

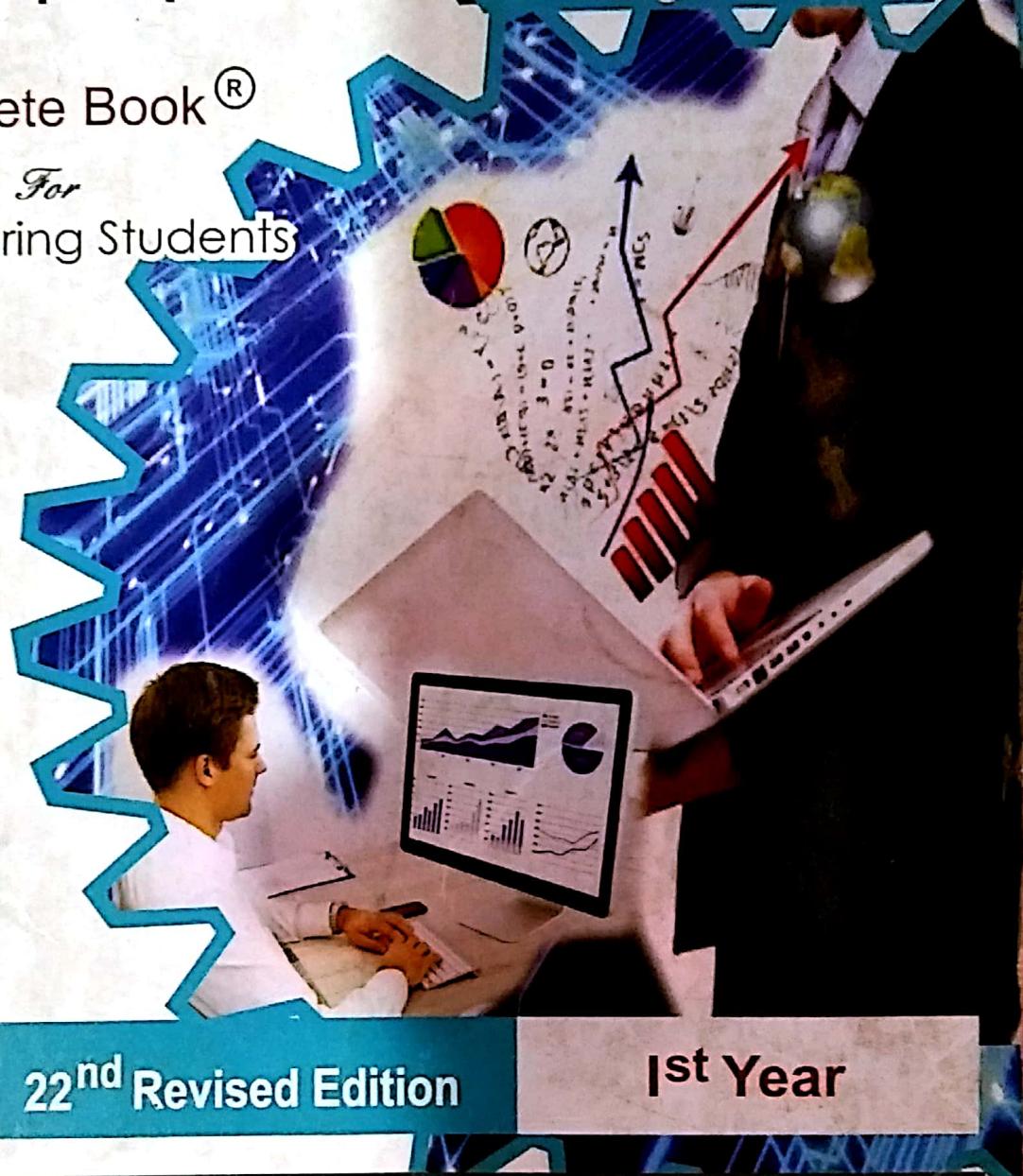
Shivani®

Educating Peoples®

As Per New
Scheme & Syllabus
(AICTE Flexible Curricula)
July 2019

Complete Book®

For
Engineering Students



22nd Revised Edition

1st Year

R.G.P.V. Examination Papers Completely Solved

Basic Computer Engineering

Smart

Accurate

Comprehensive

Mithun

Shivani®

Educating Peoples®

Complete Book®
For Engineering Students

Strictly As Per New Scheme & Syllabus Prescribed by

RGPV July 2019

For



B.Tech. First Year

S.K.Y - 360

(S.K.Y - 360)

Common for All Branches

Basic Computer Engineering

22th Revised Edition

Smart

Accurate

Comprehensive

Lucky Draw Coupon

Complete Set of Shivani Question Banks for Next Semester

Selection of Winners will be through Lucky Draw Event which will be organised in our office. Winner will be informed individuals, afterwards. Lucky Draw Event will be organised after end of the each semester. Entries should be reached in our office on or before last examination of each semester.

100 Prizes in Each Region

INDORE
GWALIOR
BHOPAL
JABALPUR

Basic Computer Engineering

Your's Name: Mr./Ms. :

Address :

.....

.....

.....

