

CHAPTER 01

FUNDAMENTALS OF COMPUTER

Q1. Select the best answers for the following MCQs.

| MCQ | i | ii | iii | iv | v | vi | vii | viii | ix | x |
|--------|---|----|-----|----|---|----|-----|------|----|---|
| Answer | B | B | D | C | B | D | C | A | B | A |

Q2. Write short answers of the following questions.

i. Describe Napier's Bone and Slide Rule.

Napier's Bone was invented by John Napier in 1614. It consisted of a wooden box containing rotating cylinders with digits 0 to 9. It could multiply, divide and find square roots of numbers by using simple addition and subtraction.

Slide Rule was developed in 1920s based on the idea of logarithm. It was very useful for solving problems of multiplication and division. It has three parts i.e. slide, rule and a sliding cursor.

ii. Compare 1st and 3rd generation computers.

First Generation Computers

- They used vacuum tubes.
- They were slow in speed and memory was very small.
- Machine language was used in these computers.

Third Generation Computers

- These computers used IC (Integrated Circuits) chips.
- IC chips improved speed and memory of computers.
- Keyboard and monitors were used in them.

iii. Differentiate between analog and digital computers.

| Analog Computer | Digital Computer |
|--------------------------------------|---|
| It uses analog (continuous) signals. | It uses digital (fixed) signals i.e. 0 and 1. |
| They are special purpose devices. | They are general purpose machines. |
| The results are less accurate. | The results are highly accurate and reliable. |

iv. Ahmed, a class IX student is asking his father to replace his home computer CRT monitor with LCD monitor. How will you justify his demand?

LCD monitor is better than CRT monitor because:

- LCD monitors are light weight.
- LCD monitor consumes less electricity.
- LCD monitor has better display quality.

v. What will happen if storage devices are removed from a computer?

If storage devices are removed from a computer, the computer will not boot an operating system. You will get an error message on the screen that *no bootable device is found*. The operating system will not boot until you will insert CD, DVD, hard disk or any other bootable device.

vi. Differentiate between system software and application software.

| System Software | Application Software |
|---|--|
| System software are designed for performing hardware operations. | They are designed for solving user problems. |
| The user does not directly interact with it as it runs in background. | The user directly interacts with these programs. |
| They can run independently. | They cannot run without the presence of system software. |
| For example , DOS and Windows. | For example , MS Office and Skype. |

vii. How a student can use computer to improve academic performance?

Many programs are available for learning the subjects of Physics, Mathematics, Chemistry, etc. Multimedia software makes the process of learning interactive and interesting. Students can refer to internet for finding information any topic.

viii. Give any three uses of computers in a school library.

In a school library, computers are used in the following three ways.

- To maintain the information of books in a particular order through software.
- Library membership can also be managed.
- Searching of books on any topic can be made easy by using computers.

ix. Name few house hold appliances in which microprocessor is used.

Microprocessor is used in several house hold appliances such as:

- Microwave oven
- Washing machines
- Cameras
- Mobile phones
- Watches

x. What are the tasks performed by operating system.

Tasks of Operating System

- It loads programs into memory and executes them.
- It manages files and folders.
- It controls the operation of input/output and storage devices.
- It allows to create password to protect computers from unauthorized use.
- It detects hardware failures and displays messages to fix them.

Q3. Write long answers of the following questions.

i. Describe the five generations of computers.

First Generation Computers

- They used vacuum tubes.
- They were slow in speed and memory was very small.
- Machine language was used in these computers.
- **For example**, ENIAC (Electrical Numerical Integrator and Computer)

Second Generation Computers

- Transistors were used in these computers.
- Transistors reduced the size of computer and increased the speed and memory of computers.
- Assembly language was used in these computers.
- **For example**, UNIVAC (Universal Automatic Computer) II

Third Generation Computers

- These computers used IC (Integrated Circuits) chips.
- IC chips improved speed and memory of computers.
- Keyboard and monitors were used in them.
- **For example**, IBM System/360

Fourth Generation Computers

- Microprocessor was used in microcomputers.
- They are very fast, have large storage capacity and use advanced input/output devices.
- They support modern programming languages such as C++, Java, etc.
- **For example**, Core i3, i5, i7 computers.

Fifth Generation Computers

- Artificial Intelligence (AI) is used in these computers.
- AI minimizes the need to write programs.
- They allow users to enter commands in any natural language like English.
- **For example**, robots and expert systems.

ii. Write note on mainframe, minicomputer and microcomputer.

