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UNIT- I FUNDAMENTALS OF COMPUTER AND WORKING WITH A TYPICAL OPERATING SYSTEMS (WINDOWS & LINUX)

CHAPTER 1 INTRODUCTION TO COMPUTERS

CHAPTER SNAPSHOT

Evaluation

Part - I

Choose the Correct Answer.

1. **First generation computers used** *[HY. 2019]*
(a) Vacuum tubes (b) Transistors
(c) Integrated circuits (d) Microprocessors
[Ans. (a) Vacuum tubes]

2. **Name the volatile memory**
(a) ROM (b) PROM (c) RAM (d) EPROM
[Ans. (c) RAM]

3. **Identify the output device**
(a) Keyboard (b) Memory
(c) Monitor (d) Mouse
[Ans. (c) Monitor]

4. **Identify the input device** *[June 2019]*
(a) Printer (b) Mouse
(c) Plotter (d) Projector
[Ans. (b) Mouse]

5. **..... Output device is used for printing building plan.**
(a) Thermal printer (b) Plotter
(c) Dot matrix (d) Inkjet printer
[Ans. (b) Plotter]

6. **Which one of the following is used to in ATM Machines** *[Sep - 2020]*
(a) Touch Screen (b) Speaker
(c) Monitor (d) Printer
[Ans. (a) Touch Screen]

7. **When a system restarts which type of booting is used.** *[Mar. 2019; QY. 2019]*
(a) Warm booting (b) Cold booting
(c) Touch boot (d) Real boot.
[Ans. (a) Warm booting]

8. **Expand POST** *[Govt.MQP-2018]*
(a) Post on self Test
(b) Power on Software Test
(c) Power on Self Test
(d) Power on Self Text
[Ans. (c) Power on Self Test]

9. **Which one of the following is the main memory?**
(a) ROM (b) RAM *[QY. 2019]*
(c) Flash drive (d) Hard disk
[Ans. (b) RAM]

10. **Which generation of computer used IC's?**
(a) First (b) Second (c) Third d) Fourth
[Ans. (c) Third]

Part - II

Very Short Answer.

1. **What is a computer?** *[Mar. 2019; QY., HY. 2019]*

Ans. **(i)** A computer is an electronic device that manipulates information, or data. It has the ability to store, retrieve, and process data.
(ii) Computer works faster than human being and given the values more accuracy and reliable

2. **Distinguish between data and information.**

Ans.

Data	Information
Data is defined as an unprocessed collection of raw facts, suitable for communication, interpretation or processing.	Information is a collection of facts from which conclusions may be drawn.
(Eg) 134, 16, 'Kavitha', 'C'	(Eg) Kavitha is 16 years old.

3. **What are the components of a CPU?**

Ans. The CPU has three components which are Control unit, Arithmetic and logic unit (ALU) and Memory unit.

4. **What is the function of an ALU?**

Ans. **(i)** The ALU performs arithmetic operations.
(ii) The result of an operation is stored in internal memory of CPU.
(iii) The logical operations of ALU promote the decision making ability of a computer.

5. **Write the functions of control unit.**

Ans. The control unit controls the flow of data between the CPU, memory and I/O devices. It also controls the entire operation of a computer.

6. What is the function of memory?

Ans. The primary memory is used to temporarily store the programs and data when the instructions are ready to execute. The secondary memory is used to store the data permanently.

7. Differentiate Input and Output unit. *[QY. 2019]*

Ans.

Input Unit	Output Unit
Input unit is used to feed any form of data to the computer, which can be stored in the memory unit for further processing.	An output unit is any hardware component that conveys information to users in an understandable form.
Example : Keyboard, mouse etc.	**Example :** Monitor, Printer etc.

8. Distinguish Primary and Secondary memory.

Ans.

Primary Memory	Secondary memory
It is used to temporarily store the programs and data when the instructions are ready to execute.	It is used to store the data permanently.
It is volatile, the content is lost when the power supply is switched off. Eg. RAM.	It is non-volatile, the content is available even after the power supply is switched off. Eg. ROM, CD-ROM, DVD ROM.

PART - III

SHORT ANSWERS.

1. What are the characteristics of a computer?

Ans.
(i) Computer is the powerful machine.
(ii) It can perform large number of tasks.
(iii) The main capacities of computer are work length, speed accuracy, diligence, versatility memory and automation and lots of more tasks.

2. Write the applications of computer.

Ans. The various applications of computers are,
(i) Business **(ii)** Education
(iii) Marketing **(iv)** Banking
(v) Insurance **(vi)** Communication
(vii) Health care
(viii) Engineering - Robotics, Nano technology, Bio Engineering

3. What is an input device? Give two examples. *[HY. 2019]*

Ans. Input device is used to feed any form of data to the computer, which can be stored in the memory unit for further processing.
Example: Keyboard, mouse, Scanner, Fingerprint scanner, Track Ball, Retinal Scanner, Light pen etc.

4. Name any three output devices. *[QY. 2019]*

Ans. **(i)** Monitor **(ii)** Printer
(iii) Plotter **(iv)** Speaker
(v) Multimedia projectors are the output devices.

5. Differentiate optical and Laser mouse.

Ans.

Optical Mouse	Laser Mouse
Measures the motion and acceleration of pointer.	Measures the motion and acceleration of pointer.
It uses light source instead of ball to judge the motion of the pointer.	Laser Mouse uses Laser Light.
Optical mouse is less sensitive towards surface.	Laser Mouse is highly sensitive and able to work on any hard surface.

6. Write short note on impact printer.

Ans. **Impact printers :**
(i) These printers print with striking of hammers or pins on ribbon. These printers can print on multi-part (using carbon papers) by using mechanical pressure. For example, Dot Matrix printers and Line matrix printers are impact printers.
(ii) A Dot matrix printer that prints using a fixed number of pins or wires.
(iii) Line matrix printers use a fixed print head for printing.

7. Write the characteristics of sixth generation. *[Govt.MQP-2018]*

Ans.
(i) In the Sixth Generation, computers could be defined as the era of intelligent computers based on Artificial Neural Networks.
(ii) One of the most dramatic changes in the sixth generation will be the explosive growth of Wide Area Networking.
(iii) Natural Language Processing (NLP) is a component of Artificial Intelligence (AI).
(iv) It provides the ability to develop the computer program to understand human language.

8. Write the significant features of monitor.

Ans. **Monitor:**

(i) Monitor is the most commonly used output device to display the information. It looks like a TV.

(ii) Pictures on a monitor are formed with picture elements called PIXELS.

(iii) Monitors may either be Monochrome which display text or images in Black and White or can be color, which display results in multiple colors.

