2025

General Knowledge & Computer Applications

for

State Engineering Services Exams, SSC, PSUs, Banking, RRB and Other Exams

by **Mr. B. Singh**

MADE EASY PUBLICATIONS

GENERAL KNOWLEDGE & COMPUTER APPLICATIONS

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Preface

This comprehensive textbook on **General Knowledge & Computer Applications** provides all the requirements of the students, i.e., comprehensive coverage of theory, fundamental concepts and objective type questions articulated in a lucid language. This concise presentation will help the readers grasp the topics of **General Knowledge & Computer Applications** with clarity and apply them with ease to solve objective questions quickly.

This book covers the syllabus of States Engineering Services Exams including APPSC, MPPSC, MPSC, BPSC, UPPSC; SSC, PSUs, Banking, RRB and other examinations. All the topics are given the emphasis they deserve so that mere reading of the book clarifies all the concepts. The book incorporates theory as well as previous years' questions of various State Engineering Services Examinations, UPSC ESE, etc. It also contains plenty of objective type questions for practice. This book has been very well targeted for aforementioned exams covering all the aspects of subject matter required for these examinations.

We have put-in our sincere efforts to present detailed theory and MCQs without compromising the accuracy of answers. For the interest of the readers, some notes, do you know and interesting facts are given in the comprehensive manner.

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)
CMD, MADE EASY Group

B. Singh (Ex. IES)

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INDIA & WORLD

◀ National Symbols

National Flag

- The National Flag of India is a horizontal tricolour of deep saffron (Kesaria) at the top, white in the middle and dark green at the bottom in equal proportion. The ratio of width of the flag to its length is 2:3. In the centre of the white band a navy-blue wheel is located which represents the Chakra.
- It was adopted by Constituent Assembly of India on July 22, 1947.
- A tricolour flag was first accepted by the Indian National Congress in 1931, having Charkha in place of today's Chakra.
- The horizontal colour strip of deep Saffron at top represents courage, sacrifice and renunciation, White at middle shows truth and purity in thoughts and dark Green at the bottom is the symbol of life abundance and prosperity.
- A wheel (Chakra) in centre of the white strip is the symbol of progress and movement. It has 24 spokes.
- Supreme Court declared the right to hoist flag as a Fundamental Right under Article 19 (i) (a) of the Constitution in 2002. Flag hoisting in India is regulated by Flag Code of India, 2002.
- The Flag was designed by **Pingali Venkayya** and first time, the flag was hoisted by **Sacchindra Prasad Bose** in 1906 in Calcutta and later on in the year 1907 an another tricolour flag was unfurled by **Madam Bhikaji Cama** in Stuttgart, Germany.
- The first flag committee was headed by **Dr. Rajendra Prasad**.

National Emblem

- The National Emblem of India is an adaptation from the Sarnath Lion Capital of Ashoka. It was adopted by the Government of India on January 26, 1950.
- In this emblem, only three lions are visible, the fourth lion being hidden from view. The wheel appears in relief in the centre of the abacus with a **bull** on **right** and a **horse** on **left**. The bell shaped lotus (as in the original) has been omitted. The other animals present in the emblem are an Elephant and a Lion.
- The words *Satyameva Jayate* are inscribed below the abacus in Devanagri script. These words are taken from *Mundaka Upanishad.*

National Anthem

- The song *Jana gana mana* is the National Anthem of India which was composed by **Rabindra Nath Tagore**, originally in Bengali.
- It was adopted by Constituent Assembly on January 24, 1950 in its Hindi version.
- The song Jana gana mana was first published in January, 1912 under the title **'Bharat Vidhata'** in Tattva Bodhini Patrika.
- The song was translated in English in 1919 with the title **"Morning Song of India".**
- It was first sung at the Calcutta Session of Congress on December 27, 1911.
- Playing time of full version of National Anthem is 52 seconds while it is 20 seconds for first and last lines of the stanza.

National Song

- "*Vande Mataram*" is the National song of India, which was composed by **Bankim Chandra Chatterjee**, originally in Sanskrit.
- It was adopted on January 24, 1950, providing it equal status with National Anthem *Jana gana mana.*
- It is taken from his novel **Anand Math** published in 1882. Its English translation was done by Sri Aurobindo.
- It was sung for the first time at the Congress Session of 1896.

