to create a bootable floppy disk.

1. Click → Start button → Settings → Control penal →Add/ Remove Programs.
2. Click the Startup Disk tab and follow the instructions.
3. Put the floppy disk in drive.

Q.27. What is the installation procedure of Windows?

STEP-BY-STEP WINDOWS INSTALLATION

1. To check and remove virus, run updated antivirus program.
2. Copy entire folder of Win98 from CD to a folder Win98Inston hard disk.
3. Restart your computer using bootable CD.
4. Type CD\Win98Inst from DOS prompt to enter required directory or folder.
5. Type SETUP command and press Enter key.
6. SETUP will run Scandisk program to check your hard disk. When Scandisk finishes, press EXIT button.
7. You will see Windows Setup screen. Read the information presented in the dialog box, then click Continue.
8. Setup will perform thorough check of your system, including looking for installed components of Windows and making sure you have enough space in your hard disk.
9. A dialog box asks you if you want to install program to save your previous Windows system files. Press YES to make it possible to uninstall Window 98 should you run into trouble.
10. The next choice you have to make, for a clean install only, about how much of the operating system you want to install. You can select default option "Typical".
11. Select the basic components to install Windows.
12. In the next dialog enter your computer name to identify it.
13. The SETUP asks you. Do you want to create a Start-Up disk? You can boot your computer with Start-Up disk in case of trouble.
14. The SETUP Wizard now needs to restart your computer and finish up.
15. After restart, Windows still has a few touches to make. It will detect and setup plug & play devices and other possible hardware.

Q.28. What is a computer virus? How a virus removed from disk?

VIRUS

- A computer virus is a hidden program, which can infect your computer system or other programs.
- A Virus attaches itself to other programs and executes secretly every time the host program is executed.
- The Virus replicates itself within a computer system.

Computer Virus may cause the following difficulties.

1. It infects your programs.
2. It changes the system date and time.

3. It destroys the data on disk.
4. It spreads from one disk to another.
5. It makes the computer unusable.
6. It increases the file size and replicates itself.

- There are a large number of viruses present in the computer world. These Viruses include:
  - C-Brain
  - Joshi
  - Jerusalem
  - Friday 13th
  - Trojan
  - Chernobyl

ANTI-VIRUS

- Anti-Virus is used to remove the virus programs from the disk that can destroy the valuable data and causes the computer to malfunctions.
- Some of the Anti-Virus programs available are:
  - Norton Anti-Virus (NAV)
  - MacAfee,
  - PC Clean
  - AVG
  - Kaspersky
  - Avast

EXERCISE

Answer the following questions?

1. Define the properties of Windows operating system?

Ans. See Q # 3

2. Distinguish between DOS and Windows operating system?

Ans. See Q # 5

3. Define what is Desktop? What are its elements?

Ans. See Q # 6

4. Explain the functions of Windows Explorer?

Ans. See Q # 21

5. Write short notes on the following?
   - Icon

Ans. See Q # 7
   - Taskbar

Ans. See Q # 7
   - Recycle bin

Ans. See Q # 7
   - My Computer

Ans. See Q # 12
   - My Documents

Ans. See Q # 12
   - Window

Ans. See Q # 7

6. How can you search a file or folder?

Ans. See Q # 11

7. What is the function of Start button?

Ans. See Q # 8

8. What are the items of Start menu?
Ans. See Q # 9
9. How can you change wallpaper of the Desktop?
Ans. See Q # 18
10. What is the procedure of setting a Screen Saver?
Ans. See Q # 19
11. What is the function of Control Panel?
Ans. See Q # 15
12. Define each item of Control Panel?
Ans. See Q # 16
13. How can you install a printer?
Ans. See Q # 10
14. What is the installation procedure of Windows?
Ans. See Q # 26
15. What is a computer virus? How a virus is removed from disk?
Ans. See Q # 27
16. Differentiate between the following?
(a) My Computer and Windows Explorer
Ans. See Q # 22
(b) Task bar and Menu bar
Ans. See Q # 14
(c) Documents and My documents
Ans. See Q # 23
(d) Wallpaper and Screen Saver
Ans. See Q # 20

Fill in the blanks.

i) Icon is a small graphical symbol that represents files and folders.
ii) The screen that Windows displays after booting is known as Desktop.
iii) Window is a rectangular area of screen that displays different information.
iv) Control panel provides that tools to control the way your computer behaves, its components presents information.
v) The RUN command is used to execute a command or program directly, instead of using the icon or program menu.
vi) Shutdown is a process in which computer closes all programs currently running and disconnects the devices connected with it.
vii) The Find / Search option of the Start menu helps in locating files or folders stored on hard disk.
viii) Network is a group of computers that are connected with each-other to share data, information and resources of computer with other users.
ix) The Add / Remove program option helps in installing new software or removes software that we no longer want to keep in the computer.
x) Screen saver is an animated image or text that displays on the screen of the monitor after some specified time when the computer is left idle.

Tick the correct answers.

i) The bar, displayed at the bottom of the desktop is known as:
(a) Title bar **(b) Task bar✓** (c) Menu bar (d) Tool bar

ii) You can Shutdown, Standby and Restart the computer using:
(a) Desktop (b) Menu bar **(c) Start Button ✓** (d) Task bar

iii) Which of the following lets your browse the contents of your computers?
(a) My Documents (b) My Computers
(c) My Network places✓ (d) Windows Explorer

iv) A convenient place to store document, graphics, or other files that you want to access quickly is:
(a) My Network places **(b) My Documents✓**
(c) My Computer (d) Folder

v) Which component makes it easy to delete and undelete files and folders?
(a) Windows Explorer **(b) Recycle Bin ✓**
(c) Add/Remove programs (d) My Documents

vi) The option that makes it easier for people with disabilities to operate a computer is:
(a) Accessibility ✓ (b) Display (c) Setting (d) Fonts

vii) The image of color set to the background of the Desktop is:
(a) Screen saver (b) Picture (c) Monogram **(d) Wallpaper ✓**

viii) The device that enables the computer to make a dialup networking is:
(a) Mouse (b) Monitor **(c) Modem ✓** (d) Keyboard

ix) Which component provides a tree like view of disk, its files and folders?
(a) My Computer **(b) Windows Explorer ✓**
(c) Control Panel (d) Start menu

x) The software that removes viruses from disk is known as:
(a) Virus Killer (b) Remover **(c) Anti-Virus ✓** (d) Destroyer

MCQs

1. The Bar displayed at the top of a window, is known as
(a) Tool Bar (b) Menu Bar **(c) Title Bar ✓** (d) Task Bar

2. The device that enables a computer to make a dial-up networking is
(a) Mouse (b) Microphone **(c) Modem ✓** (d) Monitor

3. The Bar displayed at the bottom of the desktop, is known as
(a) Title Bar **(b) Task Bar ✓** (c) Tool Bar (d) Menu Bar

4. A small colorful graphical picture representing a file, folder or program is called
(a) Folder (b) Image **(c) Icon ✓** (d) Button

5. It is a rectangular area that can contain files or folders
(a) Window ✓ (b) Menu (c) Box (d) Toolbox

6. What is the name of Windows interface?
(a) Desktop ✓ (b) Cabinet (c) Notepad (d) White board

7. URL stands for
(a) Universal and Regional LAN (b) Universal Resource Locator
(c) Uniform Resource Locator ✓ (d) Uniform Regional LAN

8. WWW stands for
(a) World Wide Web ✓ (b) World Wide Website
(c) Wide Web Website (d) World Welcome Web

9. The connection between two web pages is called
(a) Hypertext (b) URL (c) WWW **(d) Hyperlink ✓**

10. The bar, displayed at the bottom of the desktop is known as:
(a) Title bar Task bar **(b) Task bar Menu bar ✓**
(c) Menu bar Tool bar (d) Tool bar

11. You can Shutdown, Standby and Restart the computer using.
(a) Desktop **(b) Menu bar ✓** (c) Start Button (d) Task bar

12. Which of the following lets you browse the contents of your computer?
(a) My Documents **(b) My Computer ✓**
(c) My Network places (d) Windows Explorer

13. A convenient place to store documents, graphics, or other files that you want to access quickly is:
(a) My Network places **(b) My Documents✓**
(c) My Computer (d) Folder

14. Which component makes it easy to delete and undelete files and folders?
(a) Windows Explorer **(b) Recycle Bin✓**
(c) Add / Remove programs (d) My Documents

15. The option that makes it easier for people with disabilities to operate a computer:
(a) Accessibility✓ (b) Display (c) Settings (d) Fonts

