



Bihar Public Service Commission

Assistant Engineer Examination

SCIENCE & TECHNOLOGY



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BPSC Assistant Engineer Examination: Science & Technology

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First Edition: 2018

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Preface

The compilation of this book **Science & Technology** was motivated by the desire to provide a concise book which can benefit students who are preparing for Bihar Public Service Commission (BPSC) Assistant Engineer Examination.

This particular textbook of Science & Technology provides all the requirements of the students and this concise presentation will help the readers grasp the theory of this subject with clarity and apply them with ease to solve objective questions quickly. This book not only covers the syllabus of BPSC Assistant Engineer Examination in a holistic manner but is also useful for other competitive examinations. All the topics are given the emphasis they deserve so that mere reading of the book clarifies all the concepts. We have put in our sincere efforts to present detailed theory and MCQs without compromising the accuracy of answers.

Our team has made their best efforts to remove all possible errors of any kind. Nonetheless, we would highly appreciate and acknowledge if you find and share with us any printing and conceptual errors.

It is impossible to thank all the individuals who helped us, but we would like to sincerely thank all the authors, editors and reviewers for putting in their efforts to publish this book.



B. Singh (Ex. IES)

With Best Wishes

B. Singh

CMD, MADE EASY Group

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Computer and Information Technology

4 Chapter

BASICS OF COMPUTER

Computer

- A computer is basically a machine that performs a specified sequence of operations as per the set of instructions (known as programs) given on a set of data (input) to generate desired information (output).
- A complete computer system consists of four parts:
 1. **Hardware:** Hardware represents the physical and tangible components of the computer.
 2. **Software:** Software is a set of electronic instructions consisting of complex codes (Programs) that make the computer perform tasks.
 3. **User:** The computer operators are known as users.
 4. **Data:** Data consists of raw facts, which the computer stores and reads in the form of numbers.

Sl.	Generation & Description
1	First Generation (1946-1959): Vacuum tube based
2	Second Generation (1959-1965): Transistor based
3	Third Generation (1965-1971): Integrated Circuit based
4	Fourth Generation (1971-1980): VLSI microprocessor based
5	Fifth Generation (1980-onwards): ULSI microprocessor based

Types of Computers

Analog computers:

These types of computer always take input in form of signals. The input data is not a number infact a physical quantity like temp., pressure, speed, velocity. Example: Speedometer.

Features:

- Signals are continuous of (0 to 10 V).
- **Accuracy:** 1% Approximately.

Digital Computers:

These computers take the input in the form of digits and alphabets, and convert it into binary format. Examples: Computer used for the purpose of business and education is also an example of digital computers.

Features:

- Digital computers are high speed, programmable electronic devices.
- Signals are two level of (0 for low/off 1 for high/on).
- Accuracy unlimited.

Hybrid Computer:

The combination of features of an analog and digital computer is called a Hybrid computer.

Features:

- The main examples are central national defence and passenger flight radar system.
- They are also used to control robots.

Super Computer:

Supercomputers are used for the heavy stuff like weather maps, construction of atom bombs, earthquake prediction etc. It can process trillions of instructions in seconds.

Features:

- The biggest in size.
- Most Expensive
- This computer is not used as a PC in a home neither by a student in a college.
- Used by Govt. for different calculations and heavy jobs.

Mini Computer:

These computers are preferred mostly by small type of business personals, colleges etc.

Features:

- These computers are cheaper than above two.
- Its an intermediary between microcomputer and mainframe.

Micro Computer/ Personal Computer:

A microcomputer contains a central processing unit on a microchip in the form of read-only memory and random access memory, and a housed in a unit that is usually called a motherboard. It is mostly preferred by Home Users.

Features:

- Cost is less compared to above.
- Small in size.

Notebook Computers:

Notebook computers typically weigh less than 6 pounds and are small enough to fit easily in a briefcase. The principal difference between a notebook computer and a personal computer is the display screen. Many notebook display screens are limited to VGA resolution.

Steps of Data Processing Cycle

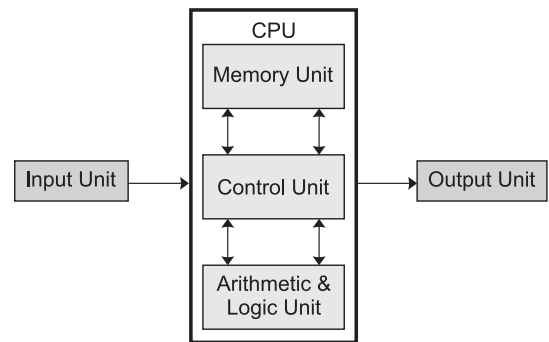
There are three steps that constitute the data processing cycle, namely

- 1. Input:** Input data is prepared in some convenient form for processing. This form depends on the processing machine, e.g. when electronic computers are used, the input data could be

recorded on any one of several types of input medium, such as magnetic disks, tapes, etc.

- 2. Processing:** In this step, input data is changed to produce data in a more useful form, e.g. paychecks may be calculated from the time cards, or a summary of sales for the month may be calculated from the sales orders.

- 3. Output:** In this step, the result of the proceeding processing step are collected, e.g. output data may be pay-checks for employees.



(Different hardware components of a computer)

Components for Language Processing

- 1. Assembler:** This language processor converts the program written in assembly language into machine language.
- 2. Interpreter:** This language processor converts High-Level Language program into machine language by converting and executing it line by line.
- 3. Compiler:** It also converts the HLL program into machine language but the conversion manner is different. It converts the entire HLL program in one go and reports all the errors of the program along with the line numbers.

Software

Software represents the set of programs that govern the operation of a computer system and make the hardware run.

Software			
Utility Software	Application Software	System Software (OS)	
Utility Tools	Text	Single User	Multiple User
Customized Software	Graphics	DOS	Unix
	Multimedia	Mac-OS	Windows Server
	Language	Windows xp, 7, 8.1	
	Accounting		

Programming Languages

There are two major types of programming languages.

1. Low-Level Languages
2. High-Level Languages

Low-Level Languages

The term low level means closeness to the way in which the machine has been built. These languages are machine oriented and require extensive knowledge of computer hardware and its configuration.

Low-Level languages are further divided into Machine language and Assembly language.

Machine Language

Machine Language is the only language that is directly understood by the computer. It does not need any translator program. It is written as strings of 1's (one) and 0's (zero). When this sequence of codes is fed to the computer, it recognizes the codes and converts it into electrical signals needed to run it.

Benefits and Limitations of Machine Language

- Program of machine language run very fast because no translation program is required for the CPU.
- It is very difficult to program in machine language. The programmer has to know details of hardware to write a program.
- The programmer has to remember a lot of codes to write a program which results in program errors.

Assembly Language

It is the first step to improve the programming structure. These are some combination of letters which can be used to substitute for a number of machine codes. The set of symbols and letters forms the Assembly Language and a translator program is required to translate the Assembly Language to machine language. This translator program is called 'Assembler'. It is considered to be a second-generation language.

Benefits and Limitations of Assembly Language

- The symbolic programming of Assembly Language is easier to understand and saves a lot of time and effort of the programmer.
- It is easier to correct errors and modify program instructions.