Phone :

Email :

Class : Branch :

College :

Name & Address of the book seller from whom you have purchased this book :

(I)



वर दे
कीर्णा
वादिनी





Preface

This book BASIC COMPUTER ENGINEERING has been written strictly accordance with the Latest Syllabus and Latest Pattern Prescribed by R.G.P.V. Bhopal.

This Subject is very wide and rather difficult for the students to collect suitable material for the Preparation of the subject from various numbers of the books. An attempt has been made by us to provide the complete syllabus in a single book.

The Engineers of the 21st Century are supposed to be more diversified in their knowledge. They are expected to be highly versatile in their compatibility.

By Keeping this view in our mind, We have prepared this book to Make Engineering easy to the students with easy language, which makes the subject more interesting.

We also discover many of new and exciting aspects and be prepared to master them. We provide knowledge in a highly interactive mode.

The world has changed Considerably with its people, Climate and almost everything from the last century, but what has not changed are the two theories of charles Darwin.

" Struggle for the existence" and " Survival of the Fittest"

Being a Publisher, we can know the real emphasis of these two theories. These theories were applicable from the very formation of the earth and they still exist and will Continue to so. There is no mean that, we can not Survive in today's world and that previously, conditions were more favourable. Every generation has its own sets of conditions and in every generation there were men who were able to swim against the tide. By Publishing this book Successfully, we have Prove that, we are fit to survive.

We are looking forward to Comments and Suggestions for future editions from students, teachers and other users.

Atlast we would like to say to "Young Engineering Students", that Our Publications is for the Engineers by an Engineer.

Publisher : Er. Narendra Singh [B.E. (Hons), M.E. (Hons), MBA]

Syllabus

BASIC COMPUTER ENGINEERING

UNIT - I :

Computer – Definition, Classification, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, and System & Application Software. Computer Application in e-Business, Bio-Informatics, health care, Remote Sensing & GIS, meteorology and Climatology, Computer Gaming, Multimedia and Animation etc.

Operating System – Definition, Functions, Types, Management of File, Process & Memory. Introduction to MS word, MS powerpoint, MS Excel.

UNIT - II :

Introduction to Algorithms, Complexities and Flowchart, Introduction to Programming, Categories of Programming Languages, Program Design, Programming Paradigms, Characteristics or Concepts of OOP, Procedure Oriented Programming VS object oriented Programming.

Introduction to C++, Character Set, Tokens, Precedence and Associativity, Program Structure, Data types, Variables, Operators, Expressions, Statements and control structures, I/O operations. Array, Functions.

UNIT - III :

Object & Classes, Scope Resolution Operator, Constructors & Destructors, Friend Functions, Inheritance and its types, Polymorphism, Overloading Functions & Operators, Virtual functions. Introduction to Data Structures.

UNIT - IV :

Computer Networking – Introduction, Goals, ISO-OSI Model, Functions of Different Layers. Internetworking Concepts, Devices, TCP/IP Model, Introduction to Internet, WWW, E-commerce.

Computer Security Basics : Introduction to viruses, worms, malware, Trojans, Spyware and Anti Spyware Software, Different types of attacks like Money Laundering, Information Theft, Cyber Pornography, Email spoofing, Denial of Service (DoS), Cyber Stalking, Logic bombs, Hacking, Spamming, Cyber Defamation, pharming, Security measures Firewall, Computer Ethics & Good Practices, Introduction of Cyber Laws about Internet Fraud, Good Computer Security Habits.

UNIT - V :

Database Management System – Introduction, File oriented approach and Database approach, Data Models, Architecture of Database System, Data independence, Data dictionary, DBA, Primary Key, Data definition language and Manipulation Languages.

Cloud Computing – Definition, cloud infrastructure, cloud segments or service delivery models (IaaS, PaaS and SaaS), cloud deployment models/types of cloud (public, private, community and hybrid clouds), Pros and Cons of cloud computing.

Price : Rs. 111.00 (Rs. One Hundred Eleven Only)

Edition : 2020

BASIC COMPUTER ENGINEERING

Contents

UNIT - I :

	PAGE NO.
Computer – Definition, Classification	(03 to 1)
CPU, register, Bus architecture, Instruction set	(10 to 2)
Memory & Storage Systems	(22 to 3)
I/O Devices and System & Application Software	(38 to 4)
Computer Application in e-Business, Bio-Informatics, health care, Remote Sensing & GIS, meteorology and Climatology, Computer Gaming, Multimedia and Animation etc.	(48 to 5)
Operating System – Definition, Functions, Types	(51 to 5)
Management of File, Process & Memory	(58 to 6)
Introduction to MS word, MS powerpoint, MS Excel	(66 to 7)

UNIT - II :

Introduction to Algorithms, Complexities and Flowchart	(73 to 7)
Introduction to Programming, Categories of Programming Languages	(76 to 8)
Program Design, Programming Paradigms	(84 to 8)
Characteristics or Concepts of OOP, PGP vs OOP	(89 to 9)
Introduction to C++, Character Set, Tokens, Precedence and Associativity	(95 to 10)
Program Structure, Data types, Variables, Operators	(100 to 11)
Expressions, Statements and control structures, I/O operations	(110 to 11)
Array, Functions	(117 to 13)

UNIT - III :

Object & Classes, Scope Resolution Operator	(131 to 13)
Constructors & Destructors	(138 to 14)
Friend Functions, Inheritance and its types, Polymorphism	(145 to 15)
Overloading Functions & Operators, Virtual functions, Introduction to Data Structures	(159 to 17)