(iv) There are many types of monitors available such as CRT (Cathode Ray Tube), LCD (Liquid Crystal Display) and LED (Light Emitting Diodes).

(v) The video graphics card helps the keyboard to communicate with the screen.

(vi) It acts as an interface between the computer and display monitor.

PART - IV

EXPLAIN IN DETAIL.

1. Explain the basic components of a computer with a neat diagram. ***[Mar. 2019, Sep. 2020]***

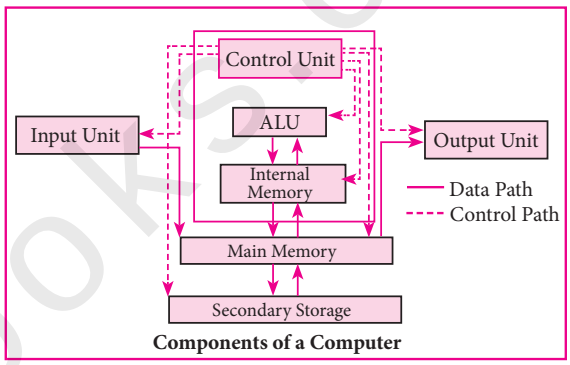
Ans. **Components of a Computer :**

The computer is the combination of hardware and software. Hardware is the physical component of a computer like motherboard, memory devices, monitor, keyboard etc., while software is the set of programs or instructions. Both hardware and software together make the computer system to function. Every task given to a computer follows an Input-process - output cycle (IPO cycle).

(i) Input unit : Input unit is used to feed any form of data to the computer, which can be stored in the memory unit for further processing. **Example :** keyboard, mouse etc.

(ii) Central Processing Unit : CPU is the major component which interprets and executes software instructions. It also control the operation of all other components such as memory, input and output units.

(iii) Arithmetic and Logic Unit : The ALU is a part of the CPU where various computing functions are performed on data. The ALU performs arithmetic operations such as addition, subtraction, multiplication, division and logical operations.



Components of a Computer

(iv) Control Unit : The control unit controls the flow of data between the CPU memory and I/o devices. It also controls the entire operation of a computer.

(v) Output Unit : An output unit is any hardware component that convey information to users in an understandable form. Example : Monitor, Printer etc.

(vi) Memory Unit : The Memory Unit is of two types which are primary memory and secondary memory. The primary memory is used to temporarily store the programs and data when the instructions are ready to execute. The secondary memory is used to store the data permanently. The Primary Memory is volatile, that is, the content is lost when the power supply is switched off. The Random Access Memory (RAM) is an example of a main memory. The Secondary memory is non volatile, that is, the content is available even after the power supply is switched off. Hard disk, CD-ROM and DVD ROM are examples of secondary memory.

2. **Discuss the various generations of computers.** *[June & QY. 2019; March 2020]*

Ans.

S.N	Generation	Period	Main Component used	Merits/ Demerits
1	**First Generation**	1940-1956	Vaccum tubes	❑ Big in size ❑ Consumed more power ❑ Malfunction due to overheat ❑ Machine Language was used
First Generation Computer - ENIAC, EDVAC, UNIVAC 1 ENIAC weighed about 27 tons, size 8 feet × 100 feet × 3 feet and consumed around 150 watts of power				
2.	**Second Generation**	1956-1964	Transistors	❑ Smaller compared to First Generation ❑ Generated Less Heat ❑ Consumed less power compared to first generation ❑ Punched cards were used ❑ First operating system was developed - Batch Processing and Multiprogramming Operating System ❑ Machine language as well as Assembly language was used.
Second Generation Computers - **IBM 1401, IBM 1620, UNIVAC 1108**				
3.	**Third Generation**	1964-1971	Integrated Circuits (IC)	❑ Computers were smaller, faster and more reliable ❑ Consumed less power. ❑ High Level Languages were used
Third Generation Computers - **IBM 360 series, Honeywell 6000 series**				
4.	**Fourth Generation**	1971-1980	**Microprocessor** Very Large Scale Integrated Circuits (VLSI)	❑ Smaller and Faster. ❑ Microcomputer series such as IBM and APPLE were developed. ❑ Portable Computers were introduced.
5.	**Fifth Generation**	1980- till date	**Ultra Large Scale Integration (ULSI)**	❑ Parallel Processing ❑ Super conductors ❑ Computers size was drastically reduced. ❑ Can recognize Images and Graphics ❑ Introduction of Artificial Intelligence and Expert Systems ❑ Able to solve high complex problems including decision making and logical reasoning
6.	**Sixth Generation**	In future		❑ Parallel and Distributed computing ❑ Computers have become smarter, faster and smaller ❑ Development of robotics ❑ Natural Language Processing ❑ Development of Voice Recognition Software

3. Explain the following :

a. Inkjet Printer **b. Multimedia projector**

c. Bar code / QR code Reader

Ans. **(a) Inkjet Printers:**

(i) Inkjet Printers use colour cartridges which combined Magenta, Yellow and Cyan inks to create color tones. A black cartridge is also used for monochrome output. Inkjet printers work by spraying jonised ink at a sheet of paper.

(ii) They use the technology of firing ink by heating it so that it explodes towards the paper in bubbles or by using piezoelectricity in which tiny electric currents controlled by electronic circuits are used inside the printer to spread ink in jet speed.

(iii) An Inkjet printer can spread millions of dots of ink at the paper every single second.

(b) Multimedia Projectors:

(i) Multimedia projectors are used to produce computer output on a big screen.

(ii) These are used to display presentations in meeting halls or in classrooms.

(c) Bar Code / QR Code Reader:

(i) A Bar code is a pattern printed in lines of different thickness. The Bar code reader scans the information on the bar codes transmits to the Computer for further processing.

(ii) The system gives fast and error free entry of information into the computer.

QR (Quick response) Code:

The QR code is the two dimension bar code which can be read by a camera and processed to interpret the image.

Government Exam Questions and Answers

5 Marks

1. Explain in detail the different types of Mouse.

[Govt.MQP-2018]

Ans. **(i) Mechanical Mouse :** A small ball is kept inside and touches the pad through a hole at the bottom of the mouse. When the mouse is moved, the ball rolls. This movement of the ball is converted into signals and sent to the computer.

(ii) Optical Mouse: Measures the motion and acceleration of pointer. It uses light source instead of ball to judge the motion of the pointer. Optical mouse has three buttons. Optical mouse is less sensitive towards surface.

(iii) Laser Mouse:

Measures the motion and acceleration of pointer. Laser Mouse uses Laser Light Laser. Mouse is highly sensitive and able to work on any hard surface.

Additional Questions and Answers

Choose the Correct Answers.