- Assembly Language has the same efficiency of execution as the machine level language. Because this is a one-to-one translator between assembly language program and its corresponding machine language program.
- Assembly language is machine dependent.
- A program written for one computer might not run on other computers with different hardware configuration.

High-Level Languages

- Higher level languages are simple languages that use English and mathematical symbols like +, -, %, / for its program construction. A higher level language has to be converted to machine language for the computer to understand.
- Higher level languages have a major advantage over machine and assembly languages because these are easy to learn and use.
- Higher level languages are problem-oriented languages because the instructions are suitable for solving a particular problem.
- **Examples:** COBOL (Common Business Oriented Language), FORTRAN (Formula Translation), BASIC (Beginners All-purpose Symbolic Instruction Code), etc.

INPUT & OUTPUT DEVICES

Input Devices

- Input devices are the link between user and computer. They translate the information into the form understandable by computer.

Some of the most widely used input devices are:

1. **Keyboard:** The most common and very popular input device which helps in inputting data to the computer.
2. **Mouse:** Mouse is the most popular pointing device and cursor-control device having a small palm size box with a round ball at its base which senses the movement of mouse and sends corresponding signals to CPU when the mouse buttons are pressed.
3. **Light Pen:** It is used to select a displayed menu item or draw pictures on the monitor screen.

4. **Track Ball:** These are mostly used in notebook or laptop computer, instead of a mouse. This is a ball which is half inserted and by moving fingers on ball, pointer can be moved.
5. **Joy Stick:** To move cursor position on a monitor screen. It is mainly used in Computer Aided Designing (CAD) and playing computer games.
6. **Scanner:** A scanner allows you to scan printed material and convert it into a file format that may be used within the PC.
7. **Digitizer:** It converts analog information into digital form.
8. **Microphone:** Microphone is an input device to input sound that is then stored in digital form.
9. **Magnetic Ink Character Recognition (MICR):** MICR input device is generally used in banks because of a large number of check to be processed every day.
10. **Optical Character Recognition (OCR):** OCR scans text optically character by character, converts.

Output Devices

- Output devices translate the computer's output into the form understandable by users.

Some of the most widely used output devices are:

1. **Monitors:** Monitors, commonly called as Visual Display Unit are the main output device of a computer. It forms images from tiny dots, called pixels that are arranged in a rectangular form. The sharpness of the image depends upon the number of pixels.
There are two kinds of viewing screen used for monitors:
 - (i) **Cathode-Ray Tube (CRT):** The CRT display is made up of small picture elements called pixels. The smaller the pixels, the better the image clarity, or resolution.
 - (ii) **Flat- Panel Display:** The flat-panel display refers to a class of video devices that have reduced volume, weight and power requirement in comparison to the CRT.
2. **Printer:** Printer is an output device, which is used to print information on paper.
There are basically two types of printers:
 - (i) **Impact Printers:** The impact printers print the characters by striking them on the ribbon which is then pressed on the paper.

- (ii) **Non-Impact Printers:** Non-impact printers print the characters without using ribbon. These printers print a complete page at a time so they are also called as Page Printers. Laser Printers, Inkjet Printers.



DBMS

Database Management System (DBMS)

- DBMS is a collection of interrelated data and a set of programs to access this data in a convenient and efficient way. It controls the organization, storage, retrieval, security and integrity of data in a database.
- The database can be represented in two levels:
 - (i) Data (which is large and is being frequently modified)
 - (ii) Structure of data (which is small and stable in time)

Features of Database

Database has following features:

1. **Faithfulness:** The design and implementation should be faithful to the requirements.
2. **Avoid Redundancy:** This value is important because of redundancy.
3. **Simplicity:** Simplicity requires that the design and implementation avoid introducing more elements than are absolutely necessary.
4. **Right kind of element:** Attributes are easier to implement but entity sets are relationships are necessary to ensure that the right kind of element is introduced.

Do You Know?

A database contains a collection of related items or facts arranged in a specific structure.

Types of Database

The database has following two types:

1. **Centralized Database:** All data is located at a single site.
2. **Distributed Database:** The database is stored on several computer.

Benefits of DBMS

- Data independence
- Reduced data redundancy
- Increased security
- Better flexibility
- Effective data sharing
- Enforces integrity constraints
- Enables backup and recovery

Important terms related to DBMS

- 1. Fields:** Each piece of information in the address book is stored in its own location called a field.
- 2. Records:** One full set of fields that is all the related information about one person or object is called a record.
- 3. Tables:** A complete collection of records makes a table.

4. Data Abstraction: There are three levels of data abstraction as given below:

(i) Physical Level: It is lowest level of abstraction and describes how the data are actually stored and complex low level data structures in detail.

(ii) Logical Level: It is the next higher level of abstraction and describes what data are stored and what relationships exist among those data. At the logical level, each such record is described by a type definition and the interrelationship of these record types is defined as well. Database administrators usually work at this level of abstraction.

(iii) View Level: It is the highest level of abstraction and describes only part of the entire database and hides the details of the logical level.

Difference between File System & DBMS	
File System	DBMS
File system is a collection of data. Any management with the file system, user has to write the procedures.	DBMS is a collection of data and user is not required to write the procedures for managing the database.
File system gives the details of the data representation and storage of data.	DBMS provides an abstract view of data that hides the details.
In File system, storing and retrieving of data cannot be done efficiently.	It is efficient to use since there are wide varieties of sophisticated techniques to store and retrieve the data.
Concurrent access to the data in the file system has many problems like reading the file while other deleting some information, updating some information	It takes care of concurrent access using some form of locking.
File system doesn't provide crash recovery mechanism.eg. While we are entering some data into the file if System crashes then content of the file is lost.	DBMS has crash recovery mechanism and it protects user from the effects of system failures.
Protecting a file under file system is very difficult.	DBMS has a good protection mechanism.

Note:

Schema is a logical design of the database and it consists of a list of attributes and their corresponding domains.



Computer Memory

- Computer memory is the storage space in computer where data is to be processed and instructions required for processing are stored.
- The memory is divided into large number of small parts called cells. Each location or cell has a unique address which varies from zero to memory size minus one.

There are basically two types of memory:

- Primary Memory/Main Memory:** Primary memory holds only those data and instructions on which computer is currently working. It has limited capacity and data is lost when power is switched off.
- Secondary Memory:** This type of memory is also known as external memory or non-volatile memory. It is slower than main memory. These are used for storing data/information permanently.

Primary memory can be further divided into:

1. Random Access Memory (RAM)

- RAM is the internal memory of the CPU for storing data, program and program result. It is read/write memory which stores data until the machine is working. As soon as the machine is switched off, data is erased.
- RAM is volatile data stored in it is lost when we switch off the computer or if there is a power failure. Hence a backup uninterruptible power system (UPS) is often used with computers. RAM is small, both in terms of its physical size and in the amount of data it can hold.

There are three types of RAM:

- Dynamic Random Access Memory (DRAM):** A type of physical memory used in most personal computers. The term dynamic indicates that the memory must be constantly refreshed or it loses its contents.
- Static Random Access Memory (SRAM):** A type of memory that is faster and less volatile than DRAM, but requires more power and is more expensive.
- Synchronous Dynamic Random Access Memory (SDRAM):** A type of DRAM that can run at much higher clock speeds.