UNIT - IV :

Computer Networking – Introduction, Goals, ISO-OSI Model, Functions of Different Layers	(175 to 18)
Internetworking Concepts, Devices, TCP/IP Model	(188 to 20)
Introduction to Internet, WWW, E-commerce	(201 to 20)
Computer Security Basics – Introduction to Viruses, worms, malware	(210 to 21)
Trojans, Spyware and Anti Spyware Software	(214 to 21)
Different types of attacks like Money Laundering, Information Theft, Cyber Pornography, Email spoofing	(217 to 21)
Denial of Service (DoS), Cyber Stalking, Logic bombs, Hacking	(219 to 22)
Spamming, Cyber Defamation, pharming Security measures Firewall	(223 to 22)
Computer Ethics & Good Practices, Introduction of Cyber Laws about Internet Fraud, Good Computer Security Habits	(228 to 23)

UNIT - V :

Database Management System – Introduction, File oriented approach and Database approach	(233 to 24)
Data Models, Architecture of Database System, Data independence, Data dictionary	(241 to 25)
DBA, Primary Key, Data definition language and manipulation language	(252 to 26)
Cloud computing – Definition, cloud infrastructure, cloud segments or service delivery models (IaaS, PaaS and SaaS), cloud deployment models/types of cloud ('public, private, community and hybrid clouds), Pros and Cons of cloud computing	(261 to 27)

UNIT

1

COMPUTER & OPERATING SYSTEM

COMPUTER – DEFINITION, CLASSIFICATION

Q.1. What is a computer ?

Ans. A computer may be defined as an electronic machine that can solve problems by accepting data, performing certain operations and presenting the results of those operations under the direction of detailed step-by-step instructions. Such a set of sequenced instructions, which cause a computer to perform particular operations, is called a program.

Q.2. What are the characteristics of computer ?

Ans. The characteristics of computers are as follows –



(i) Speed – Computer is a very fast device. It can perform in a few seconds the amount of work that a human being can do in an entire year. A computer can add and subtract numbers, compare letters to determine alphabetic sequence, move and copy numbers and letters. The speed varies from a few microseconds to nanoseconds.

(ii) Accuracy – Computers are very accurate. They can perform their hundreds of thousands of operations with great accuracy as their circuits have no mechanical parts to wear and malfunction.

(iii) Reliability – Computer output is generally very reliable, subject to the condition that the input data entering the computer should be correct and the program of instructions should be reliable and correct. Incorrect input data and unreliable programs give us computer errors and wrong results.

(iv) Storage Capacity – Various computer media can store millions of characters of data in a condensed form.

(v) Reduced Cost – The cost of computer equipment has dropped drastically over the years.

(vi) Versatility – Versatility is one of the most wonderful feature about the computer. It is preparing the results of particular examination, the next moment it is busy for preparing electricity bills.

can be measured in this way. Example –

- (a) A service station gasoline pump contains an analog processor that connects fuel flow measurements into quantity and price values.
- (b) Automobile speedometer, etc.

(iii) Hybrid Computers – Hybrid computer is a combination of an analog and a digital computer. Such a computer system utilizes the measuring capabilities of an analog computer and counting ability of a digital computer.

Q.5. Classify computers on the basis of size.

Or

Compare and contrast computers on the basis of processing speed and storage capacity.

(R.G.P.V., Dec. 2012)

Ans. On the basis of size computers are classified as follows –

(i) Microcomputers – A microcomputer is a low-cost, small, digital computer. It contains a microprocessor as its CPU, a memory unit, an input device, and an output device. The word length of a microcomputer lies in the range of 8-32 bits. Microcomputers have a wide range of applications like general purpose calculation, industrial control, home application. Microcomputers are also called personal computers.

From cost and performance point of view, personal computers are classified as PC, PC/XT, PC/AT and super AT (or super micro). All categories of personal computers contain a CPU, RAM, ROM, CRT display, keyboard, and secondary memory.

(ii) Minicomputers – Minicomputers are faster and more powerful than microcomputers. Their word length is 32 bits. Minicomputers are general purpose computers, smaller than mainframe and give computing power without adding the prohibitive expenses associated with larger systems.

The minicomputer's size prevents it from being portable, but it can be moved more easily than a mainframe. Minicomputer integrates commercial and technical operations better than the more powerful computers. It is generally easier to use.

Minicomputers are well adapted for functions such as accounting, word processing, data base management, statistical packages for social sciences, computer aided design (CAD) and numerical analysis, etc.

(iii) Mainframe Computers – Mainframe computers are very powerful, large general purpose computers. Their word length may be 48, 60, or 64 bits. Memory capacity 64-256 M byte, hard disk capacity 1-10 G byte or more, and processing speed 30-100 MIPS (million instructions per second).

They are used where large amount of data are to be processed or very complex calculations are to be made and these tasks are beyond the computing capacity of minicomputers. They are used in research organizations, large

industries, large business, and government organizations, bank, and airline reservations where a large database is required.

(iv) **Supercomputers** – A supercomputer contains a number of CPU which operate in parallel to make it faster. They are used for massive data processing and solving very sophisticated problems. They are used for weather forecasting, weapons research and development, rocketing, aerodynamic, seismology, atomic, nuclear, etc.