16. The image or color set to the background of the Desktop is:
(a) Screen saver (b) Picture (c) Monogram **(d) Wall paper✓**

17. The device that enables the computer to make a dialup networking is:
(a) Mouse (b) Monitor **(c) Modem✓** (d) Keyboard

18. Which component provides a tree like view of disks, its files and folders?
(a) My Computer **(b) Windows Explorer✓**
(c) Control Panel (d) Start menu

19. The software that removes viruses from disk is known as:
(a) Virus Killer✓ (b) Remover (c) Anti-virus (d) Destroyer

20. The program which protects your computer from virus is called ----------
(a) Antivirus✓ (b) Window (c) System (d) Format

21. You can protect your computer monitor screen by is called ----------
(a) Antivirus **(b) Window✓** (c) System (d) Format

22. In your control panel the number of items depends on----------
(a) Antivirus (b) Window **(c) System✓** (d) Format

23. Restore command is used to ----------
(a) Antivirus (b) Window (c) System **(d) Format✓**

24. The ----------contains commands that can access programs, documents, and settings
(a) **Start menu✓** (b) Internet Explorer (c) Icon (d) Task bar

25. The Quick Launch bar, introduced with 4, contains shortcuts to applications
(a) Start menu (b) **Internet Explorer✓** (c) Icon (d) Task bar

26. An _____is a small colorful graphical picture that represents an object like a file, folder, program or any hardware components of the computer
(a) Start menu (b) Internet Explorer **(c) Icon✓** (d) Task bar

27. The _____is at the bottom of the desktop but you can move it to the top or either side of the screen by clicking and dragging it to the new location
(a) Start menu (b) Internet Explorer (c) icon **(d) task bar✓**

28. A technique used by codes to convert an analog signal into a digital bit stream is known as
a. Pulse code modulation✓ b. Pulse stretcher
c. Query processing d. Queue management

29. Which of the following required large computer memory?
a. Imaging b. Graphics c. Voice **d. All of above✓**

30. The concept that many users can share a computer is called
(a) Time-sharing✓ (b) Distributed processing
(c) Parallel processing (d) Interpersonal relationship

PROBLEM SOLVING STEPS

Q.1. What are the steps required to solve a problem?

PROGRAMMING STEPS

Whenever we want to solve a problem through the computer, before programming we require two specifications.

The first will detail the precise problem to be solved and the type of the information which is required. The second will itemize the computer configuration which will handle the job, i.e., the available equipment.

This whole process is known as PROBLEM ANALYSIS.

We now summarize these stages with which a programmer is concerned in the development of a program, from the specification of the problems to its successful completion.

The programming process is a problem solving process and it consist of the following stages.

1. Defining the problem
2. Analysis of the problem
3. Algorithm
4. Flowchart
5. Coding
6. Testing and debugging
7. Implementation
8. Documentation

Q.2. How can you define a problem?

DEFINING THE PROBLEM

The solution of the problem depends upon the clear description and understanding of the problem.

This requires analysis of the problem to find the nature of the problem, analysis of the input data and planning of the output result, this step achieves the following goals.

1. Problem description
2. Determination of the objectives
3. Analysis of the input data
4. Planning of output

For example, calculate the average of three given numbers.

The analysis of the problem leads to the following steps.

Object: Calculate the average of three given numbers.

Input data: Three numbers entered as A, B, C and analysis the data that the numbers are integers or fractional or any other type.

Output: Average of the three given numbers.

Q.3. Describe problem analyses

ANALYSIS OF THE PROBLEM

This is a very important stage in the developing a solution of a problem where are completely understand or analyze the problem.

All the facts related to the problem are obtained and they are organized in some systematic manner so that they can be analyzed which leads to a through understanding of the problem.

The person who design or prepares this document is known as system Analyst.

Q.4. What is an algorithm?

ALGORITHM

A series of procedural steps required to solve a given problem is called an Algorithm.

The construction of the algorithm is the stage which requires steps or computer operation which collectively solve a given problem.

An algorithm usually written in ordinary English language and use the some mathematical symbols, if required.

The algorithm which will need the least time when executed by a computer is considered the best.

Now, we will write the algorithms of some examples problems.

Examples of Algorithms

Problem-1:

Write an algorithm to print given roll number and name.

Algorithm:

Step-1: Enter Roll number
Step-2: Enter Name
Step-3: Display Roll number
Step-4: Display name
Step-5: Stop

Problem-2:

Write an algorithm to calculate the sum of three given numbers.

Algorithm:

Step-1: Enter three numbers as A, B and C
Step-2: Calculate the sum of A,B and C and assign the value of sum to the variable S.
Step-3: Display the sum as S.
Step-4: Stop

Q.5. What is a flowchart? Why program flowchart is called a "logical diagram"?

FLOWCHART

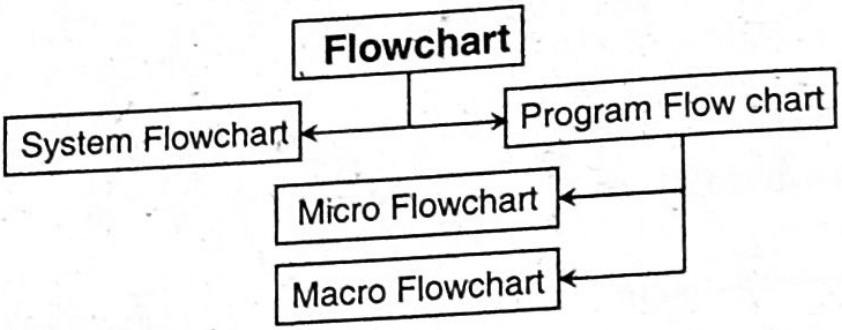
Flowchart is a graphical illustration of what the computer is supposed to do.

The flowchart is a precise and convenient mean of outlining various steps in a computer program.

Flowchart serves same purpose as algorithm, to define logic, but flowchart more easily readable. That's why program flowchart is also called a logical diagram.

Types of Flowchart

The flowchart may be categorized as follows:



i. System flowchart:

- By system flowcharts, entire system of processing is shown, just to describe the available input and output devices.
- It is very necessary for a programmer to know about available devices before developing a computer program.

ii. Program flowchart:

- A program flowchart describes the complete execution of a program.
- Program flowchart is divided in two types, namely:
  a) Macro flowchart
  b) Micro flowchart

a) Macro flowchart

A detailed flowchart is called "Macro flowchart", which required all steps by that problems and no step, even a little, is omitted.

b) Micro flow chart

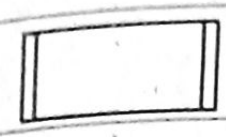
In Micro flowchart only major events are shown for less complicity, while there should be no affect on the entire processing.

Q.5. Draw and define each of the following symbols of program flowchart: Decision, Input/ Output, Process, Pre-Defined Process, Terminal, Connector, Flow line

Flowcharting Symbols:

Some flowchart symbols and its purpose are as under:

Symbol	Symbol name	Geometrical name	Purpose
	Terminal	Oval	Represent Start or End of program
	Process Box	Rectangle	Used to arithmetic assignment and its processing
	I/O or Input/Output box	Parallelogram	Used to representing input and output operation
	Decision box	Diamond	Two lines should leave from the box for "True" or "False" to indicate which path is to be taken.

	Pre-defined process box	Rectangle (with double side lines)	Used to some pre-defined operations
	Flow lines	Arrows	Use to show the flow of a program
	On page connector	Circle	Used to connect the path from one place to another place on same page
	Off page connector	Pentagon	Used to connect the path from one place to another place on different pages.

Q.7. What do you mean by Coding?

CODING

The sequence of operations outlined by the flowchart is transposed into a programming language.

For example, we can write our program in BASIC, COBOL, FORTRAN, C or any other high level language. Preprinted coding form is normally used in this exercise.

The coded form of a program in any high level language is known as **Source Program**.

Q.8. How Testing and Debugging are important in the process of solving a problem?

TESTING AND DEBUGGING

Testing is the very important stage of the program development. In this state, a program is executed with different types of data to make sure that the program will work correctly. Any error or mistake in source program are analyzed and resolved in this stage. The error in computer program is known as 'bug' and the process of removing the errors from it, is called 'debugging'.

Q.9. What is Implementation?

IMPLEMENTATION

After successful completion of testing and debugging phase of the program, it is adopted for implementation.

