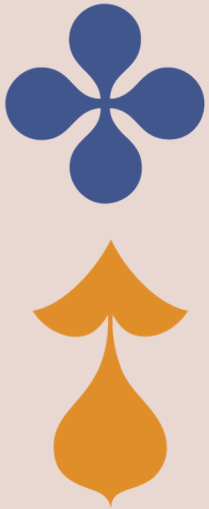
Information & Communication Technology

KVS-PAPER-1-SYLLABUS

MANU B

I.C.T: Specifications & Effects

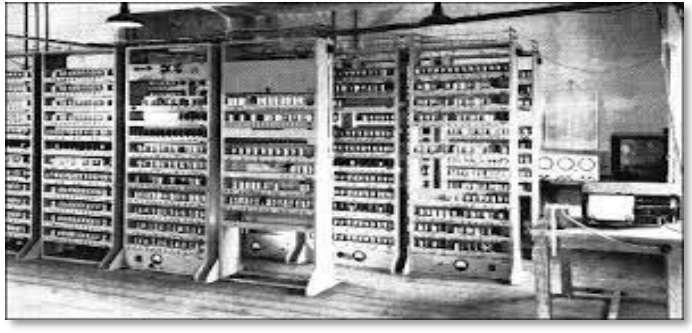


- Digital Transformation of the society
- Rapid interaction among people using advanced communication methods
- Newer dimensions to R&D: Data (record & storage), analysis and processing
- Multitasking
- Precision
- Learning facilities and Opportunities

INTRODUCTION TO COMPUTERS

- **Computer:** Fast and accurate electronic machine that converts data into meaningful information
- Used to perform calculations, documenting texts, editing photos & videos, accessing information online, educational requirements etc.
- Works with the help of a hardware and software
- **Hardware**: Physical components of a computer
- **Software:** Instructions & programs fed in a computer
- Evolution of computers through **five generations**

First Generation



- **Time Period:** 1946 – 1959
- **Basic Components:** Vacuum tubes
- **Language:** Machine Language
- **Memory:** 4000 bits
- **Size:** Almost the size of a big room
- Examples: ENIAC, UNIVAC, IBM-701

Challenges:

- Vacuum tubes generated a lot of heat; decreased efficiency & reliability
- Supported machine language only
- Very costly; affordable only to large organizations

Second Generation

- **Time Period:** 1959-1965
- **Basic Components:** Transistors
- **Language:** Assembly Language
- **Memory:** 32,000 bits (Primary + Secondary)
- **Primary Memory:** Used Magnetic cores
- **Secondary Memory:** Used Magnetic Tapes & Magnetic Disks
- **Size:** Comparatively smaller in size
- **Examples:** IBM 1401, IBM 1600

Features:

- Relatively faster and reliable than vacuum tubes
- Less heat, less electricity required, much faster
- Supported Machine & Assembly Languages
- Still Very Costly

Third Generation

- **Time Period:** 1965-1971
- **Basic Components:** Integrated Circuits (IC)
- **Language:** High Level; BASIC, PASCAL, FORTRAN, COBOL
- **Memory:** 1,28,000 bits
- **Size:** Relatively smaller than other two generations
- **Examples:** UNIVAC 9000, Personal Data Processor (PDP)

Features:

- Faster and Reliable; less maintenance and heating
- Lesser electricity required in comparison
- After all they were costly

Fourth Generation

- **Time Period:** 1971-1980
- **Basic Components:** Large Scale Integrated Microprocessors(LSI) & Very Large Scale Integrated Microprocessors (VLSI)
- **Language:** High Level; C, C++, DBASE
- **Memory:** 100 billion bits
- **Size:** Portable if required; Micro computers
- **Examples:** Personal Computers

Features:

- Very cheaper in comparison
- Concept of Internet was introduced after this
- Easy availability of computers

Fifth Generation

- **Time Period:** 1980s to present and beyond
- **Basic Components:** Ultra Large Scale Integrated Microprocessors(ULSI) & Artificial Intelligence (AI)
- **Language:** High level; SQL, Java, .net
- **Memory:** Beyond limits
- **Size:** Pocket sized and other gadgets
- **Examples:** Laptops, Smartphones, Robots etc.

Features:

- Robotics and Natural Language/Voice Recognitions
- User-friendly multimedia interfaces & parallel processing
- Availability at cheaper rates

READY FOR SOME QUESTIONS???

Question 1:

- What was the basis of second generation of computers?

1. Microprocessors
2. Integrated Circuits
3. Transistors
4. Vacuum tubes

Answer: 3

Question 2:

- Which programming languages were supported by the fifth generation of computers?