The processing speed of supercomputer lies in the range 400-10,000 MIPS, word length 64-96 bits, memory capacity 256 M byte and more, and hard disk capacity 1000 G byte and more.

Supercomputers have limited use and limited market because of the very high price. They are being used in India at some research centers and government agencies, involving sophisticated scientific and engineering tasks.

Examples of supercomputers are – PARAM developed by C-DAC in Pune (India), CRAY-3 (developed by Control Data Corporation) SX-2 (developed by Nippon Electric Corporation, Japan)

Q.6. Discuss classification of computers.

(R.G.P.V., June 2013)

Or

Discuss the classification of computer with example. (R.G.P.V., May 2019)

Ans. Refer to Q.3, Q.4 and Q.5.

Q.7. Discuss the generation of computers.

(R.G.P.V., June 2011)

Ans. Over the years, many computing devices were invented that are used by the humans to solve different types of problems. All these computing devices can be classified into five generations which refer to the phases of improvement made to different computing devices resulted in a small, cheap, fast, reliable and productive computer. The technological development in the field of computers not only refers to the improvements made to the hardware technologies, but also the improvements made to the software technologies.

(i) **First Generation (1940-1956)** – The first generation computers used the vacuum tubes technology for calculation as well as for storage and control purposes. So, these computers are also called as vacuum tubes or thermionic valves based machines. A vacuum tube, as shown in fig. 1.1, was a fragile glass device, which used filaments inside it. The filaments when

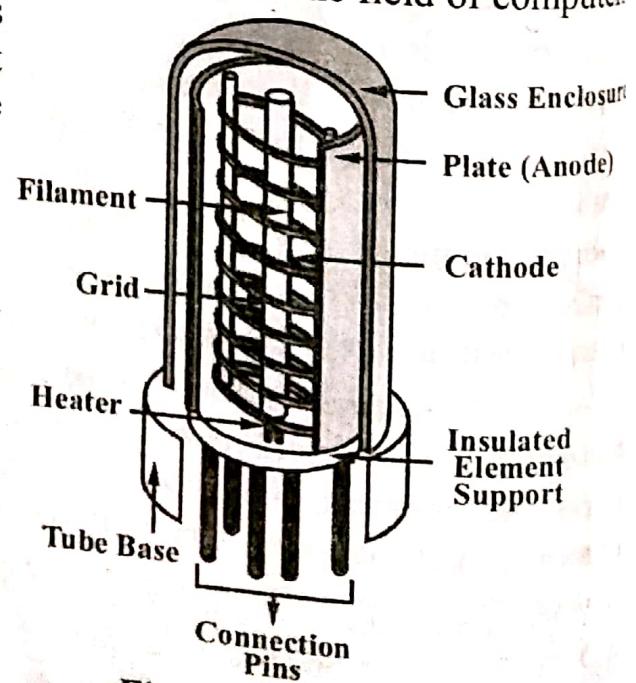


Fig. 1.1 A Vacuum Tube

(ii) In data, there is no role of information whereas in information, processing data is the most important element.

(iii) For gathering information, collection of data is the first step whereas information is the second step after manipulation collection of datas.

(iv) Data are organized in a form of spread sheet, text, pictures, voice and video, namely text, etc. Whereas information is organized as the summary and total of data, in the form in which datum are defined and stored.

Q.10. Distinguish between CPU and ALU. (R.G.P.V., June 2013)

Ans. CPU – A central component known as CPU is responsible for activating and controlling the functions of any computer system. It is referred to as the “brain” of the computer. In a computer system, all major calculations and comparisons are made inside the CPU.

ALU – The arithmetic logic unit (ALU) of a computer system is the place where the actual execution of the instructions takes place during the processing operation. That is, it is also responsible for all calculations performed and all comparisons (decisions) made in the ALU. The data and instructions, stored in the primary storage prior to processing, are transferred as and when needed, to the ALU where processing takes place. Intermediate results generated in the ALU are temporarily transferred back to the primary storage until needed at a later time. Data may move from memory to ALU and back again to storage many times before the processing is over.

There are number of arithmetic and logic operations that a computer can perform. These are add, subtract, multiply, divide and logic operations or comparisons such as less than, equal to or greater than.

Q.11. Why do computers have internal memory as part of the CPU and the internal bulk memory separately ? (R.G.P.V., Dec. 2010)

Ans. Internal memory is the part of CPU. Registers, main memory and cache memory all are the examples of internal memory. These memories resides in the computer and forms the main part of CPU. These memories are very near to CPU, so the access time is very short. These memories are very compact in size and too costly as compared to other memories. Also large volume of data cannot be stored in the internal memories.

External memory is also known as secondary or auxiliary memory. It is not the permanent memory of a computer i.e., availability of these memories is optional in a computer. It is attached to the computer if required. These are located far from CPU within a computer, so access time is more. These memories are very spacious and can store bulky data. Also they are cheap as compared to primary memory. All back up storage devices are secondary memory.