2. Read Only Memory (ROM)

- The memory from which we can only read but cannot write on it. This type of memory is non-volatile. The information is stored permanently in such memories during manufacture. A ROM, stores such instructions that are required to start a computer. This operation is referred to as bootstrap.

There are mainly four types of ROM available:

- Masked ROM (MROM):** The very first ROMs were hard-wired devices that contained a pre-programmed set of data or instructions. These kinds of ROMs are known as masked ROMs which are inexpensive.
- Programmable Read only Memory (PROM):** PROM is read-only memory that can be modified only once by a user. The user buys a blank PROM and enters the desired contents using a PROM program

Memory				
Primary Memory			Secondary Memory	
Cache Memory	Main Memory			<ul style="list-style-type: none"> • Magnetic Disk (HDD) • Optical Disk (CD, DVD, BRD) • Flash Memory (Memory Card, Pen Drive)
	Registers	RAM		
	SRAM	DRAM	PROM	
			EPROM	
			EEPROM	

(iii) **Erasable and Programmable Read Only Memory (EPROM):** The EPROM can be erased by exposing it to ultra-violet light for a duration of up to 40 minutes. Usually, an EPROM eraser achieves this function.

(iv) **Electrically Erasable and Programmable Read Only Memory (EEPROM):** The EEPROM is programmed and erased electrically. It can be erased and reprogrammed about ten thousand times. Both erasing and programming take about 4 to 10 ms (milli-second).

Secondary Memory

This type of memory is also known as external memory. It is slower than main memory and non-volatile. These are used for storing data/information permanently. Contents of secondary memories are first transferred to main memory, and then CPU can access it. For example: disk, CD-ROM, DVD etc.

Cache Memory

It is a very high speed semiconductor memory which can speed up CPU. It acts as a buffer between the CPU and main memory.

Computer Networking & Data Communication

Computer Networks

Computer networks means interconnected set of autonomous system that permit distributed processing to information.

Characteristics of Networking

- **Topology:** The geometrical arrangement of the computers or nodes.
- **Protocols:** How they communicate.
- **Medium:** Through which medium.

Types of Networks

Based on their coverage area, networks are of three types:

1. **Local Area Network (LAN):** It is privately owned network within a single building or campus. A local area network is relatively smaller and privately owned network with the maximum span of 10 km.

2. **Metropolitan Area Network (MAN):** It is defined for less than 50 km and provides regional connectivity within a campus or small geographical area. An example of MAN is cable television network in city.

3. **Wide Area Network (WAN):** It is a group communication technology which provides no limit of distance. A wide area network or WAN spans a large geographical area often a country. The Internet is a system of linked networks that are worldwide in scope and facilitate data communication services such as remote login, file transfer, electronic mail, World Wide Web and news groups etc.

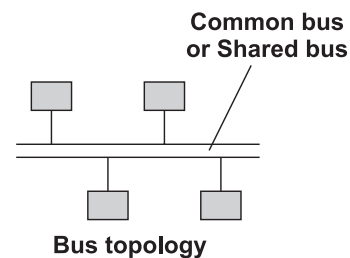
Network Topology

Network topology is the arrangement of the various elements of a computer or biological network. Essentially, it is the topological structure of a network, and may be depicted physically or logically.

Network topology is basically of five types:

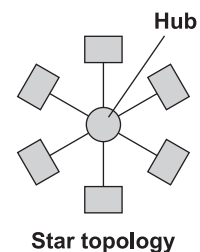
1. **Bus Topology:** In this, each node is directly connected to a common cable.

In bus topology at the first, the message will go through the bus then one user can communicate with other.



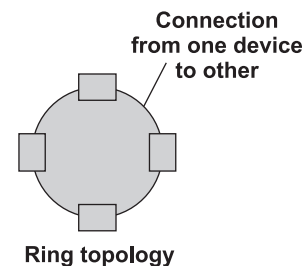
2. **Star Topology:** Each node has a dedicated set of wires connecting it to a central network hub. Since, all traffic passes through the hub, it becomes a central point for isolating network problems and gathering network statistics.

In star topology, first the message will go to the hub then that message will go to other user.

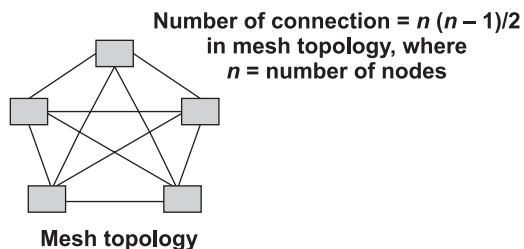


3. **Ring Topology:** It is logically closed loop. Data packets travel in a single direction around the ring from one network device to the next.

In ring topology, user can communicate as randomly.

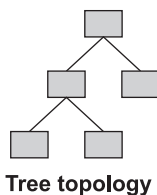


4. **Mesh Topology:** Each system is connected to all other systems in the network.



In mesh topology, any user can directly communicate with other users.

5. **Tree Topology:** In this type of network topology, in which a central root is connected to two or more nodes that are one level lower in hierarchy.



Methods of Message Delivery

These are following methods of message delivery:

1. **Unicast:** One device sends the message to the other to its address.
2. **Broadcast:** One device sends the message to all other devices on the network. The message is sent to an address reserved for this goal.
3. **Multicast:** One device sends the message to a certain group of devices on the network.

Ethernet

It is basically a *LAN technology* which strikes a good balance between speed, cost and ease of installation.

Features:

- Ethernet topologies are generally bus and/or bus-star topologies.
- Ethernets are passive, which means Ethernet hubs do not reprocess or alter the signal sent by the attached devices.
- Ethernet technology uses broadcast topology with baseband signaling and a control method called Carrier Sense Multiple Access/Collision Detection (CSMA/CD) to transmit data.

Hardware/Networking Devices

Networking hardware may also be known as network equipment computer networking devices.

1. **Network Interface Card (NIC):** NIC provides a physical connection between the networking

cable and the computer's internal bus. NICs come in three basic varieties 8 bit, 16 bit and 32 bit. The larger number of bits that can be transferred to NIC, the faster the NIC can transfer data to network cable.

2. **Repeater:** Repeaters are used to connect together two Ethernet segments of any media type. In larger designs, signal quality begins to deteriorate as segments exceed their maximum length.
3. **Hubs:** Hubs are actually multi part repeaters. A hub takes any incoming signal and repeats it out all ports.
4. **Bridges:** When the size of the LAN is difficult to manage, it is necessary to break-up the network. The function of the bridge is to connect separate networks together. Bridges do not forward bad or misaligned packets.
5. **Switch:** Switches are an expansion of the concept of bridging. Cut through switches examine the packet destination address, only before forwarding it onto its destination segment, while a store and forward switch accepts and analyze the entire packet before forwarding it to its destination.
6. **Routers:** Router forwards packets from one LAN (or WAN) network to another. It is also used at the edges of the networks to connect to the Internet.
7. **Gateway:** Gateway acts like an entrance between two different networks. Gateway in organisations is the computer that routes the traffic from a work station to the outside network that is serving web pages. ISP (Internet Service Provider) is the gateway for Internet service at homes.