Mainframe Computer

- Mainframe is a very large, very powerful and expensive computer.
- It supports hundreds and even thousands of users at a time.
- They can execute more than trillion of instructions per second (TIPS).
- **For example**, HP 16500 Series

Minicomputer

- Minicomputer is bigger than microcomputer but smaller than mainframe computer.
- It can execute billions of instructions per second (BIPS).
- It is used in organizations that have hundreds of users such as PIA, NADRA, etc.
- **For example**, HP 3000

Microcomputer

- Microcomputers are the smallest and low-cost computers.
- They are commonly used in homes and offices.

- They can execute millions of instructions per second (**MIPS**).
- **For example**, IBM Lenovo Series

iii. Explains the basic operations of a computer.

Basic Operations of a Computer

The following four basic operations are performed by computers.

- Input operation
- Processing operation
- Storage operation
- Output operation

Input Operation

A computer is a data processing machine. Users enter data and instructions into the computer through keyboard or mouse. It can also be provided to the computer from a storage device such as hard disk, CD or USB memory.

Processing Operation

The microprocessor fetches the data/instructions from the memory and stores it in instruction register. The control unit then decodes it to find out which operation is performed. After decoding the instruction, it sends signals to other parts of computer to execute it.

Storage Operation

The results produced after processing are stored in memory before they are sent to the output device or permanent storage device like hard disk.

Output Operation

The results of data processing are displayed on the screen so that user can see the output. The control unit displays the results on the monitor or prints it on the printer. The results can also be saved in a storage device such as hard disk.

iv. Write short note on the following. (1.25x5)

- Hardware Engineer**
- Network Administrator**
- Database Administrator**
- Web Designer**
- Multimedia Designer**

Hardware Engineer

Hardware engineers design and manufacture computer hardware. They repair and maintain computer hardware. They have extensive knowledge of internal working of computers and its components.

Network Administrator

Network administrator is responsible for installation, configuration and maintenance of computer networks in organizations. They are in charge of maintaining computer hardware and software in a computer network.

Database Administrator

Database administrator is a person who is responsible for the design implementation and maintenance of a database in an organization. He is also responsible for maintaining security and monitoring performance of database.

Web Designer

Web designer is responsible for planning and creating websites. He designs web pages that include text, images, sound, video clips and make the website interactive. HTML (Hypertext Markup Language) is most commonly used language for creating websites.

Multimedia Designer

Multimedia designers organize and present information in an easy to understand and attractive manner. They combine text, graphics, animation, audio and video. They create digital images and arrange them in a sequence for animations. They usually work in film/TV industry, software companies and advertising companies.

v. Describe the following types of application software. (1.5x4)

- a. Productivity software
- b. Business software
- c. Entertainment software
- d. Education software

Productivity Software

Productivity software includes word processing, spreadsheet and database management software packages. They are used to speed up daily routine tasks in an organized and efficient way.

Business Software

Any software that helps in running business in a more efficient way to improve productivity is known as *business software*. For example, software used in accounting, sales and marketing, etc.

Entertainment Software

Software developed to entertain people are called *entertainment software*. Video games are most common among entertainment software. *Edutainment* software are mainly used for entertainment but it educates as well.

Education Software

Software developed for educational purpose is called *education software*. A large variety of education software has been developed. They include typing tutor, spelling tutor, language learning, driving test, etc.