Q.12. Explain the organization of computer with the help of neat labelled diagram. (R.G.P.V., Dec. 201)

Or

Explain the various components of computer with the help of block diagram. (R.G.P.V., Dec. 201)

Or

Draw the block diagram of a computer. Explain each component. [R.G.P.V., Dec. 2015 (CBCS), June 201]

Or

Draw the block diagram of a computer system and explain its various components. (R.G.P.V., Dec. 201)

Or

Explain the organization of computer with the help of diagram. Also write down the function of each part. (R.G.P.V., June 201)

Or

What are the basic components of computer ? Explain.

(R.G.P.V., May 2018)

Or

Draw a model of basic computer system and explain function of each part. [R.G.P.V., Nov. 2018 (0)]

Ans. Fig. 1.5 shows the block diagram representation of a computer system. The solid lines are used to indicate the flow of instructions and data and the dotted lines represent the control exercised by the control unit. It displays the five major building blocks or functional units of a digital computer system. These are –

(i) **Input Unit** – Input unit is responsible for entering any data. Data and instructions must enter the computer system before any computation performed on the supplied data. Data and instructions enter input units in forms that depend upon the particular device used. For example, data is entered from a keyboard.

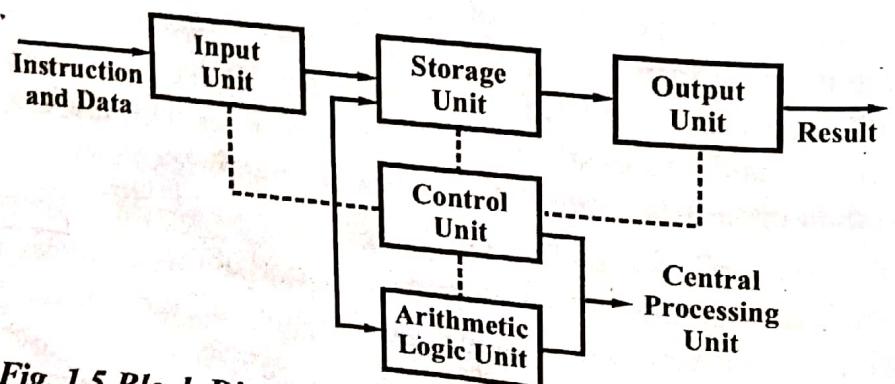


Fig. 1.5 Block Diagram Representation of a Computer System

All input devices must provide a computer with data, that are transformed into the binary codes that the primary memory of a computer is

that they can fetch and save the next instruction while the execution of the previous instruction is going on.

(3) **Memory Address Register (MAR)** – It holds the address of the next location in the memory to be accessed.

(4) **Memory Buffer Register (MBR)** – It stores data received from or sent to CPU.

(5) **Memory Data Register (MDR)** – It stores operands and data.

(6) **Accumulator (ACC)** – It stores the intermediate results produced by arithmetic and logic unit.

(iv) **Arithmetic Logic Unit** – Refer to Q.10.

(v) **Control Unit** – How does the input device know that it is time for it to feed data into the storage unit? How does the ALU know, what should be done with the data once they are received? Moreover, how is it that only the final results are sent to the output device, and not the intermediate results? All these are possible due to the control unit of the computer system. However, it does not perform any actual processing on the data, it acts as a central nervous system for the other components of the computer system. It manages and coordinates the entire system. It obtains instructions from the program stored in main memory, interprets the instructions and issues signals to other units of the system to execute them.

The CPU is the combination of the control unit and the arithmetic logic unit of a computer system. It is the brain of the computer system. In a computer system, all major calculations are made inside the CPU, and the CPU is responsible for activating and controlling the operations of other units of the computer system.

Q.13. Distinguish between input unit and output unit.

(R.G.P.V., June 2013)

Ans. Refer to Q.12 (i) and (ii).

Q.14. Differentiate between main memory and cache memory with a diagram.

(R.G.P.V., June 2012)

Ans. Refer to Q.12 (iii) (a) and (b).

Q.15. Name and explain all the registers found in CPU of computer.

(R.G.P.V., Nov. 2018)

Ans. Refer to Q.12 (iii) (c).

Q.16. What is a register? How are registers used in the arithmetic and supervisory-control units of a CPU? (R.G.P.V., June 2011)

Or

Define a register. Write and explain the purpose of different types of registers. (R.G.P.V., Dec. 2013, 2014)

Ans. Refer to Q.12 (iii) (c).

Q.17. List the different types of CPU registers. (R.G.P.V., Dec. 2013, 2014)

Ans. Refer to Q.12 (iii) (c).

Q.18. Define following –

- (i) **Instruction register**
- (ii) **Program counter.**

Ans. Refer to Q.12 (iii) (c) (2) and (1). (R.G.P.V., June 2011)

Q.19. Which is the fastest accessible memory? What it is made-up of? (R.G.P.V., June 2014)

Ans. Central processing unit contains a few special purpose, temporary storage units known as registers. They are high speed memory locations used for holding instructions, data and intermediate results that are currently being processed.

A register is a group of flip-flops with each flip-flop capable of storing one bit of information. An n-bit register has a group of n flip-flops and is capable of storing any binary information of n bits. In addition to the flip-flops, a register may have combinational gates that perform certain data-processing tasks. In its broadest definition, a register consists of a group of flip-flops and gates that effect their transition. The flip-flops hold the binary information and the gates control when and how new information is transferred into the register.