OSI Model

- The Open System Interconnection (OSI) model is a reference tool for understanding data communication between any two networked systems. It divides the communication processes into 7 layers.
- Each layer performs specific functions to support the layers above it and uses services of the layers below it.

1. **Physical Layer:** The physical layer coordinates the functions required to transmit a bit stream over a physical medium. It deals with the mechanical and electrical

specifications of interface and transmission medium. It also defines the procedures and functions that physical devices and interfaces have to perform for transmission to occur.

2. **Data Link Layer:** The data link layer transforms the physical layer, a raw transmission facility, to a reliable link and is responsible for Node-to-Node delivery. It makes the physical layer appear error free to the upper layer (i.e., network layer).
3. **Network Layer:** Network layer is responsible for source to destination delivery of a packet possibly across multiple networks (links). If the two systems are connected to the same link, there is usually no need for a network layer. However, if the two systems are attached to different networks (links) with connecting devices between networks, there is often a need of the network layer to accomplish source to destination delivery.
4. **Transport Layer:** The transport layer is responsible for- source to destination (end-to-end) delivery of the entire message. Network layer does not recognise any relationship between the packets delivered. Network layer treats each packet independently, as though each packet belonged to a separate message, whether or not it does. The transport layer ensures that the whole message arrives intact and in order.
5. **Session Layer:** The session layer is the network dia log controller. It establishes, maintains and synchronises the interaction between communicating systems. It also plays important role in keeping applications data separate.
6. **Presentation Layer:** This layer is responsible for how an application formats data to be sent out onto the network. This layer basically allows an application to read (or understand) the message.
7. **Application Layer:** This layer enables the user, whether human or software, to access the network. It provides user interfaces and support for services such as electronic mail, remote file access and transfer shared database management and other types of distributed information services.

Communication System

Basic Elements of a Communication Systems

The basic requirements for working of a communication system are:

- A sender (source) which creates the message to be transmitted.
- A medium that carries the message.
- A receiver (sink) which receives the message.

Basic Terms used in Data Communication

1. **Data:** A collection of facts in raw forms that become information after processing.
2. **Signals:** Electric or electromagnetic encoding of data.
3. **Signaling:** Propagation of signals across a communication medium.
4. **Transmission:** Communication of data achieved by the processing of signals.

Data Transmission Modes

There are three ways for transmitting data from one point to another:

1. **Simplex:** In simplex mode the communication can take place in one direction. The receiver receives the signal from the transmitting device. In this mode the flow of information is Uni-directional.



2. **Half-duplex:** In half-duplex mode the communication channel is used in both directions, but only in one direction at a time. Thus a half-duplex line can alternately send and receive data.



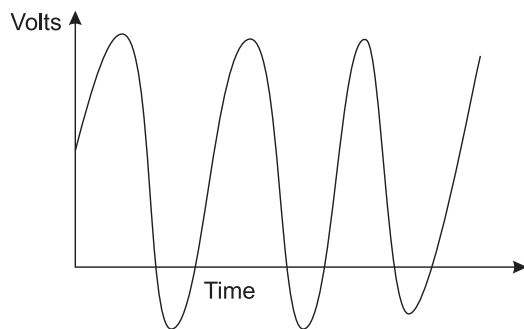
3. **Full-duplex:** In full duplex the communication channel is used in both directions at the same time. Use of full-duplex line improves the efficiency as the line turn-around time required in half-duplex arrangement is eliminated. Example of this mode of transmission is the telephone line.



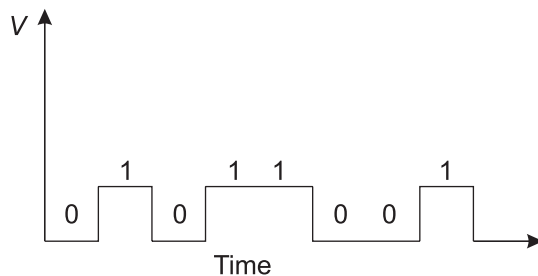
Types of Data Transmission

Data is transmitted from one point to another point by means of electrical signals that may be in digital and analog form.

1. In analog signal the transmission power varies over a continuous range with respect to sound, light and radio waves. Analog signal is measured in Volts and its frequency in Hertz (Hz).



2. A digital signal may assume only discrete set of values within a given range.



When digital data are to be sent over an analog form the digital signal must be converted to analog form. So the technique by which a digital signal is converted to analog form is known as modulation and the reverse process, that is the conversion of analog signal to its digital form, is known as demodulation. The device, which converts digital signal into analog, and the reverse, is known as modem.

Internet Protocol

It is a set of technical rules that defines how computers communicate over a network.

IPv4

It is the first version of Internet Protocol to be widely used, and accounts for most of today's Internet traffic.

Details of IPv4

- **Address Size:** 32 bits
- **Address Format:** Dotted Decimal Notation: 192.149.252.76
- **Number of Addresses:** $2^{32} = 4,294,967,296$ Approximately
- IPv4 header has 20 bytes.
- IPv4 header has many 13 fields.
- It is subdivided into classes <A-E>.
- Address uses a subnet mask.
- IPv4 has lack of security.

IPv6

It is a newer numbering system that provides a much larger address pool than IPv4.

Details of IPv6

- **Address Size:** 128 bits
- **Address Format:** Hexadecimal Notation: 3FFE:F200:0234:AB00:0123:4567:8901:ABCD
- **Number of Addresses:** 2^{128}
- IPv6 header is the double, it has 40 bytes
- IPv6 header has fewer fields, it has 8 fields.
- It is classless.
- It uses a prefix and an Identifier ID known as IPv4 network
- It uses a prefix length.
- It has a built-in strong security (Encryption and Authentication)

Masking

Masking is process that extracts the address of the physical network form an IP address.

Router

A *router* is a hardware component used to interconnect networks. Routers are devices whose primary purpose is to connect two or more networks and to filter network signals so that only desired information travels between them.

Functions of Router:

- Routers can filter traffic so that only authorized personnel can enter restricted areas. They can permit or deny network communications with a particular Web site.

- They can recommend the best route for information to travel. As network traffic changes during the day, routers can redirect information to take less congested routes.
- Routers operate primarily by examining incoming data for its network routing and transport information.
- Based on complex, internal tables of network information that it compiles, a router then determines whether or not it knows how to forward the data packet towards its destination.
- Routers can be programmed to prevent information from being sent to or received from certain networks or computers based on all or part of their network routing addresses.
- Routers also determine some possible routes to the destination network and then choose the one that promises to be the fastest.
- A router has interfaces on multiple networks.
- Router forwards packets between networks. Transforms packets as necessary to meet standards for each network.
- Routers are distinguished by the functions they perform:
 - **Internal routers:** Only route packets within one area.
 - **Area border routers:** Connect to areas together
 - **Backbone routers:** Reside only in the backbone area
 - **AS boundary routers:** Routers that connect to a router outside the AS.

Firewall

- A firewall is a device that prevents unauthorized electronic access to your entire network.
- The term firewall is generic, and includes many different kinds of protective hardware and software devices. Routers, comprise one kind of firewall.
- Most firewalls operate by examining incoming or outgoing packets for information at OSI level 3, the network addressing level.

Network Security

Network security has become one of the core issues as millions of ordinary citizens are using networks for banking, shopping, and filling their tax returns.