1. Assembly language
2. Machine language
3. Artificial Intelligence languages
4. COBOL

Answer: 3

Question 3:

- Which generation of computers is equipped with artificial intelligence?

1. Third generation
2. Fourth generation
3. Fifth generation
4. Second generation

Answer: 3

Question 4:

- Which among the following languages were used in second generation of computers?

1. High-level Language
2. Machine Language
3. Assembly Language
4. Programming Language

Answer: 3

Question 5:

- **Which of the following statements are true about the impact of ICT on society?**

A. It has enabled rapid interaction among people using advanced communication methods.
B. It has reduced the need for multitasking in professional environments.
C. It has led to precision in various technological applications.
D. It has limited learning facilities and opportunities.

Choose the correct code

1. A and B only
2. A, C, and D only
3. A, B, and C only
4. A and C only

Answer: 4

TYPES OF COMPUTERS

Operation Based Classification

ANALOG

- Process analogue data
- Data is continuous and not discrete
- Can process numeric data alone
- Better in terms of speed
- Examples: Aircraft computers & simulators, Speedometers etc.

DIGITAL

- Works on digital data
- Only discrete values like ‘0’ and ‘1’
- Both numeric and non-numeric data can be processed
- Better in terms of memory and accuracy
- Examples: Personal Computers

HYBRID COMPUTERS: They are a combination of analogue and digital computers. They have high speed of analogue computers and the accuracy and memory of digital computers. They can process both continuous and discrete data
Example: Petrol Station Machines, Electrocardiogram and Ultrasound machines

Size Based Classification

- Supercomputers
- Mainframe Computers
- Mini Computers
  (Mid-range Computers)
- Micro Computers
  (Personal Computers)

Supercomputers

- High performance computers for specific purposes
- Computational tasks like weather forecast, research and development programmes, earthquake studies etc.
- Performance is measured in terms of Floating-Point Operations per second (FLOPS); devices these days perform 1102 PFLOPS
- They are expensive and huge in size
- **Examples:** Satellite launching supercomputers in NASA, IBM Summit (2018, US), Dell Frontera (2019, US), Fujitsu Fugaku (2020, Japan), HP Frontier (2023, US)
- **First Supercomputer in India: PARAM 8000**
- **Latest Supercomputer: PRATYUSH & MIHIR** (Estd. @ Indian Inst.of Tropical Meteorology, Pune and National Centre for Medium Range Weather Forecast (NCMRWF), Noida respectively(As per Jan.2018, fastest in India)

Mainframe Computers

- Used to record huge amount data (big-data processing)
- Supports multiple operating systems – often used as servers
- Special features- virtual memory, hardware swapping without disruption
- High stability and reliability enable these machines to run uninterrupted for very long periods of time (for decades)
- Fault-tolerant computing, support mixed workloads, assured integrity
- **Examples:** Servers for ATM transaction recording, student data in universities, patient records in hospitals etc.

Mini Computers

- Also known as **mid-range computers**
- Used for scientific and engineering computations, business data processing, file-handling and data management (mid-size servers)
- A midsize multiprocessing computer; consists of two or more processors and can support 4 to 200 users at one time.
- Used in institutes and departments for tasks such as billing, accounting and inventory management
- **Example:** IBM S/36, systems more oriented for corporate intranets, computer-aided manufacturing (CAM)

Workstations

- High-end, expensive computers that are made for more complex procedures and are intended for **one user at a time**
- Science, math and engineering calculations– useful for computer design and manufacturing
- Sometimes improperly named for marketing reasons
- Not usually sold in retail
- **Example:** Apple Mac Pro

Microcomputers

- They are also known as Personal Computers
- Well-known pocket friendly type of computers
- Different varieties available in the market varying in size and price
- General-purpose computers designed for individual use
- Consists of a microprocessor as a central processing unit (CPU), memory, storage area, input unit and output unit
- Mainly used as home computers, programming, gaming etc. – high end PCs can be used in small scale businesses and offices.
- **Examples:** Desktops, Laptops, Modern Smartphones and Tablets

LIST OF ABBREVIATIONS

- **BIOS** – The Basic Input and Output System that controls the computer. It tells us about the operations to be performed on the System. The Instructions are embedded on a chip connected to the Motherboard.
- **PDF** – When the File is to be stored in the Portable Document Format, the term PDF is used
- **VGA** – The System that is used for displaying the graphics is known as Video Graphics Array or VGA. It was developed by IBM.
- **Mac -** The common abbreviation used for a type of personal computer, Macintosh made by the Apple Computer Company
- **OS** – OS is the Operating System of the Computer. It is the main program that runs on the Computer and begins automatically when the Computer is turned on.