Q.20. Explain how CPU communicates with input/output devices. (R.G.P.V., June 2012)

Ans. The communication between CPU and input/output devices is implemented using an interface unit. In a computer system, data is transferred

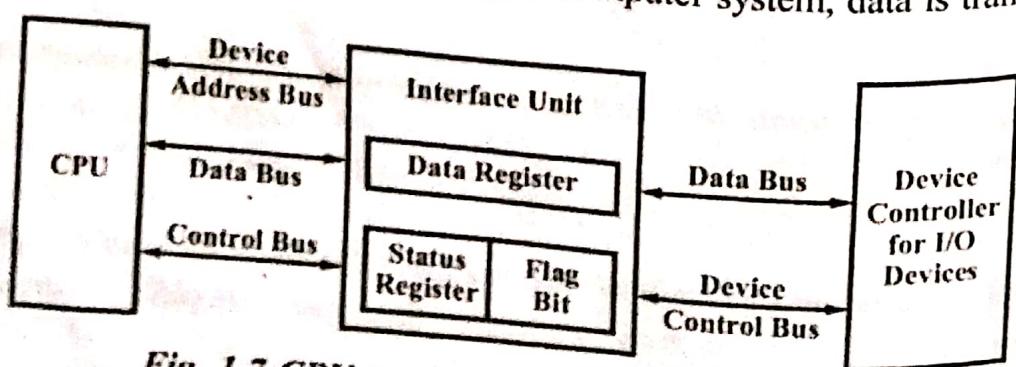


Fig. 1.7 CPU to I/O Devices Communication

(iv) Now, the data register issues a data accepted signal through the control bus to the CPU, showing that the data has been received.

(v) Then, the interface unit kept the data on the data bus connected to the device controller of the output device.

(vi) The output device receives the data and sends an acknowledgement signal to the CPU through the interface unit, showing that the desired data has been received.

Q.21. Explain the importance of a bus in the computer system. What are the different types of buses found in computer system ?

Or

Explain bus architecture briefly.

(R.G.P.V., Dec. 2011)

Or

Explain about different types of buses and bus architecture.

(R.G.P.V., Dec. 2013)

Or

Explain different types of bus architecture.

(R.G.P.V., Dec. 2014)

Or

What are the different types of buses ? Explain the differences between address bus and the data bus.

(R.G.P.V., June 2015)

Ans. A bus is a set of wires that is used to connect the different internal components of the computer system for the purpose of transferring data as well as addresses amongst them. Bus width will equal the word length (in bits) of the memory. There may be many buses in a computer system. A bus can either be a serial bus or a parallel bus. In serial bus, only one bit of data is transferred at a time amongst the various hardware components. In contrast, in parallel bus, several bits of data can be transferred at a time amongst the various hardware components. The speed of bus is measured in terms of the number of bits transferred per second between two components.

Fig. 1.8 shows a bus system used in a computer system. In this figure, there are two types of buses – ***data bus*** and ***address bus***. Apart from data and address buses, a third type of bus, which is known as ***control bus***, also exists in the computer system. The control bus manages the transfer of data and addresses among various components by transferring appropriate control signals.

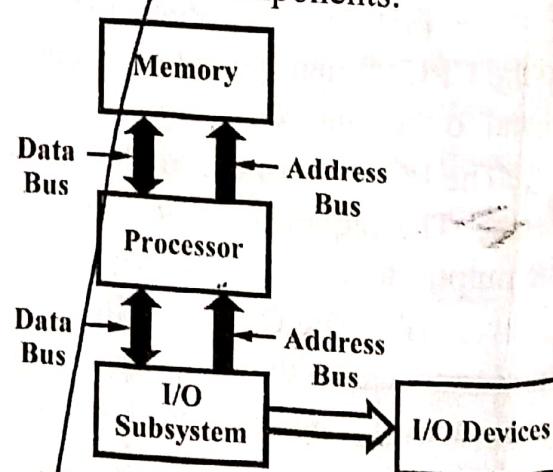
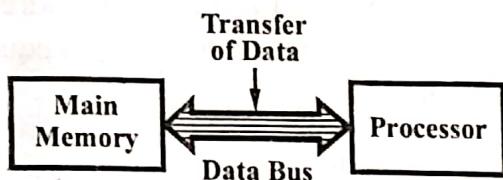
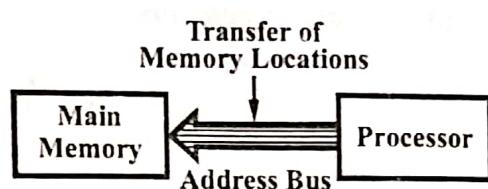


Fig. 1.8 Data and Address Buses

(i) ***Data Bus*** – The data bus is used to transfer data amongst the different internal components. The speed of the data bus also affects the overall

processing power of a computer system. Modern computer systems use 32-bit data buses for data transfer. It means that these buses can transfer 32 bits of data at a time. Fig. 1.9 shows the data bus implemented between the main memory and the processor of a computer system. In this figure, data bus is bidirectional. The bidirectional data bus allows the transfer of data in both the directions. The data bus is generally bidirectional in most computer systems.