Network security problems can be divided mainly into three interlinked areas:

- 1. Secrecy:** It means to keep information out of the hands of unauthorized users.
- 2. Authentication:** It refers to dealing with determining whom you are talking to before revealing sensitive information or entering into a business deal.
- 3. Nonrepudiation:** It deals with signatures.

Cryptography

- It is a science of converting a stream of text into coded form in such a way that only the sender and receiver of the coded text can decode the text.
- Nowadays, computer use requires automated tools to protect files and other stored information. Uses of network and communication links require measures to protect data during transmission.

OPERATING SYSTEM

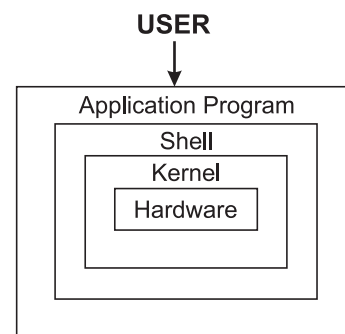
Operating System

An operating system acts as an intermediary between the user of a computer and the computer hardware.

Structure of Operating System

An operating system consists of following components:

- 1. Hardware:** It provides the basic computing resources for the system. It consists of CPU, memory and the input/output devices.
- 2. Software (Operating System):** Software includes process management routines, memory management routines, input/output control routines, file management routines.
- 3. System programs:** This layer consists of compilers, assemblers, linker etc.



4. Application Programs: Define the ways in which these resources are used to solve user's computing problems. e.g., word processors, spreadsheets, Railway reservation system, Bank data base management, web browsers etc.

Objectives of Operating system

- Operating system makes the computer more convenient to use.
- It allows computer system resources to be used in an efficient manner.
- It permit effective development, testing, and introduction of new system functions without interfering with service.

Characteristics of Operating System

- 1. Memory Management:** Operating system keeps tracks of primary memory i.e. what part of it is in use by whom, what part is not in use etc. and allocates the memory when a process or program requests it.
- 2. File Management:** It allocates and de-allocates the resources and decides who gets the resources.
- 3. Security:** It prevents unauthorized access to programs and data by means of passwords and similar other techniques.
- 4. Job accounting:** It keeps track of time and resources used by various jobs and/or users.
- 5. Processor Management:** It allocates the processor (CPU) to a process and de-allocates processor when it is no longer required.
- 6. Error-detecting aids:** The production of dumps, traces, error messages and other debugging and error-detecting methods.
- 7. Device Management:** It keeps track of all devices. This is also called I/O controller that decides which process gets the device, when, and for how much time.
- 8. Control over system performance:** It records delays between request for a service and from the system.
- 9. Interaction with the operators:** The interaction may take place via the console of the computer in the form of instructions. Operating System acknowledges the same, does the corresponding action and informs the operation by a display screen.

10. Coordination between other software and users: The coordination and assignment of compilers, interpreters, assemblers and other software to the various users of the computer systems.

Types of Operating Systems

The operating systems are of following types:

- 1. Single User Operating System:** It is a type of operating system (OS) that is developed and intended for use on a computer or similar machine that will only have a single user at any given time.
- 2. Multiuser Operating System:** It is a computer operating system (OS) that allows multiple users on different computers or terminals to access a single system with one OS on it.
- 3. Real Time Operating System:** It is defines as a data processing system in which the time interval required to process and respond to inputs is so small that it controls the environment. It is always on line whereas on line system need not be real time.
- 4. Batch Operating System:** The users of batch operating system do not interact with the computer directly. Each user prepares his job on an off-line device like punch cards and submits it to the computer operator.
- 5. Multiprogramming:** It is a technique which enables many people, located at various terminals, to use a particular computer system at the same time.
- 6. Timesharing / Multitasking:** Time sharing is a technique which enables many people, located at various terminals, to use a particular computer system at the same time. Time-sharing or multitasking is a logical extension of multiprogramming.

Microsoft Windows

MS-Windows is a Graphical User Interface (GUI) based operating system. In Windows Operating system, multiple applications can be simultaneously run in different windows.

Features of Microsoft Windows Operating System

- In MS-Windows, the screen upon which icons are displayed, is a graphic symbol that represents a window element like, file, folder, or shortcut.

- Loading up of operating system files into the computer's memory is called booting up.
- The taskbar is a bar, which is usually located at the bottom of the screen.
- My computer is helpful for viewing the contents of a single folder or drive.
- File is a program or document stored on a disk.
- Toolbar is a set of button you click to perform common tasks.
- A folder is a location in which you can store files and other folders.

Note:

When computer starts, the operating system is first loaded (as it is essential for running all other programs), this process is known as booting.

**Internet**

- The internet is a global system of interconnected computer networks that use the standard Internet protocol suite to link several billion devices worldwide. It also known as “network of networks” that consists of millions of private, public, academic, business, and government networks.
- In internet, most computers are not connected directly to the internet, rather they are connected to smaller networks, which in turn are connected through gateways to the Internet backbone.
- The World Wide Web commonly known as the Web or www developed founded by Tim Berners – Lee in 1989, is a system of interlinked hypertext documents that are accessed via the Internet. These multimedia pages are ever-changing.

Applications of Internet**The various applications of internet are:**

- Read news available from leading news groups.
- Search databases of government, individuals and organizations.
- Send or receive animation and picture files from distant places.
- Transfer files as well as software.

- Browse through information on any topic on web.
- Exchange messages using e-mail (Electronic mail).
- Communicate in real time (chat) with others connected to the Internet.
- Set up a site with information about your company's products and services.

Internet Connection

- 1. Dial-up Connection:** A dial-up connection is a temporary connection, set up between your computer and ISP (Internet Service Provider) server. A dial-up connection is established using a modem, which uses the telephone line to dial up the number of ISP server.
- 2. Broadband Connection:** The term broadband is short for broad bandwidth. Bandwidth refers to the amount of data that a signal or circuit can carry. Broadband connection speeds are measured in megabits per second (mbps).
- 3. Wireless Connection:**
 - **Wi-Fi:** It refers to Wireless Fidelity, which lets you connect to the Internet without a direct line from your PC to the ISP.
 - **WiMAX:** It is a wireless digital communication system. WiMAX can provide broadband wireless access (BWA) up to 50 km for fixed stations

Web Browser

A web browser (commonly referred to as a browser) is a software application for retrieving, presenting and traversing information resources on the World Wide Web.