Actual and Read data fed to the computer and strictly monitored the processing of the program and their outputs. The following are major activities which comprise the implementation process.

i. Develop detailed programming specifications.
ii. Develop Test specifications and test data.
iii. Write computer programs.
iv. Test Computer programs
v. User Training
vi. System testing
vii. File Conversion
viii. Change over to new system

Q.10. Define Documentation and its types.

DOCUMENTATION

Proper documentation is necessary for the more complex program.

Documentation includes the following:

i. The portion of the program that explain the program. It described what the program should do.
ii. What data is needed?
iii. How data is identified in the program statements?
iv. How the output is formatted?
v. Described the modules, their functions and relationship with the program.
vi. Algorithm and flowchart of the program.
vii. List of Hardware equipment's required for the program

Documentation of the program contributes to their useful value.

Well documented programs are extremely valuable whenever the program is to be rewritten for another computer or for the improvement of the system.

There are following two types of documentation.

1. Use Documentation
2. Technical Documentation

User Documentation

This type of documentation is prepared in a way that is easy-to-understand for the individual who use the program because sometimes non–computer professional users use to program.

The user documentation consists on the following material.

i. Describe the problem that will be solved by this program.
ii. Program Name.
iii. Machine Specification
iv. Purpose of the program
v. Location (on the Disk where program exist)
vi. To use and operate the program.
vii. Restrictions

Technical Documentation

This type of documentation helps the computer operator to execute the program.

At the time of medication these documentation is very useful for Analysts and programmer.

This documentation includes the following.

i. Proper description of the problem
ii. Program Name
iii. Purpose of the Program
iv. Algorithm and Flowchart
v. Complete Structure of the programmer
vi. Module Names, Parameters and their purpose
vii Variable Used
viii. List of errors conditions
ix. Explanatory notes about the files recording layout
x. Restrictions.

EXERCISE

1. What are the steps required to solve a problem by studying a computer

Ans. See Q # 1

2. What is a Flowchart? Why flowchart is called a "Logical diagram"?

Ans. See Q # 4

3. Draw and defined each of the following symbols of program flowchart.

Decision Input Output Pre-Define Process

Process Terminal Connector Flow lines

Ans: See Q # 5

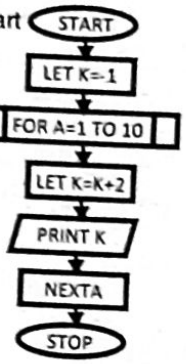
4.. Define an ALGORITHM. What is the importance of an algorithm for the preparation of a computer program?

Ans. See Q # 3

5 Draw the logic flowchart and write output of the following programs.

(i)
```
10  LET K = -1
20  FOR A = 1 TO 20
30  LET K = K +2
40  PRINT K
50  NEXT A
```

Flowchart

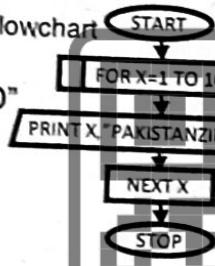


Output

2
4
6
8
10
12
14
16
18
20

(ii)
```
10  FOR X = 1 TO 10
20  PRINT X, "PAKISTAN ZINDABAD"
30  NEXT X
40  END
```

Flowchart



Output

1	PAKISTAN ZINDABAD
2	PAKISTAN ZINDABAD
3	PAKISTAN ZINDABAD
4	PAKISTAN ZINDABAD
5	PAKISTAN ZINDABAD
6	PAKISTAN ZINDABAD
7	PAKISTAN ZINDABAD
8	PAKISTAN ZINDABAD
9	PAKISTAN ZINDABAD
10	PAKISTAN ZINDABAD

(iii)
```
10  FOR A = 0 TO 20 STEP 2
20  SUM = SUM + A
30  PRINT A, SUM
40  NEXT A
```

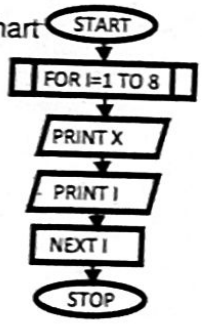
Flowchart

Output

0	0
2	2
4	6
6	12
8	20
10	30
12	42
14	56
16	72
18	90
20	110

(iv)
```
10  CLS
20  FOR I = 1 TO 8
30  PRINT X
40  PRINT I
50  NEXT I
60  END
```

Flowchart

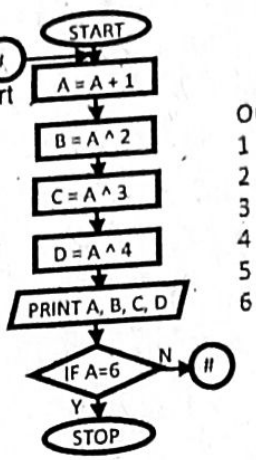


Output

0
1
0
2
0
3
0
4
0
5
0
6
0
7
0
8

(v)
```
10 CLS
20     A = A+1
30     B = A^2
40     C = A^3
50     D = A^4
60     PRINT A, B, C, D
70     END
```

Flowchart

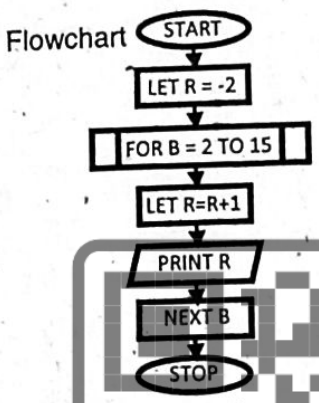


Output

1	1	1	1
2	4	8	16
3	9	27	81
4	16	64	256
5	25	125	625
6	36	216	1296

(vi)
```
10     CLS
20     LET R = -2
30     FOR B = 2 TO 10
40     LET R = R + 1
50     PRINT R
60     NEXT B
70     END
```

Flowchart

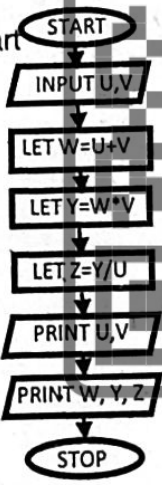


Output

-1
0
1
2
3
4
5
6
7

(vii)
```
10     CLS
20     INPUT U, V
30     LET W = U + V
40     LET Y = W * V
50     LET Z = Y / U
60     PRINT U, V
70     PRINT W, Y, Z
80     END
```

Flowchart

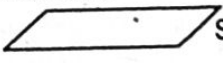


If the value of U=2 and V=3 then the output is

Output

2	3	
5	15	7.5

6. Fill in the blanks;

(i) A diagram used to plan a program is called Flowchart.
(ii) An algorithm gives the steps of solution of a problem.
(iii) Pictorial representation of logic of solution of a problem is called Flowchart.
(iv) Any type of spelling or grammatical mistake in a computer program create Syntax error.
(v) Type of flowchart is Program flowchart and System flowchart.
(vi) Terminal (oval) symbol of flowchart is used for start or end of a flowchart.
(vii) Diamond (Decision) symbol used for decision in the flowchart.
(viii) In the flowchart input/output operations shown by I./O  symbol.
(ix) An Algorithm gives the method of solution of a problem.
(x) Flow lines show the direction of flow chart.

7. Write "TRUE" or "FALSE" for the following statements:

(i) A flowchart can not be fed to a computer to solve a problem (True)

(ii) An algorithm means a flowchart. (False)
(iii) A flowchart is an absolute necessity while writing a source program. (True)
(iv) The answer to questions asked in a flow chart can be YES, NO TRUE and FALSE (True)
(v) Terminal symbol may be used in the middle of a flowchart. (False)
(vi) A small circle is used for end of flowchart. (False)
(vii) In the flowchart, decisions are shown by the diamond symbol. (True)
(viii) We can not take more than one decision in a flowchart. (False)
(ix) Rectangle is used for input output operation. (False)
(x) The flow of logic in a flowchart shown by the arrows. (True)
(xi) System flowchart is any prepared by the computer manufacturer. (False)
(xii) Debugging means removal of error from the program. (True)
(xiii) Flowchart is the block diagram of computer. (True)
(xiv) Flowchart always prepare after writing the program. (False)