**Fig. 1.9 The Data Bus****Fig. 1.10 An Address Bus**

(ii) **Address Bus** – It is also known as memory bus. It transfers the memory addresses for read and write memory operations. It contains a number of address lines that determine the range of memory addresses that can be referenced using the address bus. For example, a 32-bit address bus can be used to reference 2^{32} memory locations. The address bus can also be a serial or a parallel bus. Fig. 1.10 shows the address bus implemented between the memory and the processor for transferring memory locations.

In this figure, the address bus is unidirectional between the main memory and the processor. However, an address bus may also be bidirectional. For example, the address bus between the processor and the I/O system is bidirectional. .

Q.22. What is the function of followings –

- (i) **Address bus** (ii) **Control unit.** (R.G.P.V., June 2012)

Ans. (i) **Address Bus** – Refer to Q.21.

(ii) **Control Unit** – Refer to Q.12 (v).

Q.23. What is a bus in computer system ? What is bus width ? If the number of bits in an instruction is 32 bits, what is the width of data bus ?

(R.G.P.V., June 2011)

Ans. Refer to Q.21.

Q.24. Differentiate between address bus, data bus and control bus.

(R.G.P.V., Dec. 2010)

Ans. Refer to Q.21.

Q.25. What is an instruction set ? What are the different factors considered for classifying an instruction set ?

Ans. An instruction set can be defined as a group of instructions that a processor can execute to perform different operations.

The instruction set can be classified on the basis of complexity and the number of instructions used.

such as main memory, secondary memory and cache memory are provided in a digital computer.

Q.30. What is the purpose of memory in a computer ? What are volatile and non-volatile memories ? Explain. (R.G.P.V., June 2011)

Ans. Purpose of Memory – Refer to Q.29.

Volatile Memory – The main memory (or primary memory) is a fast memory. It stores programs along with data, which are to be executed. It also stores necessary programs of system software, which are required to execute the user's program. The main memory is directly addressed by the CPU. Semiconductor memories, RAMs are used as main memory. It processes random access property, and has smaller access time, about 50 ns (nanosecond). Main memory is a **volatile memory**. The capacity of the main memory is comparatively much smaller than that of the secondary because of its high cost.

Non-volatile Memory – Secondary (or auxiliary) memory stores operating system, data files, compilers, assemblers, application programs, etc. The CPU does not read information directly from the secondary memory. The programs and data, if needed by CPU, are first transferred from the secondary memory to the primary memory. Then the CPU reads them from the primary memory. The results are also stored in the secondary memory. The secondary memory is a mass storage memory. It is slow but cheap. It is a **permanent memory** or **non-volatile memory**. Hard disks are used as secondary memory. Their access time is about 5-10 ns.

Q.31. What is the purpose of main memory ? Define the non-volatile memory. (R.G.P.V., June 2015)

Ans. Refer to Q.29 and Q.30.

Q.32. Differentiate between primary and secondary memory.

(R.G.P.V., Dec. 2011)

Or

Write the difference between a volatile memory and a non-volatile memory.

Ans. Refer to Q.30.

(R.G.P.V., Dec. 2015)

Q.33. Discuss the classification of memory using memory hierarchy.

Ans. A typical storage hierarchy pyramid is shown in fig. 1.12. It includes cache memory, main memory, secondary storage and mass storage. As we move up the pyramid, we encounter storage elements, which have faster access time, higher cost per bit stored, and less capacity. A larger storage capacity, lower cost per bit stored, and slower access time are the results of moving down the pyramid. Hence, cache memory generally has the fastest access time, the smallest storage capacity, and the highest cost per bit stored. The primary storage (main-memory) falls next in the storage hierarchy list.

ROM does not allow the random access of data rather it allows sequential access of data. It is less expensive as compared to RAM and other storage devices such as magnetic disk, etc.

ROM is divided into the following types –

Programmable Read Only Memory (PROM) can be programmed by the user for converting critical and lengthy operations into microprograms that are fused into a chip. They can be executed at a very high speed. Once operations are written into a PROM, they cannot be altered.

Erasable Programmable Read Only Memory (EPROM) can be erased and reprogrammed. Before to accept any new contents, it is removed from the processor and exposed to ultraviolet light for some time.

Electrically Erasable Programmable Read Only Memory (EEPROM) can be erased and reprogrammed with special electric pulses.

Flash ROM (FROM) is a type of EEPROM that stores the information using floating-gate transistors, which can store electric charge for a longer period of time as compared to the normal transistors. This memory is mainly used in the memory cards of mobile phones, digital cameras and ipods for storing data. The data stored in flash ROM memory can be easily transferred using transmission mediums like data cable, bluetooth, and infrared technology. Flash ROM has faster speed of reading data as compared to other types of ROM. It uses continuous memory cells for storing data.

Q.36. Differentiate between RAM and ROM.

(R.G.P.V., Dec. 2016, May 2018)

Ans. Refer to Q.34 and Q.35.

Q.37. Explain in detail the different categories of RAM.

Ans. RAM can be categorised into two main types, namely, static RAM (SRAM) and dynamic RAM (DRAM), which can be further divided into various types for storing data. Fig. 1.13 shows the hierarchy of RAM memory.