Command and their Function	
Command	Function
Home	Opens or returns to starting page
Back	Takes you to the previous page
Forward	Takes you to the next page
Print	Prints current page
Stop	Stops loading a page
Reload	Refresh/redisplays current page
Search	Accesses search engine

The various commands, terms and functions of a web browser

Commands/Terms	Details
Menu bar	The menu bar which is located at the very top of the screen, can be accessed using the mouse.
Tool bar	The tool bar is located at the top of the browser. It contains navigational buttons for the Web.
Location bar	The location bar, below the tool bar, is a box labelled "Location," "Go To," or "Address." One can type in a site's address, and press the Return or Enter key to open the site.
Status bar	The status bar is located at the very bottom of the browser window. One can watch the progress of a web page download to determine if the host computer has been contacted and text and images are being downloaded.
Scroll bar	The scroll bar is the vertical bar located on the right of the browser window. One can scroll up and down a web page by placing the cursor on the slider control and holding down the mouse button.
Uniform Resource Locator (URL)	It is the address for web sites. Most of them begin with http (Hyper Text Transfer Protocol), followed by a colon and two slashes. In most web browsers, the URL of a web page is displayed on top inside an address bar.
Home Page:	A Home page, index page, or main page is a page on a website.
Hyperlink	A Hyperlink is a reference to data that the reader can directly follow either by clicking or by hovering or that is followed automatically.
Uploading and downloading	Uploading refers to the sending of data from a local system to a remote system such as a server or another client with the intent that the remote system should store a copy of the data being transferred. Downloading means to receive data to a local system from a remote system, or to initiate such a data transfer.
Email attachment	An email attachment is a computer file sent along with an email message. One or more files can be attached to any email message, and be sent along with it to the recipient. The first email was sent by Ray Tomlinson to himself in 1971.
CC (Carbon Copy)	It indicates in an e-mail to those who are to receive a copy of a message addressed primarily to another. The list of CC recipients is visible to all other recipients of the message.
BCC (blind carbon copy)	It is available for hidden notification; recipients listed in the BCC field receive a copy of the message, but are not shown on any other recipient's copy (including other BCC recipients).
Draft	The drafts folder retains copies of messages that you have started but are not yet ready to send.
Internet Protocol address (IP address)	It is a numerical label assigned to each device (e.g., computer, printer) participating in a computer network. It acts as an identifier for a computer. It is a unique address for every computer.

Do You Know?

A website is a set of related web pages served from a single web domain.



Practice Questions

for *BPSC Assistant Engineer Examination*

- Q.1** The computer's processor consists of which of the following parts?
(a) Hard Disk and Floppy Drive
(b) CPU and Main Memory
(c) Main Memory and storage
(d) Operating system and Applications
- Q.2.** Main memory works in conjunction with which of the following?
(a) Intel
(b) RAM
(c) CPU
(d) special function cards
- Q.3** The primary goal of a computer is to process the data into which of the following?
(a) suggestions (b) ideas
(c) information (d) reports
- Q.4** Which of the following types of computer could be found in a digital watch?
(a) Mainframe
(b) Super computer
(c) Embedded computer
(d) Notebook computer
- Q.5** Microcomputer hardware consists of which of the three basic categories of physical equipments?
(a) System unit, primary, storage, secondary storage
(b) System unit, input/output, memory
(c) System unit, input/output, secondary storage
(d) Keyboard, monitor, hard drive
- Q.6** The two types of output devices are
(a) Monitor and Printer
(b) Floppy disc and CD
(c) Keyboard and Mouse
(d) Windows 2000 and Windows XP
- Q.7** The most common input devices are
(a) Digital camera, speaker
(b) Scanner, monitor
(c) Microphone, printer
(d) Keyboard, mouse
- Q.8** Which of following is not on input device?
(a) Joystick (b) Monitor
(c) Keyboard (d) Microphone
- Q.9** Hard copy of a document is
(a) Printed on printer
(b) Store in hard disk
(c) Store in CD
(d) Stored in floppy
- Q.10** Which of the following key is used in combination with another key to perform a specific task?
(a) Function (b) Spacebar
(c) Arrow (d) Control
- Q.11** A scanner scans
(a) Pictures
(b) Text
(c) Both picture and text
(d) Neither picture nor text
- Q.12** Soft copy is an intangible output, so what kind of output is hard copy?
(a) The physical parts of computer
(b) The printed parts of the computer
(c) The printed output
(d) The physical output device
- Q.13** The part of a computer which displays the work has been done, is known as
(a) RAM (b) Printer
(c) Monitor (d) ROM
- Q.14** Soft copy refers to
(a) Digitizing (b) Music sounds
(c) Screen output (d) Printed output
- Q.15** One puts information into the computer by pressing which of the following keys?
(a) Caps lock (b) Tab
(c) Enter (d) Esc

- Q.16** A button that makes characters either upper or lower case and numbers to symbols
(a) Icon (b) Shift key
(c) Monitor (d) Mouse
- Q.17** Capital letter on a keyboard can be displayed by pressing
(a) Caps Lock key (b) Grown-ups
(c) Big guys (d) Upper case letters
- Q.18** The key that lets to exit a program when pressed is
(a) Arrow key (b) Space bar
(c) Escape key (d) Return key
- Q.19** Which keys is used to move the cursor one space to the right or puts spaces in between words?
(a) Control key (b) Space bar
(c) Escape key (d) Alt key
- Q.20** Which keys enable the input of numbers quickly?
(a) Function keys (b) The numeric keypad
(c) Ctrl, shift and alt (d) Arrow keys
- Q.21** Which of the following is NOT an output device?
(a) Plotter (b) Printer
(c) Monitor (d) Touch Screen
- Q.22** The arrow keys can be used to
(a) save the document
(b) move the cursor in the text that has already been entered
(c) delete text
(d) move the cursor while deleting text
- Q.23** For what a keyboard used?
(a) Input text and numbers and send commands to the computer
(b) To create new keys to use with your computer
(c) To open the Computer up
(d) To create images and send them to computer
- Q.24** The most frequently used piece of hardware for inputting data is
(a) keyboard (b) floppy disk
(c) cursor (d) software
- Q.25** The storage which stores or retains data after power off is called
(a) Non-volatile storage
(b) Sequential storage
(c) Direct storage
(d) None of the above
- Q.26** Built-in memory of computer is known as
(a) EROM (b) ROM
(c) RAM (d) PROM
- Q.27** The instructions for starting the computer are housed in
(a) RAM (b) CD-ROM
(c) ROM chip (d) All of these
- Q.28** Where is data saved permanently?
(a) Memory (b) Storage
(c) CPU (d) Primer
- Q.29** Secondary storage
(a) does not require constant power
(b) does not use magnetic media
(c) does not store information for later retrieval
(d) consists of four main types of devices
- Q.30** The place where the computer stores programs and data is called
(a) Backup (b) Storehouse
(c) Storage unit (d) Memory
- Q.31** To put information in a file on a magnetic disk, or in a computer's memory, so that it can be used later, called
(a) Store (b) Ship
(c) Shift (d) Centre
- Q.32** A removable magnetic disc that holds information is known as
(a) Floppy disk (b) Hard drive
(c) Monitor (d) Portable
- Q.33** Which of the following can only have sequential access?
(a) CD-ROM (b) Tape
(c) Disk (d) DVD-ROM
- Q.34** If a memory chip is volatile, it will
(a) explode if exposed to high temperatures
(b) lose its contents if turned off
(c) be used to both read and write data
(d) be used for data storage only
- Q.35** A DVD is an example of
(a) hard disk
(b) optical disc
(c) output device
(d) solid-state storage device
- Q.36** Cache and main memory will lose their contents when the power is Off. They are
(a) dynamic (b) static
(c) volatile (d) non-volatile