1 MARK

I. Chose the Corect options for the below Questions.

1. Which of the following led us today to extremely high speed calculating device?

(a) Laptop (b) Tabulating Machine
(c) Abacus (d) ENIAC

[Ans. (c) Abacus]

2. The first calculating device is

(a) ENIAC (b) Analytical Engine
(c) EDVAC (d) Abacus

[Ans. (d) Abacus]

3. In which year the concept of the analytical engine was invented?

(a) 1837 (b) 1910 (c) 1991 (d) 1836

[Ans. (a) 1837]

4. Which of the following period the first generation computers belongs?

(a) 1956-1963 (b) 1940-1956
(c) 1964-1971 (d) 1980-1990

[Ans. (b) 1940-1956]

5. Which of the following is not a first generation computers?

(a) ENIAC (b) EDVAC
(c) UNIVAC 1 (d) IBM1401

[Ans. (d) IBM1401]

6. **Which component used in third generation computers?**
(a) Vacuum Tubes (b) Transistors
(c) IC (d) Microprocessor
[Ans. (c) IC]

7. **Which of the following is a Third generation computers?**
(a) Vacuum tubes (b) Transistor
(c) Integrated Circuits (d) Microprocessor
[Ans. (b) Transistor]

8. **The fourth generation belongs to**
(a) 1940-1956 (b) 1971-1980
(c) 1964-1971 (d) 1980-1990
[Ans. (b) 1971-1980]

9. **In which generation, the Voice Recognition software developed?**
(a) Sixth (b) Fourth (c) Third (d) Second
[Ans. (a) Sixth]

10. **Which generation gave a start to parallel computing?**
(a) fourth (b) fifth (c) sixth (d) seventh
[Ans. (c) sixth]

11. **Which of the following is not a form of parallel computing?**
(a) bit level (b) instruction level
(c) task parallelism (d) Robotics
[Ans. (d) Robotics]

12. **Which of the following holds the data and instructions during the processing?**
(a) Input unit (b) output unit
(c) Memory unit (d) Software
[Ans. (c) Memory unit]

13. **Which unit does the processing of data?**
(a) CPU (b) Registers
(c) Input unit (d) Output unit
[Ans. (a) CPU]

14. **Which of the following is the heart of the computer?**
(a) CPU (b) HDD (c) SDD (d) ANN
[Ans. (a) CPU]

15. **Expansion of CPU is**
(a) Control processing unit
(b) Central processor unique
(c) Central processing unit
(d) Control processor unit
[Ans. (c) Central processing unit]

16. **Expansion of ALU is**
(a) Arithmetic Logical Unit
(b) Accumulator Logical Unit
(c) Arithmetic Language Unit
(d) None of these
[Ans. (a) Arithmetic Logical Unit]

17. **Which of the following operations of ALU promote decision -making ability of a computer?**
(a) Logical (b) Relational
(c) Arithmetic (d) Binary
[Ans. (a) Logical]

18. **Identify the Input device**
(a) Printer (b) Mouse
(c) Plotter (d) Projector
[Ans. (b) Mouse]

19. **Which of the following is not a non volatile memory?**
(a) ROM (b) Hard disk
(c) CD-ROM (d) RAM
[Ans. (d) RAM]

20. **Optical Mouse invented in the year.**
(a) 1968 (b) 1973 (c) 1988 (d) 1981
[Ans. (c) 1988]

21. **Who invented the computer mouse?**
(a) Douglas Engelbart (b) Bill English
(c) Apple Lisa (d) Henry Babbage
[Ans. (a) Douglas Engelbart]

22. **Which device works like a xerox machine?**
(a) Retinal scanner (b) OCR
(c) OMR (d) Scanner
[Ans. (d) Scanner]

23. **Which device is very safe and convenient for security instead of password?**
(a) Scanner (b) Fingerprint Scanner
(c) Track ball (d) Retinal Scanner
[Ans. (b) Fingerprint Scanner]

24. Which of the following device uses CCD Electronic chip?
(a) OCR (b) BCR
(c) Voice Input Systems (d) Digital Camera
[Ans. (d) Digital Camera]

25. Expansion of CCD is
(a) Coupled Changed Device
(b) Changed Coupled Device
(c) Changed Couple Device
(d) Camera changed Divider
[Ans. (b) Changed Coupled Device]

26. Expansion of GUI is
(a) Graphics User Interface
(b) Graphical User Information
(c) Geographical User Information
(d) Graphical User Interface
[Ans. (d) Graphical User Interface]

27. In which device the keys are arranged in a cluster?
(a) Keyboard (b) Keyer
(c) Barcode Reader (d) Touch Screen
[Ans. (b) Keyer]

28. Expansion of CPS is
(a) Character Per second (b) Copy Per second
(c) Code Per second (d) Character Per screen
[Ans. (a) Character Per Second]

29. Which of the following is the logical machine which interprets and executes software instructions?
(a) CPU (b) ALU
(c) Control Unit (d) Memory Unit
[Ans. (a) CPU]

30. The expansion of VLSI is
(a) Verified Logical Scale Integrated Circuits
(b) Very Logical Small Integer Circuits
(c) Very Large Scale Integrated Circuits
(d) Volatile Large Scale Integrated Circuits
[Ans. (c) Very Large Scale Integrated Circuits]

31. Who was the inventor of the electronic digital computer?
(a) John Vincent Atanasoft
(b) J. Presper Eckert
(c) John Mauchly
(d) Charles babbage
[Ans. (a) John Vincent Atanasoft]

32. The first digital computer name was
(a) EDVAC (b) UNIVACI
(c) ENIAC (d) IBM 1620
[Ans. (c) ENIAC]

33. Which company developed first digital computer?
(a) Atanasoft Berry Computer
(b) AT & T bell
(c) IBM
(d) Microsoft
[Ans. (a) Atanasoft Berry Computer]

34. Which of the following are the computer systems inspired by the biological neural networks?
(a) NLP (b) IBM
(c) Robotics (d) ANN **[Ans. (d) ANN]**

35. Artificial neurons are organized in
(a) Nodes (b) Layers
(c) Signals (d) Units
[Ans. (b) Layers]

36. Which of the following is a type of computation in which many calculations are carried out simultaneously?
(a) NLP (b) ANN
(c) Parallel Processing (d) Parallel Computing
[Ans. (d) Parallel Computing]

37. Which of the following has become the dominant paradigm in computer architecture?
(a) Parallel computing
(b) parallel processing
(c) Multi tasking
(d) Multi processing
[Ans. (a) Parallel computing]

38. Which of the following concerned with the interactions between computers and human language?
(a) Artificial Neurons
(b) Neural network
(c) Artificial intelligence
(d) Natural language processing
[Ans. (c) Artificial intelligence]