MCQs

1. A detailed series of steps written for computer to produce desired result is known as:
(a) Flowchart (b) Algorithm✓ (c) Analyzing (d) None of them
2. Program can take decision in flowchart by:
(a) Oval (b) Rectangle (c) Circle **(d) Diamond✓**
3. A flowchart helps to prepare a program in:
(a) BASIC (b) COBOL (c) FORTRAN **(d) all of them✓**
4. Manually execution of a program is called:
(a) Error removing (b) Analyzing **(c) Dry run✓** (d) None of them
5. A procedure of removing errors is called:
(a) Debugging✓ (b) Documentation (c) Coding (d) None of them
6. Last step in a solving of a problem is:
(a) Testing (b) Writing program (c) Debugging **(d) Documentation✓**
7. The person who designs solution of a problem is known as:
(a) Operator (b) Programmer **(c) System analysis ✓** (d) None of them
8. Graphical representation of a program is called:
(a) Algorithm **(b) Flowchart✓** (c) Coding (d) Documentation
9. The printed or coded form of a program in any high level language is known as:
(a) Algorithm **(b) Source program✓** (c) Object program (d) None of them
10. A detailed flowchart is called:
(a) Micro flowchart (b) Mini flowchart **(c) Macro flowchart✓** (d) None of them
11. Program flowchart is divided into:
(a) Two types✓ (b) Three types (c) Four types (d) Five types
12. Only major events are shown in:
(a) Micro flowchart✓ (b) Mini flowchart (c) Macro flowchart (d) None of them
13. The procedure of writing a program is called:
(a) Debugging **(b) Coding✓** (c) Analyzing (d) None of them
14. A flowchart symbol that is used to representing input and output operation is:
(a) Rectangle (b) Oval (c) Diamond **(d) Parallelogram✓**
15. After successful completion of testing and debugging phase of the program, it is adopted for:
(a) Coding (b) Analyzing **(c) Implementation✓** (d) Defining the problem

INTRODUCTION TO BASIC LANGUAGE

Q.1. Define BASIC language?

DEFINITION

BASIC is an acronym of Beginners All-purpose Symbolic Instruction Code. BASIC was invented at Dartmouth College in the early 1960s by John George Kemeny and Thomas Eugene Kurtz. It was interpreted, easy to use and introduced thousands to programming long before personal computers existed. A famous Computer Scientist once said that anyone who learnt BASIC was brain damaged.

Q.2. How many modes of BASIC

MODES OF OPERATION

Once BASIC is initialized (loaded), it displays the Ok prompt. Ok means BASIC is at command level, that is, it is ready to accept commands. At this point, BASIC may be used in either of two modes:

1. Direct mode 2. Indirect mode.

Q.3. Describe direct mode and indirect mode of BASIC language.

DIRECT MODE

In the direct mode, BASIC statements and commands are executed as they are entered. Results of arithmetic and logical operations can be displayed immediately and/or stored for later use, but the instructions themselves are lost after execution. This mode is useful for debugging and for using BASIC as a calculator for quick computations that do not require a complete program.

INDIRECT MODE

The indirect mode is used to enter programs. Program lines are always preceded by line numbers, and are stored in memory. The program stored in memory is executed by entering the RUN command.

Q.4. What is the difference between direct and indirect mode of BASIC language?

Difference between Direct mode and Indirect Mode of BASIC language

DIRECT MODE	DIRECT MODE
1. Program lines are always entered without line numbers.	1. Program lines are always preceded by line numbers.
2. Command and statements are executed as they are entered.	2. The program stored in memory is executed by entering the RUN command.
3. Results of arithmetic and logical operations can be displayed immediately without any program.	3. Programs are entered to get results of arithmetic and logical operation.

4. Direct mode instructions are lost after execution.	4. Direct mode instructions are does not lose after execution.
5. We can't store these instructions on disk.	5. We can store these instructions on disk as a program.

Q.5. What are the elements of BASIC language?

ELEMENTS OF BASIC LANGUAGE

A BASIC program is made up of several elements:

a) Keywords b) Commands c) Statements d) Functions e) Variables

Q.6. What is the meaning of reserved words or keywords?

KEYWORDS/RESERVED WORDS

- BASIC keywords, such as PRINT, GOTO, and RETURN have special significance for the BASIC Interpreter. BASIC interprets keywords as part of statements or commands.
- Keywords are also called reserved words. They cannot be used as variable names, or the system will interpret them as commands. However, keywords may be embedded within variable names.
- Keywords are stored in the system as tokens (1- or 2-byte characters) for the most efficient use of memory space.

Q.7. Define commands and statements of BASIC language.

COMMANDS

- Commands and statements are both executable instructions.
- The difference between commands and statements is that commands are generally executed in the direct mode, or command level of the interpreter.
- They usually perform some type of program maintenance such as editing, loading, or saving programs.
- When BASIC is invoked and the BASIC prompt, Ok, appears, the system assumes command level.

STATEMENTS

A statement, such as ON ERROR GOTO, is a group of BASIC keywords generally used in BASIC program lines as part of a program. When the program is run, statements are executed when, and as, they appear.

Q.8. What is the different between command and statement?

Difference between COMMAND and STATEMENT of BASIC language

COMMAND	STATEMENT
Usually commands are entered without line number.	Usually statements are entered with line number.
Results of commands can be displayed immediately.	Programs are entered to get results of statements.
We cannot save commands without line number.	We can save statements as a BASIC program.

Q.9. Define function and its types.

FUNCTIONS

- The BASIC Interpreter performs both numeric and string functions.

Numeric Functions

- The BASIC Interpreter can perform certain mathematical (arithmetical or algebraic) calculations.
- For example, it calculates the sine (SIN), cosine (COS), or tangent (TAN) of angle x.
- Unless otherwise indicated, only integer and single-precision results are returned by numeric functions.

String Functions

- String functions operate on strings.
- For example, TIME$ and DATE$ return the time and date known by the system.
- If the current time and date are entered during system start up, the correct time and date are given (the internal clock in the computer keeps track).

User-Defined Functions

- Functions can be user-defined by means of the DEF FN statement. These functions can be either string or numeric.

Q.10. What is a variable? Describe its types.

VARIABLES

- Variables are the names that you have chosen to represent values used in a BASIC program.
- The value of a variable may be assigned specifically, or may be the result of calculations in your program.
- If a variable is assigned no value, BASIC assumes the value to be zero.

TYPES OF VARIABLES:

There are two types of variables.

1. **Numeric Variable:** Numeric Variables can store numbers only.
2. **String Variable:** String variables can store Alphabets, numbers and some special characters.

Q.11. What are the rules of writing a variable name?

Variable Names and Declarations

i. BASIC variable names may be any length; up to 40 characters are significant.

ii. The characters allowed in a variable name are letters, numbers, and the decimal point.

iii. The first character in the variable name must be an alphabet.

iv. Special type declaration characters are also allowed.

v. Reserved words (all the words used as BASIC commands, statements, functions, and operators) can't be used as variable names.

vi. However, if the reserved word is embedded within the variable name, it will be allowed.

vii. Variables may represent either numeric values or strings.

Example:

	Item	Nature
(i)	X$	String variable
(ii)	1A$	String variable
(iii)	ABC	String variable

(iv)	C1	Numeric variable
(v)	5XAB$	Numeric variable
(vi)	M=A$	String variable
(vii)	15B	Numeric variable.
(viii)	$y	String variable
(ix)	2z$	Numeric variable
(x)	A	String variable
(xi)	B	String variable
(xii)	523	Numeric variable
(xiii)	CDE	Numeric variable
xiv)	A-B$	Numeric variable
(xv)	x-y	Numeric variable

Q.12. How can you declare a type of variable?

Type Declaration Characters

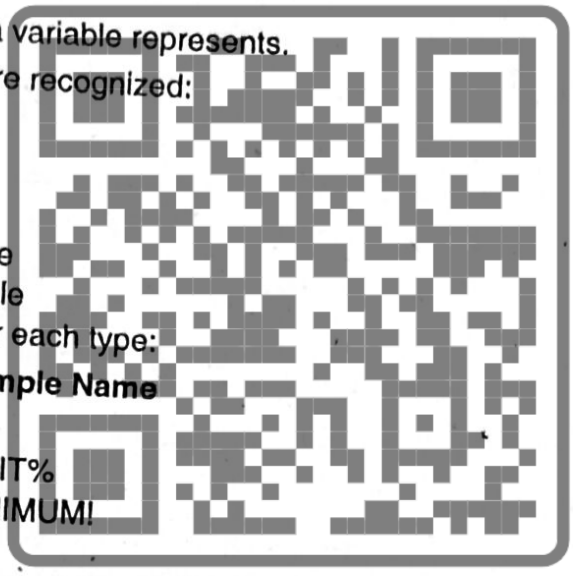
Type declaration characters indicate what a variable represents.