SLO-BASED MCQS

1. **Input was based on punched cards in _____ generation of computers.**
 - a. Fourth
 - b. Second
 - c. Third
 - d. First
2. **Which one of the following will allow users to give commands in any natural language such as English?**
 - a. Fifth generation computers
 - b. First generation computers
 - c. Second generation computers
 - d. Fourth generation computers
3. **The software that controls the operation of a computer device is:**
 - a. Utility programs
 - b. Device drivers
 - c. Language processor
 - d. Firmware
4. **The _____ generation of computers have artificial intelligence.**
 - a. Second
 - b. Fourth
 - c. Fifth
 - d. Third
5. **Who invented algorithm?**
 - a. Blaise Pascal
 - b. John Napier
 - c. Charles Babbage
 - d. Herman Hollerith
6. **Which of the following is a non-impact printer?**
 - a. Dot matrix
 - b. Daisy wheel
 - c. Line printer
 - d. Laser
7. **Which storage device has the fastest read/write access?**
 - a. Compact disk
 - b. Floppy disk
 - c. Digital video disk
 - d. Hard disk
8. **Cards used to connect additional devices to motherboard are attached via:**
 - a. Expansion slot
 - b. Connector
 - c. Bays
 - d. Links
9. **Which computer professional has the skills to edit and manipulate audio/video files?**
 - a. Programmer
 - b. Multimedia designer
 - c. Web designer
 - d. Software engineer
10. **An operating system is a/an:**
 - a. System software
 - b. Utility program
 - c. Application software
 - d. Language processor
11. **First generation computers are based on:**
 - a. Vacuum tubes
 - b. GUI
 - c. Artificial Intelligence
 - d. IC chips
12. **Device driver is a type of _____ software.**
 - a. Application
 - b. System
 - c. Business
 - d. Productivity
13. **Which one of the following is open-source operating system?**
 - a. UNIX
 - b. Linux
 - c. DOS
 - d. Novell's Network

| Answers of MCQs | | | | | | | | | |
|-----------------|------|------|-----|-----|-----|-----|-----|-----|------|
| 1=d | 2=a | 3=b | 4=c | 5=b | 6=d | 7=d | 8=a | 9=b | 10=a |
| 11=a | 12=b | 13=b | | | | | | | |

SLO-BASED SHORT QUESTIONS

Q1. What is meant by Cloud Computing?

Cloud computing means storing and accessing data and programs over the Internet. You do not need to buy and install your own computer system. This service is provided and managed by another company.

Q2. Differentiate between RAM and ROM.

- RAM stands for Random Access Memory whereas ROM stands for Read Only Memory.
- RAM can perform both read and write operations while ROM can only perform read operation.
- RAM is temporary memory but ROM is a permanent memory.

Q3. What is meant by:

a) Port b) Expansion card c) Expansion slot

- **Port** is an interface for connecting various devices to the system unit. USB and HDMI are common *examples* of ports used in modern computers.
- **Expansion slots** are narrow sockets on the motherboard used for installing expansion cards. *For example*, AGP and PCI slots.
- **Expansion cards** are small circuit boards. They add new capabilities to the computers. Common *examples* are sound card, graphic card and modem card.

Q4. Computer has evolved by passage of time. How 4th generation computer is better than previous generations?

- Fourth generation computers are very fast, have large storage capacity and light weight than previous generation computers.
- They are very small in size, very reliable and consume less power than previous generation computers.
- Large variety of software are available for microcomputers than previous generation computers.

Q5. Discuss the scope of 'Programmer' and 'Network Administrator' in IT careers.

Programmer

Computer programmers are IT professionals who have extensive knowledge and expert in programming languages. They write programs to solve different kinds of problems in business, education, engineering, medical, entertainment, etc.

Network Administrator

Network administrator is responsible for installation, configuration and maintenance of computer networks in organizations. They are in charge of maintaining computer hardware and software in a computer network.

Q6. Printers are among main output devices. Discuss its types briefly.

Printer

Printer is an output device that prints text and graphics on paper which is known as *hardcopy*. There are two types of printers which are impact printers and non-impact printers.

- *Impact printers* strike against the paper and leave an image of character on the paper. For example, Dot Matrix printer.
- *Non-impact printers* print without striking the paper. For example, inkjet and Laser printers.

Q7. Write three uses of computer in media.

Media

Computers have many uses in print and electronic media.

- **Print media** refers to mass communication through printed material. For example, newspapers, magazines, books, etc.
- **Electronic media** refers to broadcast media that includes radio, television, cable and satellite television. It also includes *new age media* such as Internet and mobile devices.

Q8. How computer technology has revolutionized Business? Support your answer with examples.

Business

- Computer technology has revolutionized banking business. People can withdraw cash any time anywhere through ATM machine.
- Computers are used in retail stores. Barcode system is used to prepare the cash bill in a faster and accurate manner.
- E-commerce allows to sell products and services using networks like Internet.
- Computers are also used in hospitals, schools, real estate, stock exchange, etc.

Q9. What is cache memory?

Cache Memory

Cache is a very small amount of extremely fast memory inside the microprocessor or on the motherboard. It stores information that is most frequently used by the computer. It is used to improve the processing speed of computer.