39. The conversion of data to information is called
(a) Data Digitization (b) Data Processing
(b) Data Management (d) All of these
[Ans. (b) Data Processing]

40. **A set of instructions given to the computer is called**
(a) Information (b) Data
(c) Input (d) Program
[Ans. (d) Program]

41. **Which of the following devices not stores the date permanently?**
(a) HDD (b) SSD
(c) Tape Drives (d) RAM
[Ans. (d) RAM]

42. **Which of the following devices stores the data permanently?**
(a) HDD (b) Tape drives
(c) SSD (d) All of these
[Ans. (d) All of these]

43. **How many classification of memories in memory unit?**
(a) 2 (b) 3
(c) 4 (d) more than 2
[Ans. (a) 2]

44. **How many types of Keyboards used to input the data?**
(a) 3 (b) 2 (c) 4 (d) 5
[Ans. (a) 3]

45. **How many types of pointing device are there?**
(a) 2 (b) 3 (c) 1 (d) Many
[Ans. (a) 2]

46. **Which mouse has as many as 12 buttons?**
(a) Laser (b) Optical
(c) Mechanical (d) Both a and b
[Ans. (a) Laser]

47. **The mechanical mouse introduced in the year.**
(a) 1978 (b) 1988
(c) 1968 (d) 1958 **[Ans. (c) 1968]**

48. **Who assisted Douglas Engelbart to invent the mouse?**
(a) Berry (b) Steve Kirsch
(c) Bill English (d) Bill Gates
[Ans. (c) Bill English]

49. **Which device is used to enter information directly into the computer's memory?**
(a) Keyboard (b) Scanner
(c) Mouse (d) Plotter
[Ans. (b) Scanner]

50. **The expansion of USB is**
(a) Universal Serial Bus (b) Uniform Serial Bus
(c) Uniform Serious Bus (d) Universal Serial BIOS
[Ans. (a) Universal Serial Bus]

51. **Which device used CCD chip?**
(a) Light pen (b) Scanner
(c) Microphone (d) Digital Camera
[Ans. (d) Digital Camera]

52. **Which device is used to input by pressing one or more switches?**
(a) Keyboard (b) Mouse
(c) Touch Screen (d) Keyer
[Ans. (d) Keyer]

53. **How many types of monitors are there?**
(a) 2 (b) 3 (c) 4 (d) Many
[Ans. (b) 3]

54. **The expansion of CRT is**
(a) Cathode Ray Tube (b) Cathode Radio Tube
(c) Cathode Ray Technology
(d) Cathode Radio Technology
[Ans. (a) Cathode Ray Tube]

55. **The expansion of LCD is**
(a) Liquid Cathode Diodes
(b) Liquid Cluster Display
(c) Liquid Crytal Display
(d) Live Extract Display
[Ans. (b) Liquid Cluster Display]

56. **The expansion of LED is**
(a) Light Extract Display (b) Light Emitting Diodes
(c) Liquid Emitting Diodes
(d) Liquid Extract Display
[Ans. (c) Liquid Emitting Diodes]

57. **The expansion of VGA is**
(a) Visual Graphics Adapter
(b) Video Graphics Adapter
(c) Video Graphics Array
(d) Voice Graphics Array
[Ans. (c) Video Graphics Array]

58. **Which device produce graphical output on papers?**
(a) Scanner (b) Touch Screen
(c) Plotter (d) Track ball
[Ans. (c) Plotter]

59. **Which of the following is an impact priners**
(a) Inkjet (b) Fax
(c) Dot Matrix (d) Laser
[Ans. (c) Dot Matrix]

60. **Which printer do not use striking mechanism for printer?**
(a) Inkjet (b) Laser
(c) Thermal (d) All of these
[Ans. (d) All of these]

61. **Which device is used to produce computer output on a big screen?**
(a) Monitor (b) LED
(c) Projector (d) Monochrome Monitor
[Ans. (c) Projector]

62. **Which of the following is the diagnostic testing sequence of the computer hardware?**
(a) POST (b) BIOS (c) MAR (d) MBR
[Ans. (a) POST]

63. **Which of the following issue an error message if any computer hardware not defected?**
(a) BIOS (b) BUS (c) RAM (d) POST
[Ans. (a) BIOS]

64. **Which code checks partition table for an active partition in a computer?**
(a) MBR (b) Marse (c) Binary (d) Object
[Ans. (a) MBR]

65. **The process of loading an OS in a computer RAM is known as**
(a) POST (b) BIOS
(c) Booting (d) All of these
[Ans. (c) Booting]

II. Choose and fill in the blanks.

1. **The component used in second generation computers is .....**
(a) Transistors (b) ICs
(c) Vacuum tubes (d) Microprocessors
[Ans. (a) Transistors]

2. **The Second generation computers belongs to period .....**
(a) 1940-1956 (b) 1956-1964
(c) 1980-1990 (d) 1964-1971
[Ans. (b) 1956-1964]

3. **The component used in fourth generation computers are ..... .**
(a) ICS (b) Transistors
(c) VLSI (d) Vacuum tube
[Ans. (c) VLSI]

4. **Laptops, Notebook, Tablets are belongs to ..... generation computers.**
(a) First (b) Second (c) Third (d) Fourth
[Ans. (d) Fourth]

5. **The fifth generation computers belongs to .....**
(a) 1971-1980 (b) 1980 till date
(c) 1964-1971 (d) 1940-1956
[Ans. (b) 1980 till date]

6. **Name the software introduced in fifth generation computers ..... .**
(a) Artificial Neural Networks
(b) Artificial Intelligence
(c) Robotics
(d) Natural language processing
[Ans. (b) Artificial Intelligence]

7. **Robotics developed in ..... generation.**
(a) Third (b) Fourth (c) Fifth (d) Sixth
[Ans. (d) Sixth]

8. **ENIAC was invented by ..... .**
(a) John Vincent
(b) Cliff Berry
(c) Presper Eckert, John Mauchly
(d) Earl R Johnson and Atanasoff
[Ans. (c) Presper Eckert, John Mauchly]

9. **Expand NLP ..... .**
(a) National Language Problem
(b) Natural Language Processing
(c) Network Language Program
(d) Network Local Processing
[Ans. (b) Natural Language Processing]

10. **NLP is a component of ..... .**
(a) Expert systems (b) Robotics
(c) Parallel computing (d) Artificial Intelligence
[Ans. (d) Artificial Intelligence]

11. **Every task given to a computer-follows a(n) ..... cycle.**
(a) BPO (b) IPO
(c) ANN (d) NLP **[Ans. (b) IPO]**