The following type declaration characters are recognized:

Character	Type of Variable
$	String variable
%	Integer variable
!	Single-precision variable
#	Double-precision variable

The following are sample variable names for each type:

Variable Type	Sample Name
String variable	N$
Integer variable	LIMIT%
Single-precision variable	MINIMUM!
Double-precision variable	PI#



Note: The default type for a numeric variable name is single-precision e.g. ABC

Memory Space Requirements for Variable Storage

The different types of variables require different amounts of storage.

Depending on the storage and memory capacity of your computer and the size of the program that you are developing, these can be important considerations.

Variable	Required Bytes of Storage
Integer	2
Single-precision	4
Double-precision	8

Q.13. Define constant and its types.

CONSTANTS

- Constants are static values the BASIC Interpreter uses during execution of your program.

TYPES OF CONSTANTS

There are two types of constants:

1. String Constant 2. Numeric Constant

i. STRING CONSTANT

- A string constant is a sequence of 0 to 255 alphanumeric characters enclosed in double quotation marks.
- The following are sample string constants:

HELLO

Rs.25,000.00

Number of Employees

ii. NUMERIC CONSTANTS

- Numeric constants can be positive or negative.
- When entering a numeric constant in GW-BASIC, you should not type the commas.
- For instance, if the number10,000 were to be entered as a constant, it would be typed as 10000.
- There are five types of numeric constants: integer, fixed-point, floating-point, hexadecimal, and octal.

Single- and Double-Precision Form for Numeric Constants

- Numeric constants can be integers, single-precision, or double-precision numbers.
- Integer constants are stored as whole numbers only. Single-precision numeric constants are stored with 7 digits (although only 6 may be accurate).
- Double-precision numeric constants are stored with 17 digits of precision, and printed with as many as 16 digits.

Q.14. Describe the operators of BASIC language.

OPERATORS

- Operators perform mathematical or logical operations on values.
- The operators provided by BASIC are divided into four categories:

1. Arithmetic 2. Relational 3. Logical 4. Functional

Q.15. Define Arithmetic operators.

Arithmetic Operators

- The following are the arithmetic operators recognized by BASIC.
- They appear in order of precedence.

Operator	Operation
^	Exponentiation
–	Negation
*	Multiplication
/	Floating-point Division
+	Addition
–	Subtraction

- Operations within parentheses are performed first.
- Inside the parentheses, the usual order of precedence is maintained.

Q.16. How can you write an algebraic expression with arithmetic operator in BASIC Language?

Expressions

- An expression may be simply a string or numeric constant, a variable, or it may combine constants and variables with operators to produce a single value.
- The following are sample algebraic expressions and their BASIC counterparts:

Algebraic Expression	BASIC Expression
$\frac{X - Y}{Z}$	(X – Y)/Z
$\frac{XY}{Z}$	X * Y/Z
$\frac{X + Y}{Z}$	(X + Y)/Z
$(X^2)^Y$	(X ^ 2) ^Y
X^{Y^2}	X ^ (Y ^ Z)
$X(-Y)$	X * (– Y)
$\sqrt{5}$	5 ^ (1/2)
$\frac{b + \sqrt{b^2 - 4ac}}{2a}$	b + (b ^ 2 – 4 * a * c) ^ (1/2)) / (2 * a)
$P\left(1 + \frac{r}{n}\right)^{nt}$	P * (1 + r/n) ^ (n * t)

- Two consecutive operators must be separated by parentheses.

Q.17. What are the additional arithmetic operators?

Additional arithmetic operators

Two additional arithmetic operators are available:

i. Integer division
ii. Modulus arithmetic

i. Integer division

- Integer division is denoted by the backslash (\).
- The operands are rounded to integers (must be within the range of -32768 to 32767) before the division is performed, and the quotient is truncated to an integer.
- The following are examples of integer division:

  10\4 = 2

  25.68\6.99 = 3

ii. Modulus arithmetic

- Modulus arithmetic is denoted by the operator MOD.
- It gives the integer value that is the remainder of an integer division.
- The following are examples of modulus arithmetic:

  10 MOD 4 = 2

  (10/4=2 with a remainder 2)

Q.18. What is the use of relational operators?

Relational Operators

- Relational operators let you compare two values.
- The result of the comparison is either true (-1) or false (0).
- This result can then be used to make a decision regarding program flow.

Q.19. Draw a table of Relational operators with their Operators, Relation tested and Expression.

Following table displays the relational operators.

Operator	Relation Tested	Expression
=	Equality	X = Y
<>	Inequality	X <> Y
<	Less than	X < Y
>	Greater than	X > Y
<=	Less than or equal to	X <= Y
>=	Greater than or equal to	X >= Y

- When arithmetic and relational operators are combined in one expression, the arithmetic is always performed first:

Q.20. What is the purpose of Logical operators?

Logical Operators

- Logical operators perform tests on multiple relations, bit manipulation, or Boolean operations.
- The logical operator returns a bit-wise result which is either true (not zero) or false (zero).
- In an expression, logical operations are performed after arithmetic and relational operations.

Q.21. How many types of logical operators in BASIC? Write their names?

The outcome of a logical operation is determined as shown in the following table.

The operators are listed in order of precedence.

Operation	Value	Value	Result
NOT	X		NOT X
	T		F
	F		T
AND	X	Y	X AND Y
	T	T	T
	T	F	F

	F	T	F
	F	F	F
OR	X	Y	X OR Y
	T	T	T
	T	F	T
	F	T	T
	F	F	F
XOR	X	Y	X XOR Y
	T	T	T
	F	T	F
	T	T	F
	F	F	F
EQV	X	Y	X EQV Y
	T	T	T
	T	F	F
	F	T	F
	F	F	T
IMP	X	Y	X IMP Y
	T	T	T
	T	F	F
	F	T	T
	F	F	T

- Just as the relational operators can be used to make decisions regarding program flow, logical operators can connect two or more relations and return a true or false value to be used in a decision.
- For example:

  IF D<200 AND F<4 THEN 80

  IF I>10 OR K<0 THEN 50

  IF NOT P THEN 100

Q.22. *What is mean by functional operators?*

FUNCTIONAL OPERATORS

- A function is used in an expression to call a predetermined operation that is to be performed on an operand.
- BASIC has intrinsic functions that reside in the system, such as SQR (square root) or SIN (sine).
- BASIC also allows user-defined functions written by the programmer.

String Operators

- To compare strings, use the same relational operators used with numbers:

Operator	Meaning
=	Equal to
<>	Unequal
<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to

Q.23. Write some commands, statements and functions of BASIC language with purpose, syntax and examples.

COMMANDS (PURPOSE, SYNTAX, EXAMPLES)

AUTO

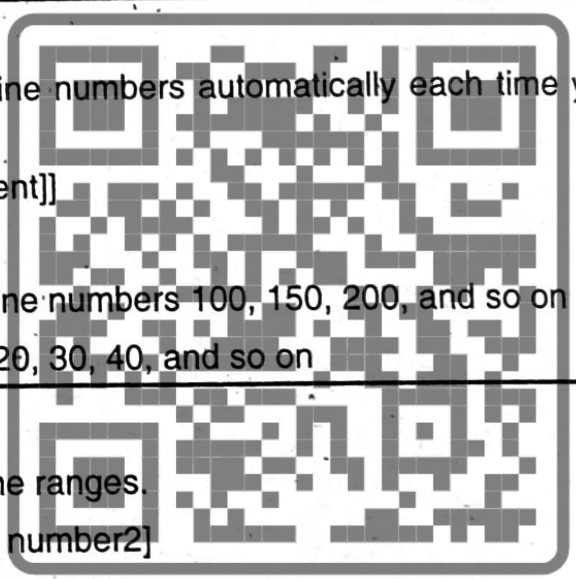
Purpose: To generate and increment line numbers automatically each time you press the RETURN key.

Syntax: AUTO [line number][,[increment]]

AUTO [,[increment]]

Examples: AUTO 100, 50 Generates line numbers 100, 150, 200, and so on

AUTO Generates line numbers 10, 20, 30, 40, and so on



DELETE

Purpose: To delete program lines or line ranges.

Syntax: DELETE [line number1][-line number2]

DELETE line number1-

Examples:		
	DELETE 40	Deletes line 40.
	DELETE 40-100	Deletes lines 40 through 100, inclusively
	DELETE -40	Deletes all lines up to and including line 40
	DELETE 40-	Deletes all program lines from 40 to end

EDIT

Purpose: To display a specified line, and to position the cursor under the first digit of the line number, so that the line may be edited

Syntax: EDIT line number

EDIT.