National Calendar

- National Calendar is based on Saka Era (began on 78 A.D.) with Chaitra as its first month and Phalguna as its last month with a normal year of 365 days adopted from March 22, 1957 along with the Gregorian Calendar.
- First day of Chaitra normally falls on March 22 and on March 21 in leap year.

National Animal

- The Tiger (Panthera Tigris) is the National Animal of India. It has a thick yellow coat of fur with dark stripes.
- Lion was the National Animal of India till 1972. Later on, it was replaced by Tiger.

Other Indian National Symbols	
National Bird	Peacock *(Pavo Cristatus)*
National Flower	Lotus *(Nelumbo Nucipera Gaertn)*
National River	Ganga
National Tree	Banyan *(Ficus Benghalensis)*
National Fruit	Mango *(Mangifera Indica)*
National Aquatic Animal	Ganges River Dolphin
National Heritage Animal	Elephant
National Game (De-facto)	Hockey

National Emblems of Countries	
Country	**Emblem**
India	Sarnath Lion Capital
Australia	Kangaroo
Bangladesh	Water Lily
Canada	White Lily
France	Lily
Germany	Corn flower
Iran	Rose
Italy	White Lily
Japan	Chrysanthemum
Pakistan	Crescent
Spain	Eagle
Sri Lanka	Sword & Lion
Russia	Sickle and Hammer
Norway	Lion
United Kingdom	Rose
USA	Golden Rod

Significance of Signs and Symbols	
Symbol	**Meaning**
Red triangle	Family planning
Red cross	Hospital/Ambulance
Red light	Danger/Emergency
Green light	Line clear signal
Olive branch	Peace
Black arm-band	Sign of mourning/protest
Dove	Peace
Black flag	Demonstration of protest
Red flag	Sign of danger, revolution
Yellow Flag	Displayed by ship with infectious disease on board or ship in quarantine.
White Flag	Truce

Inventions			
Invention	**Year**	**Inventor**	**Country**
Laser	1960	Theodore H. Maiman	USA
Microphone	1876	Alexander Graham Bell	USA
Micro-processor	1971	Robert Noyce & Gordon Moore	USA
Optical fibre	1955	Narinder Kapany	Germany
Pasteurization	1867	Louis Pasteur	France
Printing Press	1455	Johannes Gutenberg	Germany
Radar	1922	A.H. Taylor & Leo C. Young	USA
Refrigerator	1850	James Harrison, Alexander Catlin	USA
Steam Engine	1765	James Watt	Britain
Submarine	1776	David Bushnell	USA
Super Computer	1976	J.H.Van Tassel	USA
Tank	1914	Sir Ernest D. Swington	Britain
Telegraph	1787	M. Lammond	France
Telescope	1608	Hans Lippershey	Netherlands
Television (mechanical)	1926	John Logie Baird	Britain
Television (electronic)	1927	P.T. Farnsworth	USA
Thermometer	1593	Galileo Galilei	Italy
Transistor	1948	Bardeen, Shockley & Brattain	USA
Typewriter	1808	Pellegrine Tarri	Italy
Stethoscope	1819	Rene Laennec	France
Electro-cardiograph	1903	Willem Einthoven	Netherlands
Penicillin	1928	Alexander Fleming	Britain
D.D.T. (Dichloro-Diphenyl-Trichloroethane)	1939	Paul Muller	Germany
Rh-factor	1940	Weiner	USA
Cryo-surgery	1953	Henry Swan	USA
Poliomyelitis vaccine (incectivates)	1954	Jonas Salk	USA
Poliomyelitis vaccine (oral)	1960	Albert Sabin	USA

BASICS OF COMPUTER APPLICATIONS

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.
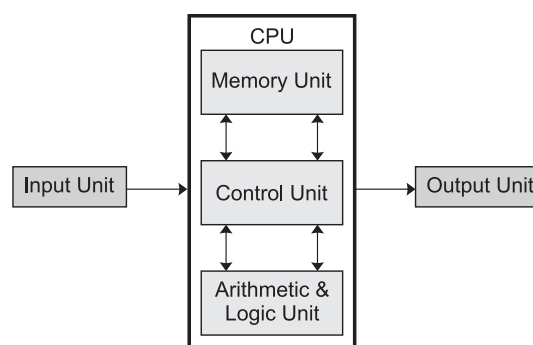
(Different hardware components of a computer)

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 & 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.