12. **The memory unit is of ..... kinds.**
(a) 3 (b) 4 (c) 2 (d) 5
[Ans. (c) 2]

13. **Laser mouse has as many as ..... buttons.**
(a) 10 (b) 11 (c) 12 (d) 3
[Ans. (c) 12]

14. **The first computer monitor was released in the year ..... .**
(a) 1980 (b) 1983 (c) 1963 (d) 1973
[Ans. (d) 1973]

15. **The Red, Green or Blue led used mouse in invented by .....**
(a) John Mauchly (b) Steve Kirsch
(c) Henry babbaje (d) Presper Eckert
[Ans. (b) Steve Kirsch]

16. **The first compute Monitor was released in the year .....**
(a) 1974 (b) 1972 (c) 1971 (d) 1973
[Ans. (d) 1973]

17. **An error will half the boot process found in .....**
(a) BIOS (b) POST
(c) HDD (d) I/O System
[Ans. (b) POST]

III. Match the following.

1.

i)	First Generation	1)	ICS
ii)	Second Generation	2)	VLSI
iii)	Third Generation	3)	Parallel Processing
iv)	Fourth Generation	4)	Vacuum tubes
v)	Fifth Generation	5)	Parallel competing
vi)	Sixth Generation	6)	Transistors

(a) 2,3,5,1,4,6 (b) 4,6,1,2,3,5
(c) 6,5,4,1,2,3 (d) 1,3,2,5,6,4
[Ans. (b) 4,6,1,2,3,5]

2.

i)	Expert System	1)	Second Generation
ii)	Batch Processing	2)	Fourth Generation
iii)	NLP	3)	Sixth Generation
iv)	Introduction of Laptop	4)	Fifth Generation

(a) 4, 1, 3,2 (b) 1, 3, 2, 4
(c) 3, 4, 1, 2 (d) 4, 3, 1, 2
[Ans. (a) 4, 1, 3,2]

3.

i)	EDVAC	1)	Second Generation Computer
ii)	APPLE	2)	Fifth Generation Computer
iii)	IBM 1620	3)	First Generation Computer
iv)	Expert System	4)	Fourth Generation Computer

(a) 4, 3, 1, 2 (b) 3, 1, 2, 4
(c) 4, 1, 2, 3 (d) 3, 4, 1, 2
[Ans. (d) 3, 4, 1, 2]

4.

i)	Information	1)	Set of instructions
ii)	Hardware	2)	Set of Programs
iii)	Data	3)	Convey some meaning
iv)	Program	4)	Motherboard
v)	Software	5)	Set of raw facts

(a) 3, 4, 5, 1, 2 (b) 4, 5, 1, 2, 3
(c) 1, 3, 4, 5, 2 (d) 2, 3, 5, 4,1
[Ans. (a) 3, 4, 5, 1, 2]

5.

i)	Out device	1)	Retrieve the data is possible
ii)	CPU	2)	Data and instructions given to the computer
iii)	Memory	3)	Temporarily stores data
iv)	Mass Storage Device	4)	Delivers the data processed by CPU
v)	Input Device	5)	Executes Instruction

(a) 5, 4, 1, 2, 3 (b) 4, 5, 3, 1, 2
(c) 4, 5, 3, 2,1 (d) 5, 4, 3, 2, 1
[Ans. (b) 4, 5, 3, 1, 2]

6.

i)	Used to feed data to the computer	1)	ALU
ii)	Controls the operation of memory Uni	2)	Input Unit
iii)	Computing functions are performed on data	3)	Output Unit
iv)	Controls the flow of data between memory unit and I/O Units.	4)	CPU
v)	Convey information in understandable form	5)	Control Unit

(a) 2,4, 1, 3, 5 (b) 1, 3, 5, 2, 4
(c) 2, 3, 1, 4, 5 (d) 2, 4, 1, 5, 3

[Ans. (d) 2, 4, 1, 5, 3]

IV. Pick the Odd one Out.

1. (a) Keyboard (b) Mouse
(c) Track Ball (d) Monitor

[Ans. (d) Monitor]

Reason : Monitor is the most commonly used output device to display the information. Other three are examples of input device.

2. (a) Mechanical Mouse (b) Laser Mouse
(c) Plotter (d) Optical Mouse

[Ans. (c) Plotter]

Reason : Plotter is an output device that is used to produce graphical output on papers other three are types of mouse.

V. Which one of the Following is Not Correctly Matched?

1. (a) Impact printers – Dot Matrix printer
(b) Non–Impact printers – Laser printer
(c) Hardware – Keyboard
(d) Software – CPU

[Ans. (d) Software – CPU]

2. (a) Second generation – Transistors
(b) Third generation – Integrated circuits
(c) Fourth generation – Vacuum tubes
(d) Fifth generation – ULSI

[Ans. (c) Fourth generation – Vacuum tubes]

VI. Consider the Following Statement.

1. **Assertion (A) :** Computers have now become an indispensable part of our lives.
Reason (R) : Computers have revolutionized out lives with their accuracy and speed of performing a job, it is truly remarkable.

(a) Both (A) and (R) are true and (R) is the correct explanation of A.
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

[Ans. (a) Both (A) and (R) are true and (R) is the correct explanation of (A)]

2. **Assertion (A) :** CPU is the major component which interprets and executes software instructions.
Reason (R) : The ALU is a part of the CPU where various computing functions are performed on data.

(a) Both (A) and (R) are true and (R) is the correct explanation of A.
(b) Both (A) and (R) are true and (R) is not the correct explanation of A.
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

[Ans. (b) Both (A) and (R) are true and (R) is not the correct explanation of (A)]

3. **Assertion (A) :** Microphone serves as a voice Input device.
Reason (R) : Digital camera uses a CCD electronic chip.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

[Ans. (b) Both (A) and (R) are true and (R) is not the correct explanation of (A)]

VII. Choose the correct statement.

1. Which of the following statements are true?

(i) Machine language programs are done in first generation

(ii) Third generation computers are not more reliable

(iii) Voice recognition software developed in fifth generation computer

(iv) Micro processors are used in fourth generation computer

(a) Only (i) (b) Only (i) and (iv)

(c) Only (iii) and (iv) (d) Only (i) (iii) and (iv)

[Ans. (b) Only (i) and (iv)]

Very Short Answers. 2 MARKS

1. Name the first generation computers.

Ans. ENIAC, EDVAC, UNIVAC 1.

2. Name the Second generation computers.

Ans. IBM 1401, IBM 1620, UNIVAC 1108.

3. Name the Third generation computers.

Ans. IBM 360 Series, Honeywell 6000 series.

4. Expand (i) BIOS (ii) ENIAC (iii) RAM (iv) ALU

Ans. (i) BIOS - Basic Input Output System.