Examples: EDIT 150 Displays program line number 150 for editing.

LIST

Purpose: To list all or part of a program to the screen, line printer, or file.

Syntax: LIST [line number][-line number][,filename]
LIST [line number-][,filename]

Examples:

LIST	Lists all lines in the program.
LIST -20	Lists lines 1 through 20.
LIST 10-20	Lists lines 10 through 20.
LIST 20-	Lists lines 20 through the end of the program.

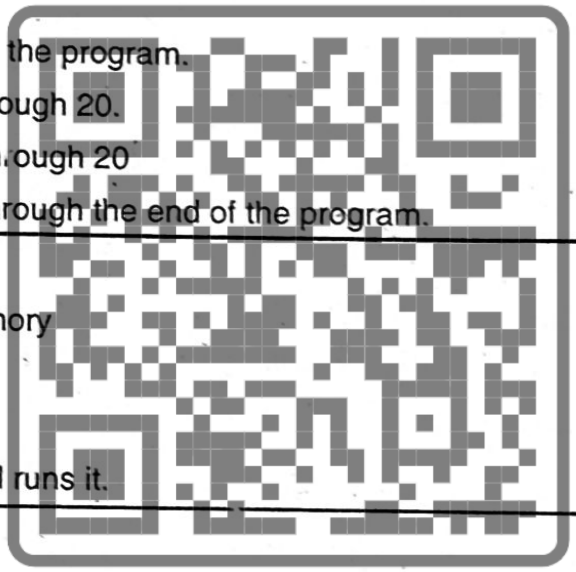
LLIST

Purpose: To list all or part of the program from memory to the line printer

Syntax: LLIST [line number][-line number]
LLIST [line number-]

Examples:

LLIST	Lists all lines in the program.
LLIST -20	Lists lines 1 through 20.
LLIST 10-20	Lists lines 10 through 20
LLIST 20-	Lists lines 20 through the end of the program.



LOAD

Purpose: To load a file from diskette into memory

Syntax: LOAD filename [,R]

Examples: LOAD "ACCOUNTS",R
Loads the file ACCOUNTS.BAS and runs it.

KILL

Purpose: To delete a file from a disk

Syntax: KILL [Path] filename

Examples: KILL "CATS\DOGS\RAINING.BAS"

NAME

Purpose: To change the name of a disk file

Syntax: NAME old filename AS new filename

Examples: NAME "ACCTS.BAS" AS "LEDGER.BAS"

NEW

Purpose: To delete the program currently in memory and clear all variables

Syntax: NEW

Examples: NEW

RENUM

Purpose: To renumber program lines.

Syntax: RENUM [new number],[old number][,increment]]

Examples: RENUM The first new line number will be 10. Increment by 10

RENUM 300,,50The first new line number will be 300. Increment by 50

RENUM 1000,900,20 Renumbers the lines from 900 up so they start with line number 1000 and are incremented by 20.

RUN

Purpose: To execute the program currently in memory or to load a file from the disk into computer's memory and run it.

Syntax: RUN [line number]

RUN [filename]

Examples: RUN

RUN 100

RUN "ACCOUNTS"

SAVE

Purpose: To save a program file on diskette

Syntax: SAVE filename [,a]

SAVE filename [,p]

Examples: SAVE "COM2", A Saves the file COM2.BAS in the ASCII format.

SAVE "PROG", P Saves in binary format with protected list.

EDIT

Purpose: To display a specified line, and to position the cursor under the first digit of the line number, so that the line may be edited

Syntax: EDIT line number

EDIT. A period (.) refers to the current line

Examples: EDIT 150

Displays program line number 150 for editing.

FILES

Purpose: To print the names of the files residing on the specified drive.

Syntax: FILES [pathname]

Examples: FILES

```
FILES "*.BAS"
FILES "B:*.*"
FILES "TEST?.BAS"
FILES "ACCTS\"
FILES "B:ACCTS\*.PAY"
```

SYSTEM

Purpose: To return to MS-DOS.

Syntax: SYSTEM

Examples: SYSTEM

STATEMENTS (PURPOSE, SYNTAX, EXAMPLES)

CLS

Purpose: To clear the screen

Syntax: CLS

Examples: 10 CLS ' This clears the screen.

DATA

Purpose: To store the numeric and string constants that are accessed by the program READ statement(s).

Syntax: DATA constants

Example:

```
10 PRINT
20 PRINT "NAME","F-NAME","ZIP CODE"
30 READ N$,F$,Z
40 DATA "AFZAL MOHANI,","RIZWAN MOHANI", 75800
50 PRINT N$, F$, Z
RUN
NAME              F-NAME              ZIP CODE
AFZAL MOHANI      RIZWAN MOHANI       75800
```

END

Purpose: To terminate program execution, close all files, and return to command level.

Syntax: END

Examples: 520 IF K>1000 THEN END ELSE GOTO 20

FOR ... NEXT

Purpose: To execute a series of instructions a specified number of times in a loop

Syntax: FOR variable=x TO y [STEP z]

.

.

NEXT [variable][,variable...]

Comments: variable is used as a counter

x,y, and z are numeric expressions.

STEP z specifies the counter increment for each loop.

Examples: The following example prints integer values of the variable I% from 1 to 10 in steps of z. For fastest execution, I is declared as an integer by the % sign.

```
10 K=10
20 FOR I%=1 TO K STEP 2
30 PRINT I%
40 NEXT
RUN
 1
 3
 5
 7
 9
```


GOSUB ... RETURN

Purpose: To branch to, and return from, a subroutine.

Syntax: GOSUB line number

.

.

RETURN [line number]

Comments: line number is the first line number of the subroutine.

Examples:

```
10 GOSUB 40
20 PRINT "BACK FROM SUBROUTINE"
30 END
40 PRINT "SUBROUTINE";
50 PRINT " IN";
```

```
60 PRINT " PROGRESS"
70 RETURN
RUN
SUBROUTINE IN PROGRESS
BACK FROM SUBROUTINE
```

The END statement in line 30 prevents re-execution of the subroutine.

GOTO

Purpose: To branch unconditionally out of the normal program sequence to a specified line number

Syntax: GOTO line number

Examples:

```
10 GOTO 30
20 A=10
30 B=30
40 C=A+B
50 PRINT C
RUN
30
```

Due to control transfer, interpreter does not read the value of variable A.

IF ... THEN ... ELSE

Purpose: To make a decision regarding program flow based on the result returned by an expression.

Syntax: IF expression[,] THEN statement(s)[,][ELSE statement(s)]

IF expression[,] GOTO line number[[,] ELSE statement(s)]

Examples:

```
100 IF(N<20) and (N>10) THEN DB=1979-1: GOTO 300
110 PRINT "OUT OF RANGE"
```

INPUT

Purpose: To prepare the program for input from the terminal during program execution

Syntax: INPUT[;][prompt string;] list of variables

INPUT[;][prompt string,] list of variables

Comments: prompt string is a request for data to be supplied during program execution.

list of variables contains the variable(s) that stores the data in the prompt string.

Example: To find the square of a number:

```
10 INPUT X
```

```
20 PRINT X "SQUARED IS" X^2
30 END
RUN
?
```

The operator types a number (5) in response to the question mark.

```
5 SQUARED IS 25
```

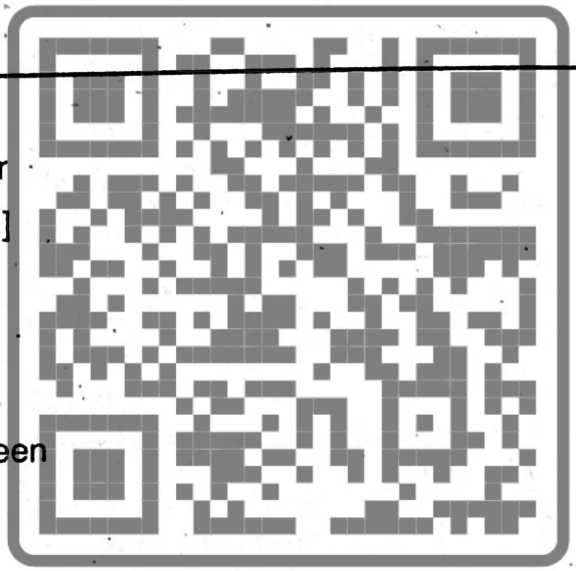
LET

Purpose: To assign the value of an expression to a variable.