Important Abbreviations: General

ABBREVIATION	FULL-FORM
HDD	Hard Disk Drive
UNIVAC	Universal Automatic Computer
GUI	Graphic User Interface
USB	Universal Serial Bus
VGA	Video Graphic Array
ASCII	American Standard Code for Information Interchange
DVD	Digital Versatile Disc
URL	Uniform Resource Locator
FORTRAN	Formula Translator
SIM	Subscriber Identification Module

Important Abbreviations: General

ABBREVIATION	FULL-FORM
HDMI	High Definition Multimedia Interface
VPN	Virtual Private Network
PHP	Hypertext Pre-processor
SQL	Structured Query Language
CMD	Command
BASIC	Beginner All-purpose Symbolic Instruction Code
HTTP	Hypertext Transfer Protocol
Wi-Fi	Wireless Fidelity
ATM	Automated Teller Machine
VIRUS	Vital Information Resources Under Siege
UPS	Uninterrupted Power Supply

Important Abbreviations: Hardware

Abbreviation	Full Form	Relevance
BIOS	Basic Input Output System	Startup firmware in PCs.
POST	Power-On Self Test	Performed by BIOS during boot.
USB	Universal Serial Bus	External connectivity.
SSD	Solid State Drive	Faster than HDD.
GPU	Graphics Processing Unit	Parallel processing for graphics & AI.

Important Abbreviations: Software/Networking

Abbreviation	Full Form	Relevance
HTTP	HyperText Transfer Protocol	Web data exchange.
HTTPS	HTTP Secure	Uses SSL/TLS encryption.
IP	Internet Protocol	IPv4 / IPv6 types.
FTP	File Transfer Protocol	Exam Q: TCP/IP suite member.
DNS	Domain Name System	Converts URLs to IP addresses.

Important Abbreviations: Education & Updates

Abbreviation	Full Form	Relevance
LMS	Learning Management System	ICT-based teaching tool.
MOOC	Massive Open Online Course	Platforms like SWAYAM, Coursera.
SWAYAM	Study Webs of Active Learning for Young Aspiring Minds	A massive open online course recognised by Ministry of Education.
CBT	Computer-Based Test	Common in eligibility exams.
BYOD	Bring Your Own Device	Emerging educational policy concept.

READY FOR SOME QUESTIONS???

Question 1:

In ICT-enabled education, MOOC platforms like SWAYAM are characterized by:

a) Closed, invitation-only courses

b) Massive enrollment capacity and open access

c) Offline-only learning modes

d) Limiting enrollment to 100 students per batch

Answer: b

Explanation:
MOOCs are Massive Open Online Courses with open access and large-scale enrollment.

Question 2:

- Which of the following statements are true?

1. Supercomputers are the fastest and most powerful type of computer, while microcomputers are the smallest and least powerful.
2. Supercomputers are typically used for scientific research and engineering, while microcomputers are typically used for personal and business use.
3. Mainframes are larger and more powerful than minicomputers, while minicomputers are larger and more powerful than microcomputers.
4. All of the above statements are true.

Answer: 4

Question 3:

Which type of computer is NOT designed for a single user?

A) Microcomputers

B) Mainframe computers.

C) Minicomputers.

D) Supercomputers.

Answer: B

Explanation:
Mainframe computers are not designed for individual users. They serve large organizations and handle centralized data processing for tasks like banking, insurance, and multinational companies. Mainframes are powerful machines used by institutions to manage extensive data processing needs. They offer features like parallel processing and have larger storage capacity.

Question 5:

Match the following abbreviations with their functional domains:

List I	List II
A. LMS	1. External Memory
B. USB	2. Web Communication
C. HTTP	3. Graphics Processing
D. GPU	4. Education & Learner management

Codes:

a) A–2, B–1, C–3, D–4
b) A–3, B–2, C–4, D–1
c) A–4, B–1, C–2, D–3
d) A–1, B–2, C–3, D–4

Answer: c

Question 5:

- **BYOD in ICT policy refers to:**

  a) Allowing students to use institutional devices only

  b) Encouraging students to bring their own digital devices

  c) Prohibiting device usage in classrooms

  d) Limiting devices to faculty members

Answer: B

Explanation:
BYOD = Bring Your Own Device is a workplace policy that allows employees (and sometimes contractors, students, or partners) to use their personally owned devices to access company networks, applications, and data

END OF SESSION