(ii) ENIAC - Electronic Numerical Integrator And Calculator.

(iii) RAM - Random Access Memory

(iv) ALU - Arithmetic and Logic unit

5. Name the softwares introduced in fifth generation computers.

Ans. (i) Artificial Intelligence

(ii) Expert Systems

6. Name the types of computer introduced in Fourth generation computers.

Ans. (i) Microcomputer

(ii) Portal Computers.

7. Write the developments of Sixth generation computers.

Ans. (i) Parallel Computing

(ii) Artificial Neural Networks

(iii) Robotics

(iv) Natural Language Processing

8. What is NLP?

Ans. Natural Language Processing is the ability of a computer program to understand human language. It is a component of artificial intelligence.

9. What is the use of Microphone?

Ans. Microphone serves as a voice Input device. It captures the voice data and send it to the Computer.

10. Write a note on Digital Camera.

Ans. It captures images / videos directly in the digital form. It uses a CCD (Charge Coupled Device) electronic chip. When light falls on the chip through the lens, it converts light rays into digital format.

11. What is use of VGA?

Ans. The screen monitor works with the VGA (Video Graphics Array). The video graphics card helps the keyboard to communicate with the screen. It acts as an interface between the computer and display monitor. Usually the recent motherboard incorporates built in video card.

12. Write the two main categories of Printer.

Ans. Printers are divided into two main categories:

(i) Impact Printers

(ii) Non Impact printers

13. What is booting a computer?

Ans. Booting a computer is to load an operating system into the computer's main memory or random access memory (RAM).

14. What makes Charles Babbage the father of computing?

Ans. Charles Babbage radical ideas and concept of the Analytical Engine (It contained an ALU, basic flow control and integrated memory) makes him the father of computing.

15. What is the goal of neural network approach?

Ans. The original goal of the neural network approach was to solve problems in the same way that a human brain would. Over time, attention focused on matching specific mental abilities, leading to deviations from biology.

16. Write the tools in which nano technology was born.

Ans. The right tools, such as the scanning tunneling microscope (STM) and the atomic force microscope (AFM), the age of nano-technology was born.

17. Define IPO Cycle.

Ans. The functional components of a computer performs. Every task given to a computer follows an Input-Process- Output Cycle (IPO cycle).

18. Name the different keys available in the keyboard.

Ans. There are different set of keys available in the keyboard such as character keys, modifier keys, system and GUI keys, enter and editing keys, function keys, navigation keys, numeric keypad and lock keys.

19. Which device is used to draw a lines?

Ans. Light Pen is an input device which is used to draw lines or figures on a computer screen. It is touched to the CRT screen where it can detect faster on the screen as it passes.

20. Define Pixels.

Ans. Pictures on a monitor are formed with picture elements called PIXELS.

21. Name the types of Monitors available.

Ans. The types of monitors available such as CRT (Cathode Ray Tube), LCD (Liquid Crystal Display) and LED (Light Emitting Diodes).

22. How the date travel through control bus?

Ans. The date travel in both unidirectional and bidirectional due to the internal connection with in the computer architecture.

23. Name the type of registers are essential for instruction execution.

Ans.
(i) Program counter
(ii) Instruction Register
(iii) Memory Address Registers
(iv) Memory Buffer Register
(v) Accumulator

24. Expand (a) MAR (b) MBR

Ans.
(a) MAR - Memory Address Register
(b) MBR - Memory Buffer Register

25. Why POST is essential?

Ans. If the hardware is not detected, a particular pattern of beeps will inform about the error. An error found in the POST is usually fatal (that is, it causes current program to stop running) and will halt the boot process, since the hardware check is absolutely essential for the computer's functions.

26. What does reboot mean?

Ans. It means to reload the operating system.

27. Write the limitations of impact printer.

Ans.
(1) It is slow as compared to non-impact printers
(2) It is not best suited for graphics
(3) It is not possible to obtain colour output.

Short Answers. 3 MARKS

1. Write a note Vaccum tube.

Ans.
(i) Vacuum tubes contain electrodes for controlling electron flow and were used in early computers as a switch or an amplifier.
(ii) Vaccum tubes are big in size and consumed more power.

2. Define Transistor.

Ans.
(i) The transistor ("transfer resistance") is made up of semi-conductors.
(ii) It is a component used to control the amount of current or voltage used for amplification/ modulation or switching of an electronic signal.

3. Define Punched cards.

Ans. Punch cards also known as Hollerith cards are paper cards containing several punched or perforated holes that were punched by hand or machine to represent data.

4. What is Machine language?

Ans.
(i) Machine language is a collection of binary digits or bits that the computer reads and interprets.
(ii) In first generation, machined language was used.

5. What is Integrated circuits?

Ans.
(i) IC is short for Integrated Circuit or Integrated Chip.
(ii) The IC is a package containing many circuits, pathways, transistors, and other electronic components all working together to perform a particular function or a series of functions.

6. What is Robotics?

Ans.
(i) Robot is a term coined by Karel Capek in the 1921 play RUR (Rossum's Universal Robots).
(ii) It is used to describe a computerized machine designed to respond to input received manually or from its surroundings.

7. What is Nano-technology?

Ans. Nano-technology, is an engineering, science, and technology that develops machines or works with one atom or one molecule that is 100 nanometers or smaller.

8. Define POST.

Ans. **(i)** POST (Power-On Self-Test) is the diagnostic testing sequence that a computer's basic input/output system runs to determine if the computer keyboard, random access memory, disk drives and other hardware are working correctly.

(ii) If the necessary hardware is detected and found to be operating properly, the computer begins to boot.

9. Write the short note on finger print scanner.

Ans. **Finger print Scanner:** Fingerprint Scanners is a fingerprint recognition device used for computer security, equipped with the fingerprint recognition feature that uses biometric technology. Fingerprint Reader / Scanner is very safe and convenient device for security instead of password, that is vulnerable to fraud and is hard to remember.

10. Write a note on Touch Screen.

Ans. **(i)** A touch screen is a display device that allows the user to interact with a computer by using the finger.

(i) It can be quite useful as an alternative to a mouse or keyboard for navigating a Graphical User Interface (GUI).

(iii) Touch screens are used on a wide variety of devices such as computers, laptops, monitors, smart phones, tablets, cash registers, and information kiosks.

(iv) Some touch screens use a grid of infrared beams to sense the presence of a finger instead of utilizing touch-sensitive input.

11. Write the sequence of steps in boot process? (or) Explain the types of booting in computer.

Ans. Booting process is of two types.