Syntax: [LET] variable=expression

Example:

```
110 LET D=12
120 LET E=12^2
130 LET F=12^4
140 LET SUM=D+E+F
```

LPRINT

Purpose: To print data at the line printer

Syntax: LPRINT [list of expressions] [;]

Example:

```
LPRINT 2+5
LPRINT "MARKS SHEET"
```

PRINT

Purpose: To output a display to the screen

Syntax: PRINT [list of expressions][;]

?[list of expressions][;]

Comments: If list of expressions is omitted, a blank line is displayed.

BASIC divides the line up to 5 print zones of 14 spaces each. If typing a comma between expressions causes the next value to be printed at the beginning of the next zone.

If typing a semicolon causes the next value to be printed immediately after the last value.

Example:

```
PRINT 2+5
PRINT "MARKS SHEET"
```

READ

Purpose: To read values from a DATA statement and assign them to variables.

Syntax: READ list of variables

Comments: A READ statement must always be used with a DATA statement.

Examples:
```
5 PRINT
10 PRINT "CITY", "STATE", "ZIP"
20 READ C$, S$, Z
30 DATA "DENVER,", "COLORADO", 80211
40 PRINT C$, S$, Z
RUN
CITY STATE ZIP
DENVER, COLORADO 80211
```

REM

Purpose: To allow explanatory remarks to be inserted in a program.

Syntax: REM[comment]

'[comment]

Comments: REM statements are not executed, but are output exactly as entered when the program is listed.

Examples:
```
120 REM CALCULATE AVERAGE VELOCITY
130 FOR I=1 TO 20
440 SUM=SUM+V(I)
450 NEXT I
```


RESTORE

Purpose: To allow DATA statements to be reread from a specified line.

Syntax: RESTORE [line number]

Comments: If line number is specified, the next READ statement accesses the first item in the specified DATA statement.

If line number is omitted, the next READ statement accesses the first item in the first DATA statement.

Examples:
```
10 READ A, B, C,
20 RESTORE
30 READ D, E, F
40 DATA 57, 68, 79
```

RETURN

Purpose: To return from a subroutine.

Syntax: RETURN [line number]

Examples: 10 RETURN

500 RETURN 150

DIM

Purpose: To specify the maximum values for array variable subscripts and allocate storage accordingly

Syntax: DIM variable(subscripts)[,variable(subscripts)]...

Examples: 10 DIM A(20)

20 FOR I=0 TO 20

30 READ A(I)

40 NEXT I

WHILE ... WEND

Purpose: To execute a series of statements in a loop as long as a given condition is true.

Syntax: WHILE expression

.

[loop statements]

.

END

Examples: 90 'BUBBLE SORT ARRAY A$

100 FLIPS=1

110 WHILE FLIPS

115 FLIPS=0

120 FOR N=1 TO J-1

130 IF A$(N)>A$(N+1) THEN SWAP A$(N), A$(N+1): FLIPS=1

140 NEXT N

150 WEND

FUNCTIONS (PURPOSE, SYNTAX, EXAMPLES)

CHR$

Purpose: To convert an ASCII code to its equivalent character

Syntax: CHR$(n)

Comments: n is a value from 0 to 255.

Examples: PRINT CHR$(66);

B

This prints the ASCII character code 66, which is the uppercase letter B.

PRINT CHR$(13);

This command prints a carriage return.

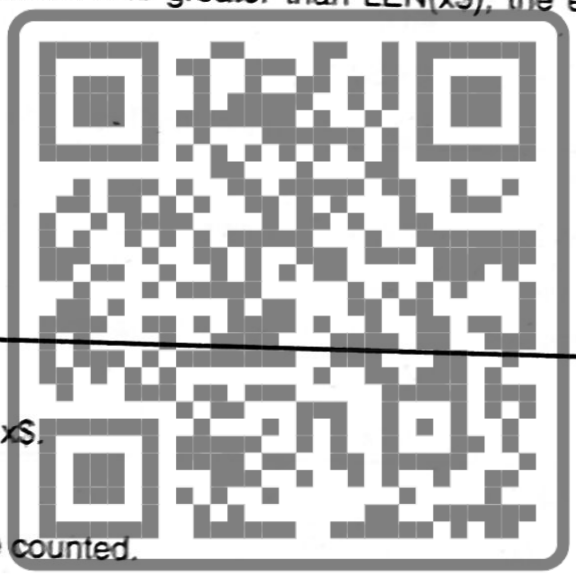
LEFT$

Purpose: To return a string that comprises the left-most n characters of x$

Syntax: LEFT$(x$,n)

Comments: n must be within the range of 0 to 255. If n is greater than LEN(x$), the entire string (x$) will be returned.

Example:
```
10 A$="BASIC"
20 B$=LEFT$(A$,3)
30 PRINT B$
RUN
BAS
```

LEN

Purpose: To return the number of characters in x$.

Syntax: LEN(x$)

Comments: Nonprinting characters and blanks are counted.

Example: x$ is any string expression.

```
10 X$="PORTLAND, OREGON"
20 PRINT LEN(X$)
RUN
16
```

MID$

Purpose: To return a string of m characters from x$ beginning with the nth character.

Syntax: MID$(x$,n[,m])

Comments: n must be within the range of 1 to 255.

m must be within the range of 0 to 255.

If m is omitted, or if there are fewer than m characters to the right of n, all rightmost characters beginning with n are returned.

Examples:
```
10 A$="GOOD"
20 B$="MORNING EVENING AFTERNOON"
30 PRINT A$; MID$(B$, 8, 8)
RUN
GOOD EVENING
```

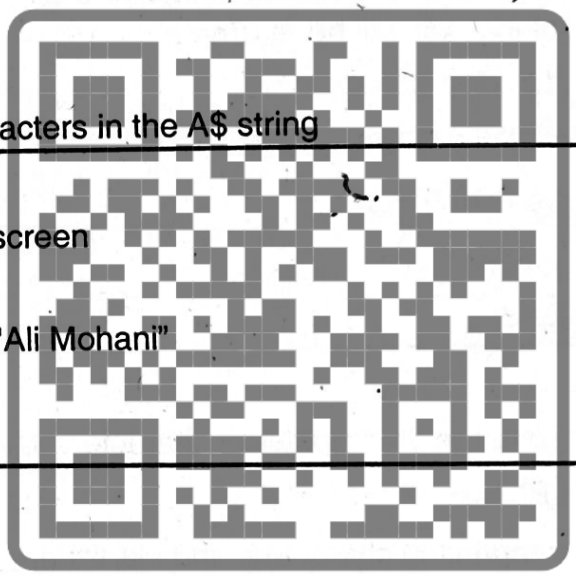
RIGHT$

Purpose: To return the rightmost n characters of string x$

Syntax: RIGHT$(x$,n)

Comments: If n is equal to or greater than LEN(x$), RIGHT$ returns x$. If n equals zero, the null string (length zero) is returned (see the MID$ and LEFT$ functions).

Examples:
```
10 A$="DISK BASIC"
20 PRINT RIGHT$(A$, 5)
RUN
BASIC
```
Prints the rightmost five characters in the A$ string



TAB

Purpose: Spaces to position n on the screen

Syntax: TAB(n)

Examples:
```
10 PRINT "Name" TAB(25) "Ali Mohani"
RUN
Name                    Ali Mohani
```

STRING$

Purpose: To return

- a string of length n whose characters all have ASCII code j, or
- the first character of x$

Syntax:
```
STRING$(n,j)
STRING$(n,x$)
```

Comments: STRING$ is also useful for printing top and bottom borders on the screen or the printer.

n and j are integer expressions in the range 0 to 255.

Examples:
```
10 X$ = STRING$(10, 45)
20 PRINT X$ "MONTHLY REPORT" X$
RUN
 ----------MONTHLY REPORT----------
```
45 is the decimal equivalent of the ASCII symbol for the (-) sign.

VAL

Purpose: Returns the numerical value of string value.

Syntax: VAL(x$)

Examples:
```
10 LET AD$ = "547, NAZIMABAD"
20 PRINT VAL(AD$)
RUN
 547
```
Prints 547 as the result of the action

ABS

Purpose: To return the absolute value of the expression n.

Syntax: ABS(n)

Comments: n must be a numeric expression.

Examples:
```
PRINT ABS(7*(-5))
35
```
Prints 35 as the result of the action

ASC

Purpose: To return a numeric value that is the ASCII code for the first character of the string x$.

Syntax: ASC(x$)

Examples:
```
10 X$="TEN"
20 PRINT ASC(X$)
RUN
84
```
84 is the ASCII code for the letter T.