(ii) **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

(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.
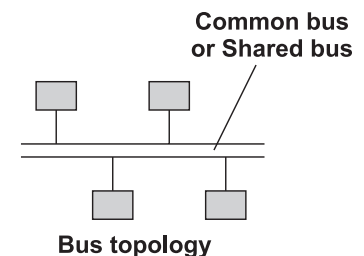
Network Topology

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.

   Common bus or Shared bus
   Bus topology

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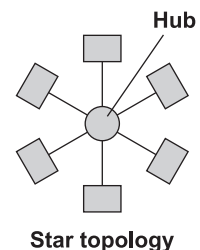
   In star topology, first the message will go to the hub then that message will go to other user.

   Hub
   Star topology

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.


Connection from one device to other
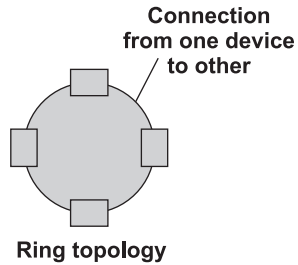
Ring topology

In ring topology, user can communicate as randomly.

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

Number of connection = $n\,(n-1)/2$ in mesh topology, where n = number of nodes
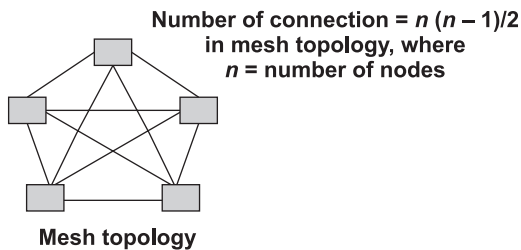
Mesh topology

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.

Tree topology
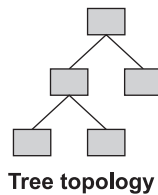
Methods of Message Delivery

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.

Previous Years' Questions & Practice Questions

GENERAL KNOWLEDGE

1. What is the full form of CDMA in mobile phones?
(a) Code Division Multiple Access
(b) Code Destination Major Access
(c) Card Distribution Multiple Access
(d) Catalogue Dipolar Maximum Access
[BPSC (AE) : 1995]

Ans. **(a)**

2. Where is India's Maitri Research Station located?
(a) Ladakh
(b) Gangotri
(c) Andaman and Nicobar Islands
(d) Antarctica
[BPSC (AE) : 1995]

Ans. **(d)**

3. In which year was IIT Patna established?
(a) 2008 (b) 2009
(c) 2010 (d) 2011
[BPSC (AE) : 1995]

Ans. **(a)**

4. Which is the apex body of Indian scientists?
(a) Indian Institute of Science
(b) Indian National Science Academy
(c) National Academy of Science
(d) Institute of Engineers
[BPSC (AE) : 1995]

Ans. **(b)**

5. Which of the following organizations is working to spread scientific sensibility among school children aged 10 to 17 years in the country in a big way?
(a) CARE Science
(b) Rashtriya Pragya Vikas
(c) National Children's Science Congress
(d) Vidyalaya Vigyan Setu
[BPSC (AE) : 1995]

Ans. **(c)**

6. INSPIRE (Innovation in Science Pursuit for Inspired Research) is a programme initiated by
(a) SERC (b) IDBI
(c) DST (d) UCET
[BPSC (AE) : 1995]

Ans. **(c)**

7. Isaac Asimov is a
(a) scientist
(b) astronaut
(c) science fiction writer
(d) environmental activist
[BPSC (AE) : 1995]

Ans. **(c)**

8. Where is the headquarters of Indian Space Research Organization situated?
(a) Chennai (b) Sri Harikota
(c) Bengaluru (d) New Delhi
[BPSC (AE) : 1995]

Ans. **(c)**

9. Which is the largest dam in India?
(a) Bhakra-Nangal dam
(b) Maithon dam
(c) Hirakud dam
(d) Tehri dam
[BPSC (AE) : 1995]

Ans. **(c)**