(i) Cold Booting (ii) Warm Booting

(i) Cold Booting: When the system starts from initial state i.e. it is switched on, we call it cold booting or Hard Booting. When the user presses the Power button, the instructions are read from the ROM to initiate the booting process.

(ii) Warm Booting: When the system restarts or when Reset button is pressed, we call it Warm Booting or Soft Booting. The system does not start from initial state and so all diagnostic tests need not be carried out in this case. There are chances of data loss and system damage as the data might not have been stored properly. Differentiate optical mouse and laser mouse.

12. Differentiate Impact Printers and Non-Impact Printers.

Ans.

Impact Printers	Non-Impact Printers
It uses ribbons / carbon papers to leave the impressions on the paper.	It use ink cartridges and the impressions appear on the paper with the flow of ink.
The quality of printing is a draft quality.	The quality of printing is a high quality.
Striking Mechanism used to produce output.	No striking mechanism used to produce output.
faster speeds around 250 words per second.	slower speeds around 1 page per seconds.
Example : Dot Matrix printers and line matrix printers	**Example :** Laser printers and Inkjet printers.

13. Differentiate Dot Matrix Printer and Laser Printer.

Ans.

Dot Matrix Printer	Laser Printer
Printing speed is slow.	Printing speed is high.
Suitable for black and white printing.	Suitable of colour printing.
It makes noise while printing.	It is silent while printing.

LONG ANSWERS. 5 MARKS

1. Explain any two input and output devices.

Ans. **Input Devices :**

(i) Scanner: Scanners are used to enter the information directly into the computer's memory. This device works like a xerox machine. The scanner converts any type of printed or written information including photographs into a digital format, which can be manipulated by the computer.

(ii) Finger print Scanner: Finger print Scanner is a fingerprint recognition device used for computer security, equipped with the fingerprint recognition feature that uses biometric technology. Fingerprint Reader / Scanner is a very safe and convenient device for security instead of using passwords, which is vulnerable to fraud and is hard to remember.

Output Devices :

(i) Monitor: Monitor is the most commonly used output device to display the information. It looks like a TV. Monitors may either be Monochrome which display text or images in Black and White or can be color, which display

results in multiple colors. There are many types of monitors available such as CRT (Cathode Ray Tube), LCD (Liquid Crystal Display) and LED (Light Emitting Diodes). The video graphics card helps the keyboard to communicate with the screen. It acts as an interface between the computer and display monitor.

(ii) **Plotter:** Plotter is an output device that is used to produce graphical output on papers. It uses single color or multi color pens to draw pictures.

2. Explain Impact Printers with an Example.

Ans. **Impact Printers :**

(i) These printers print with striking of hammers or pins on ribbon. These printers can print on multi-part (using carbon papers) by using mechanical pressure.

(ii) For example, Dot Matrix printers and Line matrix printers are impact printers.

(iii) A Dot matrix printer that prints using a fixed number of pins or wires. Each dot is produced by a tiny metal rod, also called a "wire" or "pin", which works by the power of a tiny electromagnet or solenoid, either directly or through a set of small levers.

(iv) It generally prints one line of text at a time. The printing speed of these printers varies from 30 to 1550 CPS (Character Per Second).

3. Explain Non-Impact printers with an examples.

Ans. **Non-Impact Printers :**

(i) These printers do not use striking mechanism for printing. They use electrostatic or laser technology.

(ii) Quality and speed of these printers are better than Impact printers. For example, Laser printers and Inkjet printers are non-impact printers.

Laser Printers :

(i) Laser printers mostly work with similar technology used by photocopiers.

(ii) It makes a laser beam scan back and forth across a drum inside the printer, building up a pattern. It can produce very good quality of graphic images.

Inkjet Printers :

(i) Inkjet Printers use colour cartridges which combined Magenta, Yellow and Cyan inks to create color tones.

(ii) A black cartridge is also used for monochrome output. Inkjet printers work by spraying ionised ink at a sheet of paper.

(iii) They use the technology of firing ink by heating it so that it explodes towards the paper in bubbles or by using piezoelectricity in which tiny electric currents controlled by electronic circuits are used inside the printer to spread ink in jet speed.

(iv) An Inkjet printer can spread millions of dots of ink at the paper every single second.

☆ ☆ ☆

CHAPTER 2 NUMBER SYSTEMS

CHAPTER SNAPSHOT

EVALUATION

PART - I

CHOOSE THE CORRECT ANSWER.

1. Which refers to the number of bits processed by a computer's CPU? *[March 2020]*

(a) Byte (b) Nibble
(c) Word length (d) Bit

[Ans. (c) Word length]

2. How many bytes does 1 KiloByte contain?

(a) 1000 (b) 8
(c) 4 (d) 1024 **[Ans. (d) 1024]**

3. Expansion for ASCII

(a) American School Code for Information Interchange
(b) American Standard Code for Information Interchange
(c) All Standard Code for Information Interchange
(d) American Society Code for Information Interchange

[Ans. (b) American Standard Code for Information Interchange]

4. 2^50 is referred as

(a) Kilo (b) Tera
(c) Peta (d) Zetta

[Ans. (c) Peta]

5. How many characters can be handled in Binary Coded Decimal System?

(a) 64 (b) 255
(c) 256 (d) 128 **[Ans. (a) 64]**

6. For 1101_2 the equalent Hexadecimal equivalent is?

(a) F (b) E
(c) D (d) B

[Ans. (c) D]

7. What is the 1's complement of 00100110?

(a) 00100110 (b) 11011001
(c) 11010001 (d) 00101001

[Ans. (b) 11011001]

8. Which amongst this is not an Octal number?

(a) 645 (b) 234 *[QY. 2019]*
(c) 876 (d) 123 **[Ans. (c) 876]**

PART - II

VERY SHORT ANSWERS.

1. What is data?

Ans. The term data comes from the word datum, which means a raw fact. The data is a fact about people, places or some objects.

2. Write the 1's complement procedure.

Ans. **Step 1:** Convert given Decimal number into Binary

Step 2: Check if the binary number contains 8 bits, if less add 0 at the left most bit, to make it as 8 bits.

Step 3: Invert all bits (i.e. Change 1 as 0 and 0 as 1).

3. Convert $(46)_{10}$ into Binary number.

Ans.

2	46	
2	23	– 0
2	11	– 1
2	5	– 1
2	2	– 1
2	1	– 0

Answer - $46_{10} = (101110)_2$

4. We cannot find 1's complement for $(28)_{10}$. State reason.

Ans. $(28)_{10}$ is positive number. 1's Complement represent signed numbers (Negative numbers) only. So, $(28)_{10}$ cannot find 1's complement.

5. List the encoding systems that represents characters in memory.

Ans. **(i)** BCD – Binary Coded Decimal.