- Q.37** What part of the computer provides only temporary storage of files?
(a) ROM memory (b) RAM memory
(c) Hard drive (d) Mother board
- Q.38** A UPS
(a) limits damage caused by fluctuating levels of electricity
(b) provides battery backup for a limited time
(c) delivers electronic messages via a bus
(d) conducts a power-on test, or POST
- Q.39** A disk on which information is stored is known as
(a) Plate (b) Data disk
(c) Paper disk (d) TV disk
- Q.40** Computer's hard disk is
(a) an arithmetic and logical unit
(b) operating system
(c) computer software
(d) computer hardware
- Q.41** Which of the following an example of a processing device?
(a) a magnetic ink reader
(b) a tablet PC
(c) Special function cards
(d) scanners
- Q.42** The pictorial representation of a program or algorithm is known as
(a) chart (b) solve chart
(c) flow chart (d) mix chart
- Q.43** Computer language used on the internet is
(a) Basic (b) Pascal
(c) Java (d) COBOL
- Q.44** A prescribed set of well-defined instructions for solving Mathematical problems is known as
(a) A compiler (b) A code
(c) A description (d) An algorithm
- Q.45** Which of the following is a popular programming language for developing multimedia web pages?
(a) COBOL (b) Java
(c) Assembler (d) BASIC
- Q.46** The operating system called UNIX is typically used for which of the following?
(a) desktop computers
(b) laptop computers
(c) super computers
(d) web servers
- Q.47** The term bit is short for
(a) Megabyte (b) Binary number
(c) Binary digit (d) Binary language
- Q.48** How many options does a binary choice offer?
(a) One
(b) Two
(c) Three
(d) It depends on the amount of memory in the computer
- Q.49** The smallest unit of information a computer can understand and process is called
(a) digit (b) kilobyte
(c) bit (d) byte
- Q.50** Information on a computer is stored as which of the following?
(a) modem data (b) digital data
(c) analog data (d) watts data
- Q.51** A string of eight 0s and 1s is called a
(a) megabyte (b) kilobyte
(c) gigabyte (d) byte
- Q.52** Which of the following is the largest unit of storage?
(a) KB (b) MB
(c) GB (d) TB
- Q.53** An error in a program which causes wrong result is called
(a) bug (b) byte
(c) problem (d) attributes
- Q.54** Each component of computer is either
(a) Hardware or software
(b) Software or RAM
(c) Application software
(d) Input devices or output devices
- Q.55** Which of the following can be correctly describe as backup?
(a) Connect a network to more component
(b) Copy to save a data from original source to other destination
(c) Filter an old data from new data
(d) Access data from tape
- Q.56** The main function of an assembler is
(a) To convert assemble language into high level language
(b) To convert high level language into machine language
(c) To convert assemble language into machine language
(d) To convert basic language into machine language

- Q.57** MS Word is an example of
(a) Processing device
(b) Application software
(c) Operating system
(d) Input device
- Q.58** A compiler translates a program written in a high level language into
(a) machine language
(b) a debugged program
(c) an algorithm
(d) Java
- Q.59** Which of the following best describe hardware?
(a) All devices used to input data into a computer
(b) Sorts of instructions that a computer runs or executes
(c) The computer and all the devices connected to it that are used to input and output data
(d) All devices involved in processing information including the CPU, memory and storage
- Q.60** Which of the following part of a computer one can touch and feel?
(a) Hardware (b) Software
(c) Programs (d) Output
- Q.61** A series of instructions that tells a computer what to do and how to do it is called a
(a) programme (b) processor
(c) user response (d) command
- Q.62** Antivirus software is an example of
(a) an office suite
(b) an operating system
(c) a security utility
(d) business software
- Q.63** Which of the following is not an item of hardware?
(a) An MP3 file (b) A keyboard
(c) A monitor (d) A mouse
- Q.64** Compatibility in regard to computers refers to
(a) The software being able to run on the computer.
(b) It being versatile enough to handle the job.
(c) The software doing the right job for the user.
(d) Software running with other previously installed software.
- Q.65** The ability of an Operating System (OS) to run more than one application at a time is called
(a) multi-tasking
(b) object-oriented programming
(c) Multi-user computing
(d) Timesharing
- Q.66** Which of the following is not an example of hardware?
(a) Monitor (b) Printer
(c) Mouse (d) Excel
- Q.67** Which of the following peripheral devices displays information to a user?
(a) Monitor
(b) Keyboard
(c) Secondary storage devices
(d) Primary storage devices
- Q.68** A program which helps to create written documents and let go back and make corrections when necessary is known as
(a) Spreadsheet (b) Word printer
(c) Personal writer (d) Word processor
- Q.69** A computer system includes
(a) hardware
(b) software
(c) peripheral devices
(d) All of these
- Q.70** Compiling creates
(a) an algorithm
(b) a program specification
(c) an executable program
(d) a subroutine
- Q.71** Which of the following process checks to ensure the components of the computer are operating and connected properly?
(a) Booting (b) Editing
(c) Saving (d) Processing
- Q.72** A computer cannot “boot” if it does not have the
(a) Loader (b) Compiler
(c) Operating System (d) Assembler
- Q.73** Which of the following correctly define ‘software’?
(a) A type of computer code
(b) A computer language
(c) A set of instructions for computer
(d) A cover for the computer
- Q.74** Computer equipment itself is called
(a) hardware (b) byte
(c) software (d) mouse

- Q.75** Server is a computer which provides resources to other computers commuted in a
(a) network (b) mainframe
(c) supercomputers (d) clients
- Q.76** A device that connects to a network without the use of cables is known as
(a) distributed (b) wireless
(c) centralised (d) None of these
- Q.77** Computers connected to a LAN (local area network) can
(a) run faster
(b) go online
(c) share information and/or share peripheral equipment
(d) e-mail
- Q.78** A word in a web page that, when clicked, opens another document is known as
(a) Reference (b) Hyperlink
(c) Anchor (d) URL
- Q.79** The most important or powerful computer in a typical network is
(a) network client (b) network station
(c) desktop (d) network server
- Q.80** Terminal is
(a) any input/output device
(b) a point at which data enters or leaves the computer
(c) the last instruction in a program
(d) a device to give power supply to the computer
- Q.81** Which of the following is an example of continuity?
(a) Internet (b) Word document
(c) Power cord (d) Data
- Q.82** Unsolicited e-mail is called a
(a) COBOL (b) Java
(c) Backlash (d) Spam
- Q.83** Inventor of WWW is
(a) Bill Gates (b) Lee. N. Feyong
(c) N. Ressler (d) Tim Berners Lee
- Q.84** Passwords enables users to
(a) Get into the system quickly
(b) Simplify file structure
(c) Retain confidentiality of files
(d) Make efficient use of time
- Q.85** What is an e-mail?
(a) A real-time typed conversation
(b) An online area on which a user can converse
(c) Transmission of files and messages through computer network
(d) A real time typed conversation
- Q.86** Sending an e-mail is similar to
(a) Telling an event
(b) Narrating a story
(c) Writing a letter
(d) Creating a drawing
- Q.87** e-commerce allows companies to
(a) issue important business reports
(b) conduct business over the internet
(c) support decision making processes
(d) keep track of paper based transaction
- Q.88** Junk e-mail is also called
(a) Spam (b) Spoof
(c) Algorithm (d) Starred
- Q.89** Marketing of internet banking means
(a) Meeting of banks on the internet
(b) Marketing of internet
(c) Marketing the usage of banking transactions through internet
(d) Transactions with duplicate currency
- Q.90** Output which is made up of pictures, sounds, and videos is called
(a) Design (b) Hard copy
(c) Graphics (d) Multimedia
- Q.91** The internet is a system of
(a) Website
(b) Web page
(c) Software bundles
(d) Interconnected network
- Q.92** What is a modem connected to?
(a) printer (b) motherboard
(c) processor (d) phone line
- Q.93** Program such as Internet Explorer that serve as navigable windows into the Web are called
(a) Internet (b) Networks
(c) Hypertext (d) Web browsers
- Q.94** The standard protocol of the internet is
(a) TCP/IP (b) COBOL
(c) HTML (d) Flash
- Q.95** The acronym HTML stands for
(a) High Transmission Markup Language
(b) High Transfer Machine Language
(c) Hypertext Markup Language
(d) Hypermedia Markup Language