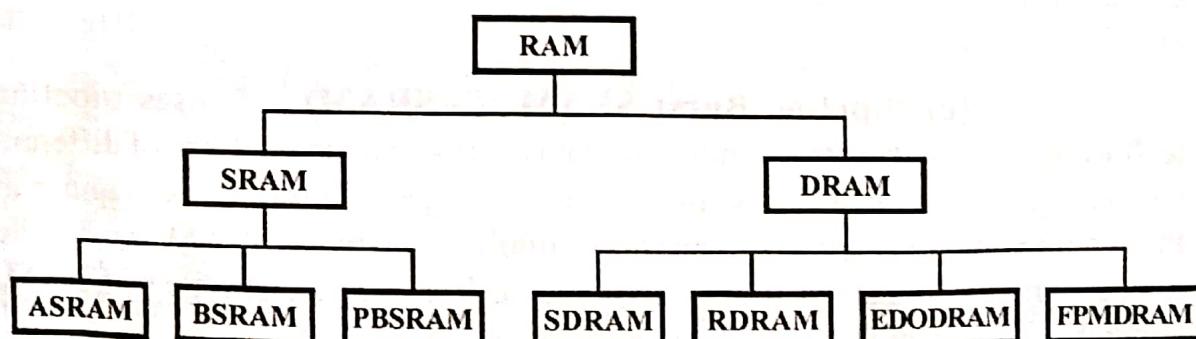


Fig. 1.13 Types of Random Access Memory

(i) Static RAM (SRAM) – It is a type of RAM in which data is stored till the power of the computer system is switched on. SRAM uses a number of

(ii) **Custom-made Software** – There are situations when none of the available pre-written software packages can meet the specific requirements of a user (an organization or an individual), either partially or fully. In such a situation, it becomes necessary to create a customized software package to satisfy the specific requirements. If the user has an in-house software development team, the software package can be created in house. However, if such a team does not exist, the user must get it created by placing an order for it.

Q.62. Explain system software and application software.

(R.G.P.V., June 2011, Dec. 2014)

Or

Differentiate between system software and application software.

(R.G.P.V., Dec. 2011, 2016, May 2018, 2019)

Ans. Refer to Q.61.

Q.63. Define software. What is the difference between the system software and application software ?

[R.G.P.V., Dec. 2015 (CBCS)]

Or

What is software ? Explain system and application software. Enlist system and application software.

[R.G.P.V., June 2016 (CBCS)]

Or

What is software ? Enlist system and application software.

(R.G.P.V., June 2016)

Ans. Refer to Q.60 and Q.61.

Q.64. Explain how the following features of a graphics software are useful –

- (i) **Present graph**
- (ii) **Drag and drop objects**
- (iii) **Import objects**
- (iv) **Screen captures.**

(R.G.P.V., Dec. 2014)

Ans. (i) Present Graph – This feature allows users to create graphs and charts from numerical data. The numerical data to be converted into a graph or chart may be imported from another software. The most popular types of graphs and charts used for graphical representation of numerical data are pie charts, line graph and bar graph. Presentation graphics software is very useful for analysts and decision makers, because it allows them to gain a better understanding of the relationships, changes, and trends that are buried in their numeric data.

(ii) Drag and Drop Objects – This feature allows the users to create their overall designs and pictures much faster by allowing them to use ready-made graphic objects or images, supplied with the software. For example, the drawing software comes with a set of ready-made shapes like line, rectangle, circle, etc. which the user can use in his design as per the requirement. The user can select a desired object from the set of given objects and drag it to the desired position on the drawing area, and then drop it there to add it to the

is one of the most commonly used terms in entertainment industry, which produces various entertainment products such as movies and video games.

Computer animation deals with the generation, sequencing, and display of a set of images to create an effect of visual change or motion, similar to a movie film (video). Animation is an important component of multimedia, because just as a picture is a powerful way to illustrate information, a small animation clip is even more powerful and useful for illustrating concepts, which involve movement. For example, in the multimedia application meant for educating small children, an animation clip will be very effective in illustrating the difference in the movement of a horse during a gallop versus a walk. Several movies and advertisements now contain many visual tricks, which could never be accomplished without the aid of computers. For example, if you carefully watch the advertisements for detergent soaps/powders, toothpastes, insecticides for mosquitoes and cockroaches, etc., you will notice scenes in them, which cannot be videographed. These scenes are produced by using computer animation.

Q.73. Briefly discuss the application of computer in the field of computer gaming, multimedia and animation. (R.G.P.V., June 2017)

Ans. Refer to Q.69 (ii) and Q.72.

Q.74. Discuss the use of computer in the field of Bio-informatics, computer gaming, multimedia and animation. (R.G.P.V., Dec. 2017)

Ans. Refer to Q.66, Q.69 (ii) and Q.72.

OPERATING SYSTEM – DEFINITION, FUNCTIONS, TYPES

Q.75. What is an operating system ?

Ans. An operating system is an integrated set of programs that controls the resources such as CPU, memory, I/O devices, etc., of a computer system and provides its users with an interface or virtual machine that is more convenient to use than the bare machine.

An operating system is master control program that runs the computer and acts as a scheduler. It controls the flow of signals from CPU to various parts of the computer. It is first program loaded into the memory when the computer is turned on. Popular operating systems are MS-DOS, Windows and UNIX.

Q.76. Explain the major functions performed by an operating system.

Or

Briefly explain the functions of operating system. (R.G.P.V., Dec. 2016)

Or

What are the function of operating system ? (R.G.P.V., May 2018)