Q10. Briefly explain types of cache memory.

There are three types of cache memories which are Level 1 (L1), Level 2 (L2) and Level 3 (L3). L1 is built inside the microprocessor while L2 and L3 are on the motherboard. L1 cache memory is faster than L2 and L3.

Q11. Write down two benefits and one drawback of laser printer.

Benefits

- Laser printer is faster in speed.
- Print quality is very high than other printers.

Drawback

- Laser printer is very expensive.

Q12. Write down characteristics of third generation of computers.

Third Generation Computers

- Third generation computers used IC chips.
- Computers consumed less electricity, became smaller, cheaper and more reliable.
- Keyboard and monitor were used in these computers.
- The common example is **IBM System/360**.

Q13. Write down the purpose of Shareware and Freeware software? Give an example of each.

Shareware

Shareware is a software that is distributed free of cost for a limited period of time usually one or two months. It is a trial version of software. **For example**, antivirus and computer games.

Freeware

Freeware is software given free of cost for unlimited period of time. It is a full version of software with some limitations such as personal or academic use only. **For example**, Google Chrome and Mozilla Firefox.

Q14. How is the job of System Analyst different from a programmer?

| Programmer | System Analyst |
|--|--|
| <i>Programmer</i> has extensive knowledge and expert in programming languages. | <i>System Analyst</i> analyzes the data process requirements of organizations and develop information systems to implement them. |
| They write programs to solve problems in business, education, medical, etc. | They investigate problems, plan solutions and recommend hardware and software requirements. |

Q15. Write down any three applications of Mainframe computers.

Applications of Mainframe Computers

- Mainframe computers are used in large organizations.
- They are used in banking and insurance.
- They can be used in health care, research and government organizations.

Q16. Write down any six characteristics of 4th generation of computers.

Fourth generation computers

1. Microprocessor was used in microcomputers.
2. They are very fast, have large storage capacity and use advanced input/output devices.
3. They are very small in size, very reliable and consume less power than other computers.
4. They support multimedia software to combine text, image, sound and video.
5. They support modern programming languages such as C++, Java, etc.
6. **For example**, Core i3, i5, i7 computers.

Q17. Why plotter is preferable over printer? Justify with two reasons.

Plotter

Plotters are used for printing engineering drawings, machine parts, building designs, maps, charts and Pana flex on large size papers or sheets.

Reasons

- Plotters are used for large size printing on paper and sheets whereas printers print on small size paper.
- Printing quality is much better than printer.

SLO-BASED LONG QUESTIONS

Q1. Discuss any four output devices.

Output Devices

The most common four types of output devices are the following.

1. Monitor
2. Printer
3. Plotter
4. Speaker

Monitor

Monitors have a screen which displays information. The output produced by monitors is called *soft copy*. The most common types are CRT and LCD monitors.

- **CRT monitor** is similar to old television.
- **LCD monitor** uses less power and gives better display than CRT monitor.

Printer

Printer is an output device that prints text and graphics on paper which is known as *hardcopy*. There are two types of printers which are impact printers and non-impact printers.

- **Impact printers** strike against the paper and leave an image of character on the paper. For example, Dot Matrix printer.
- **Non-impact printers** print without striking the paper. For example, inkjet and Laser printers.

Plotter

Plotter is an output device used for printing engineering drawings, machine parts, maps, etc. on large size paper/sheets. It is more expensive than printers. There are two types of plotters which are *ink plotter* and *pen plotter*.

- **Ink plotter** is used for printing images.
- **Pen plotter** is used for printing engineering drawings, machine parts, maps, etc.

Speaker

Speaker is a device used to produce *audio output*. A pair of speakers is attached to the sound card on the motherboard. They are commonly used with multimedia software and play music and videos on computer.

Q2. Explain the following digital computers in terms of size, speed, storage capacity and number of users they can support.

- **Mainframe computer**
- **Micro computer**

| Characteristic | Mainframe Computer | Microcomputer |
|------------------|---|--|
| Size | It is very large in size. | It is very small in size. |
| Speed | It can execute more than one trillion instructions per second (TIPS). | It can execute millions of instructions per second (MIPS). |
| Storage capacity | It can store huge amount of data much more than microcomputer. | It can store limited amount of data in up to terabytes. |
| Number of users | It can support hundreds and thousands of users at the same time. | It is a personal computer for a single user. |