- Q.96** A modem
- (a) translates analog signals from a computer into digital signals that can travel along conventional telephone lines
 - (b) translates digital .signal* from a computer into analog signals that can travel along conventional telephone lines
 - (c) demodulates digitals signals from a computer
 - (d) modulates signals an analog telephone line
- Q.97** An email account includes a storage area, often called
- (a) an attachment
 - (b) a hyperlink
 - (c) a mailbox
 - (d) an IP address
- Q.98** A small arrow or blinking symbol on desktop is called a
- (a) Mouse
 - (b) Logo
 - (c) Graphics
 - (d) Cursor
- Q.99** At which button is Help Menu available?
- (a) End
 - (b) Start
 - (c) Turn off
 - (d) Restart
- Q.100** All the deleted files go to
- (a) Recycle Bin
 - (b) Task bar
 - (c) Toolbar
 - (d) My computer
- Q.101** What is a file?
- (a) A file is a section of main storage used to store data.
 - (b) A file is a collection of information that has been given a name and stored in secondary memory.
 - (c) A file is the part of a program that is used to describe what the program should do.
 - (d) Floppy disks which only store data, not programs.
- Q.102** Deleted data remains on a disk until
- (a) The data is overwritten
 - (b) The recycle bin is emptied
 - (c) The disk is scanned
 - (d) A file compression utility is used
- Q.103** To shrink a window to an icon
- (a) Restore a window
 - (b) Minimise a window
 - (c) Maximise a window
 - (d) Open a group window
- Q.104** The portion that shows all the choices you can make while working in a window is called the
- (a) Table
 - (b) Options
 - (c) Menu bar
 - (d) Start
- Q.105** Date and Time are available on the desktop at
- (a) My computer
 - (b) Recycle bin
 - (c) Keyboard
 - (d) Task bar
- Q.106** A place that a user can create to store files is known as
- (a) Text
 - (b) Cursor
 - (c) Folder
 - (d) Boot
- Q.107** A menu contains a list of
- (a) Commands
 - (b) Reports
 - (c) Objects
 - (d) Data
- Q.108** Files are organized by storing them in
- (a) Databases
 - (b) Tables
 - (c) Folders
 - (d) Graphs
- Q.109** Which of the following menu types is also called a drop down menu?
- (a) pop up
 - (b) cascading
 - (c) fly-out
 - (d) pull-down
- Q.110** The copy command saves to
- (a) the desktop
 - (b) the clipboard
 - (c) printer
 - (d) Microsoft Word
- Q.111** The taskbar is located
- (a) on the Start menu
 - (b) at the bottom of the screen
 - (c) at the top of the screen
 - (d) on the Quick Launch toolbar
- Q.112** The Recycle Bin stores discarded items until
- (a) the end of the day
 - (b) the computer is shut down
 - (c) another user logs on
 - (d) user empty it
- Q.113** When a file is saved for the first time
- (a) a copy is automatically printed
 - (b) it must be given a name to identify it
 - (c) it only need a name if it is not going to be printed
 - (d) it does not need a name
- Q.114** Software used to create a budget is known as
- (a) utility software
 - (b) graphics software
 - (c) word processing software
 - (d) spreadsheet software
- Q.115** Microsoft Office is an example of a
- (a) vertical market software
 - (b) open source software
 - (c) horizontal market software
 - (d) closed source software

- Q.116** If a previously saved file is edited
- it cannot be saved again
 - the file will only have to be saved again if it is more than one page in length
 - the changes will automatically be saved in the file
 - the file must be saved again to store the changes
- Q.117** To print a document
- select the Print command and then select OK
 - close the document select the Print command, then select OK
 - type Print and then press Enter
 - select the Ready Printer command then select OK
- Q.118** Which of the following is an example of storage devices?
- Magnetic disks
 - Tapes
 - DVDs
 - All of these
- Q.119** The main system board of a computer is known as
- processor
 - motherboard
 - integrated circuit
 - microchip
- Q.120** The internet allows which of the following tasks?
- Sending e-mail
 - Connect to servers
 - View web pages
 - All of these

Chapter 4 | Computer and Information Technology

Answer Key

Bihar Public Service Commission | Assistant Engineer Examination

- | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1. (c) | 2. (c) | 3. (c) | 4. (c) | 5. (c) | 6. (a) | 7. (d) | 8. (b) | 9. (a) |
| 10. (d) | 11. (c) | 12. (c) | 13. (c) | 14. (c) | 15. (c) | 16. (b) | 17. (a) | 18. (c) |
| 19. (b) | 20. (b) | 21. (d) | 22. (b) | 23. (a) | 24. (a) | 25. (a) | 26. (b) | 27. (c) |
| 28. (b) | 29. (a) | 30. (c) | 31. (a) | 32. (a) | 33. (b) | 34. (b) | 35. (b) | 36. (c) |
| 37. (b) | 38. (b) | 39. (b) | 40. (d) | 41. (c) | 42. (c) | 43. (c) | 44. (d) | 45. (b) |
| 46. (d) | 47. (c) | 48. (b) | 49. (c) | 50. (b) | 51. (d) | 52. (d) | 53. (a) | 54. (a) |
| 55. (b) | 56. (c) | 57. (b) | 58. (a) | 59. (c) | 60. (a) | 61. (a) | 62. (c) | 63. (a) |
| 64. (d) | 65. (a) | 66. (d) | 67. (a) | 68. (d) | 69. (d) | 70. (c) | 71. (a) | 72. (c) |
| 73. (c) | 74. (a) | 75. (a) | 76. (b) | 77. (c) | 78. (b) | 79. (d) | 80. (b) | 81. (a) |
| 82. (d) | 83. (d) | 84. (c) | 85. (c) | 86. (c) | 87. (b) | 88. (a) | 89. (c) | 90. (d) |
| 91. (d) | 92. (d) | 93. (d) | 94. (a) | 95. (c) | 96. (b) | 97. (c) | 98. (d) | 99. (b) |
| 100. (a) | 101. (b) | 102. (b) | 103. (b) | 104. (c) | 105. (d) | 106. (c) | 107. (a) | 108. (c) |
| 109. (d) | 110. (b) | 111. (b) | 112. (d) | 113. (b) | 114. (d) | 115. (c) | 116. (d) | 117. (a) |
| 118. (d) | 119. (b) | 120. (d) | | | | | | |