EXERCISE

1. Define BASIC language.
Ans. See Q1

2. How many modes of BASIC? Write their names.
Ans. See Q2

3. What is the difference between direct and indirect mode of BASIC?
Ans. See Q3

4. What is a variable?
Ans. See Q10

5. What is the difference between Command and Statement?
Ans. See Q8

6. What is a constant?

Ans. See Q13

7. How many type of constant? Give their names?

Ans. See Q13

8. What are the rules for writing a variable name?

Ans. See Q11

9. Write at least 5 correct variable names of each type.

	Item	Nature	
(i)	X$	String variable	(Correct)
(ii)	1A$	String variable	(Wrong)
(iii)	ABC	String variable	(Wrong)
(iv)	C1	Numeric variable	(Correct)
(v)	5XAB$	Numeric variable	(Wrong)
(vi)	M=A$	String variable	(Wrong)
(vii)	15B	Numeric variable	(Wrong)
(viii)	$y	String variable	(Wrong)
(ix)	2z$	Numeric variable	(Wrong)
(x)	A	String variable	(Wrong)
(xi)	B$	String variable	(Correct)
(xii)	A523	Numeric variable	(Correct)
(xiii)	CDE	Numeric variable	(Correct)
xiv)	A-B$	Numeric variable	(Wrong)
(xv)	x-y	Numeric variable	(Wrong)

10. What is the meaning of reserved word or keyword?

Ans. See Q6

11. Write at least 5 keywords of BASIC.

Ans. PRINT , GOTO , INPUT, LIST, RUN etc

12. What is mean by arithmetic operator?

Ans. See Q15

13. What is the use of relational operator?

Ans. See Q18

14. Write the name and symbols of relational operators and describe their functions.

Ans. See Q19

15. What is the purpose of logical operators?

Ans. See Q20

16. How many types of logical operators in BASIC? Write their names.

Ans. See Q21

17. What is mean by functional operators?

Ans. See Q22

18. What is the purpose of INRUT statement?

Ans. Purpose: To prepare the program for input from the terminal during program execution

19. Write syntax of INPUT statement?

Ans. Syntax: INPUT[;][prompt string;] list of variables

INPUT[;][prompt string,] list of variables

20. What is the purpose and syntax of PRINT statement?

Ans. Purpose: To output a display to the screen

Syntax: PRINT [list of expressions][;]

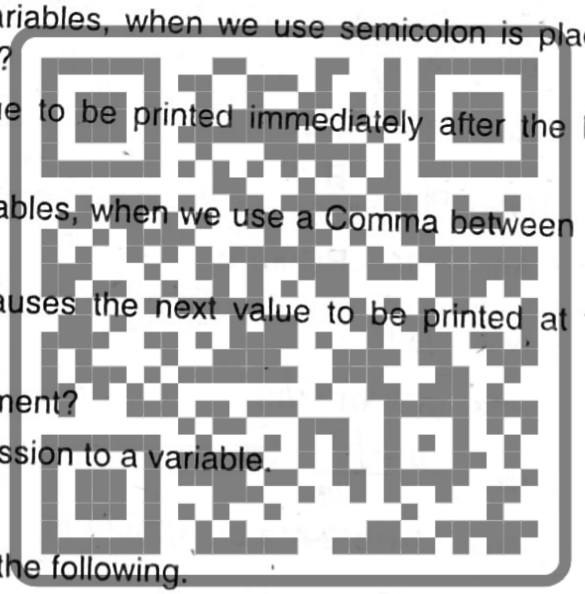
?[list of expressions][;]

21. How can a computer print the values of variables, when we use semicolon is placed between the variables in a PRINT statement?

Ans. If typing a semicolon causes the next value to be printed immediately after the last value.

22. How can a computer print the values of variables, when we use a Comma between the variables in a PRINT statement?

Ans. If typing a comma between expressions causes the next value to be printed at the beginning of the next zone.



23. What is the purpose and format of LET statement?

Ans. Purpose: To assign the value of an expression to a variable.

Syntax: [LET] variable=expression

24. Write the BASIC statement or statements for the following.

(i) Assign 5 to a numeric variable X.

Ans. LETX = 5

(II) Assign "CADET" to a string variable A$.

Ans. Let A$ = "CADET"

(iii) Assign the string represented by the variable M$ to another variable N$.

Ans. Let N$ = M$

(iv) Assign 77 to a string variable B$.

Ans. LET B$ = "77"

(v) Assign the value of the numeric variable A to another numeric variable B.

Ans. LET B=A

(vi) Assign the value of $\sqrt{b^2-4ac}$ to a variable Z.

Ans. LET Z = (B^2 – 4 * A * C)^ (1/2)

(vii) Z = (P + Q) ^3

Ans. $Z = (P + Q)^3$

(viii) A = 20*X/(X^ 2 + 250)

Ans. $A = \frac{20X}{X^2 + 250}$

(ix) X = (A^(1/2) + B^(1/2))/((A –B)^(1/2))

Ans. $X = \frac{A^{\frac{1}{2}} + B^{\frac{1}{2}}}{(A - B)^{\frac{1}{2}}}$

(x) C = 2*X+3*Y+7

Ans. 2X + 3Y + Z

28. What is the value of the following BASIC numeric expressions?

(i) 5*3 + 7+2

Ans. 15 + 7 + 2

22 + 2

24

(ii) (25 + 5) /30

Ans. 30 / 30

1

(iii) 8+7*2 + 12/6

Ans. 8 + 14 + 2

22 + 2

24

(iv) 7 + 3/2 * 6

Ans. 7 + 1.5 * 6

7 + 9

16

(v) 7/(3/2)*(5 + 6)

Ans. 7 / 1.5 * 11

4.66 * 11

51.26

(vi) 4*3*2 + 5

Ans. 12 * 2 + 5

24 + 5

29

(vii) 5*3 + 15*3

Ans. 15 + 45

60

(viii) 5 / 7 * 3

Ans. 0.71 × 3

2.13

(ix) 25^(1/2) + 36^(1/2)

Ans. 25^0.5 + 36 ^ 0.5

5 6

11

(x) (7 + 3) * (5 – 2)

Ans. 10 * 3

30

29. Compute the values of the variable given on left hand side of the following LET statements, where

A = 3, b =5, c = 6, I = 4, j = 3, k = 2

(i) LET X = I*J^2/K

Ans. X = 4 * 3 ^ 2 / 2

X = 4 * 9 / 2

X = 4 * 4.5

X = 18

(ii) LET Y = I^J^K

Ans. Y = 4 ^ 3 ^ 2

4 ^ 9

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(iii) LET Z = A*B/C*(J+K)

Ans. Z = 3 * 5 / 6 * (3 + 2)
Z = 3 * 5 / 6 * 5
Z = 3 * 0.83 * 5
Z = 2.49 * 5
Z = 12.45

(iv) LET P = K^C * J/(B–2)

Ans. P = 2 ^ 6 * 3 / (5 – 2)
P = 2 ^ 6 * 3 / 3
P = 64 * 3 / 3
P = 64 * 1
P = 64

(v) LET M = A + (B–C) * K

Ans. M = 3 + (5 – 6) * 2
M = 3 + (–1) * 2
M = 3 + (–2)
M = 1

30. Fill in the blanks:

(i) BASIC stands for Beginners All-purpose Symbolic Instruction Code.

(ii) BASIC is a High level language.

(iii) Every BASIC statement consists of a line numbers a key word and the parameter.

(iv) Two modes of BASIC known as direct and indirect modes.

(v) Each statement is preceded by a line number in the indirect mode.

(vi) PRINT statement is used to transmit numeric or string output data from the computer and displays it on the screen.

(vii) There are three types of operators in BASIC language Arithmetic Relational and Logical.

(viii) Four popular arithmetic operators are + , – , x and /

(ix) First character of the variable name must be an alphabet .

(x) Last character of the string variable name must be $ sign.

(xi) The ^ sign is used for exponentiation.

(xii) LET statement is used to assign a value to a variable.

(xiii) The end of a BASIC program represented by END statement.

(xiv) Through the INPUT statement computer receive the information from the computer user.

(xv) LPRINT statement is used for printing the data on paper through the printer.

31. Write True or False for the following statements:

(i) LET statement is used to transmit numerical or string output data from the computer and to display it on the screen (False)

(ii) LPRINT statement is used to transmit numerical or string output data from the computer and display it on the screen. (False)

(iii) PRINT statement assigns value before printing. (False)

(iv) PRINT statement prints only values of the variables. (False)