(ii) EBCDIC – Extended Binary Coded Decimal Interchange Code.

(iii) ASCII – American Standard Code for Information Interchange.

(iv) Unicode.

(v) ISCII - Indian Standard Code for Information Interchange.

PART - III

SHORT ANSWERS.

1. What is radix of a number system? Give example

Ans. A numbering system is a way of representing numbers. Each number system is uniquely identified by its base value or radix. Radix or base is the count of number of digits in each number system. Radix or base is the general idea behind positional numbering system.

Example :

Binary Number System - Radix 2
Octal Number System - Radix 8
Decimal Number System - Radix 10
Hexadecimal Number System - Radix 16.

2. Write note on binary number system. *[HY. 2019]*

Ans. **(i)** There are only two digits in the Binary system, namely, 0 and 1. The numbers in the binary system are represented to the base 2 and the positional multipliers are the powers of 2.

(ii) The left most bit in the binary number is called as the Most Significant Bit (MSB) and it has the largest positional weight.

(iii) The right most bit is the Least Significant Bit (LSB) and has the smallest positional weight.

3. Convert $(150)_{10}$ into Binary, then convert that Binary number to Octal. *[Sep. 2020]*

Ans. $150_{10} = ?$

2	150	
2	75	– 0
2	37	– 1
2	18	– 1
2	9	– 0
2	4	– 1
2	2	– 0
	1	– 0

$150_{10} = (10010110)_2$

$10010110_2 = ?$

10 | 010 | 110
↓ | ↓ | ↓
2 | 2 | 6

$10010110_2 = 226_8$.

4. Write short note on ISCII.

Ans. **(i)** ISCII is the system of handling the character of Indian local languages. This as a 8-bit coding system.

(ii) Therefore it can handle 256 (28) characters. This system is formulated by the department of Electronics in India in the year 1986-88 and recognized by Bureau of Indian Standards (BIS).

(iii) Now this coding system is integrated with Unicode.

5. Add a) $-22_{10}+15_{10}$ b) $20_{10}+25_{10}$ *[QY. 2019; HY. 2019]*

Ans. **(a)** $-22_{10}+15_{10}$

2	22	
2	11	– 0
2	5	– 1
2	2	– 1
	1	– 0

2	15	
2	7	– 1
2	3	– 1
2	1	– 1

$(1111)_2 \Rightarrow (00001111)_2$

$(10110)_2 \Rightarrow (00010110)_2$

1's complement	= 11101001
2's complement	= 11101010
$(-22)_{10} + (15)_{10}$	= 11101001
	= 00001111
	11111001

(b) $20_{10}+25_{10}$

2	20	
2	10	– 0
2	5	– 0
2	2	– 1
	1	– 0

2	25	
2	12	– 1
2	6	– 0
2	3	– 0
	1	– 1

$(10100)_2$	$= (11001)_2$
8 bit format of 20_{10}	= 00010100
8 bit format of 25_{10}	= 00011001
$20_{10} + 25_{10}$	= 00101101

$20_{10} + 25_{10} = 00101101_2$

PART - IV

EXPLAIN IN DETAIL.

1. a) Write the procedure to convert fractional Decimal to Binary *[March 2020]*

b) Convert $(98.46)_{10}$ to Binary *[QY. 2019]*

Ans. **a)** The method of repeated multiplication by 2 has to be used to convert such kind of decimal fractions.

The steps involved in the method of repeated multiplication by 2:

Step 1: Multiply the decimal fraction by 2 and note the integer part. The integer part is either 0 or 1.

Step 2: Discard the integer part of the previous product. Multiply the fractional part of the previous product by 2. Repeat Step 1 until the same fraction repeats or terminates (0).

Step 3: The resulting integer part forms a sequence of 0s and 1s that become the binary equivalent of decimal fraction.

Step 4: The final answer is to be written from first integer part obtained till the last integer part obtained.

b) 98.46_{10}

1. Integer part

2	98	
2	49	– 0
2	24	– 1
2	12	– 0
2	6	– 0
2	3	– 0
	1	– 1

2. Fractional part

$0.46 \times 2 = 0.92 = 0$
$0.92 \times 2 = 1.84 = 1$
$0.84 \times 2 = 1.68 = 1$
$0.68 \times 2 = 1.36 = 1$
$0.36 \times 2 = 0.72 = 0$
$0.72 \times 2 = 1.44 = 1$
$98.46_{10} = (1100010.011101....)_2$

2. Find 1's Complement and 2's Complement for the following Decimal number. a) -98 b) -135

Ans. **a) -98**

2	98	
2	49	– 0
2	24	– 1
2	12	– 0
2	6	– 0
2	3	– 0
	1	– 1

$= 98_{10} = 1100010$

8 bit format of 98_{10} = 01100010
1's complement = 10011101
Add 1 bit = +1
2's complement = 10011110

b) -135

2	135	
2	67	– 1
2	33	– 1
2	16	– 1
2	8	– 0
2	4	– 0
2	2	– 0
	1	– 0

$135_{10} = 10000111$

1's complement = 01111000
Add 1 bit = +1
2's complement = 01111001

3. a) Add $1101010_2 + 101101_2$

b) Subtract $1101011_2 - 111010_2$ *[Sep. 2020]*

Ans. **a)** $1101010_2 + 101101_2$

```
  1101010
+  101101
 10010111
```

$= 10010111_2$

b) $1101011_2 - 111010_2$

```
  1101011
+  111010
   110001
```

$= 110001_2$

WORKSHOP

1. Identify the number system for the following numbers.

Ans.

S.No	NUMBER	NUMBER SYSTEM
1.	$(1010)_{10}$	Decimal Number system
2.	$(1010)_2$	Binary Number System
3.	$(989)_{16}$	Hexadecimal Number System
4.	$(750)_8$	Octal Number System
5.	$(926)_{10}$	Decimal Number System

2. State whether the following numbers are valid or not. If invalid, give reason.

Ans.

S.No	STATEMENT	YES / NO	REASON (IF INVALID)
1.	786 is an Octal number	No	In. octal number, the allowable digits is between 0 and 7
2.	101 is a Binary number	No	No Radix is mentional
3.	Radix of Octal number is 7	No	Radix of octal number is 8

3. Convert the following Decimal numbers to its equivalent Binary, Octal, Hexadecimal.

1) 1920 2) 255 3) 126

Ans. **1)** $1920_{10} = ?_2$

2	1920
2	960 – 0
2	480 – 0
2	240 – 0
2	120 – 0
2	60 – 0
2	30 – 0
2	15 – 0
2	7 – 1
2	3 – 1
	1 – 1

$1920_{10} = 11110000000_2$

$1920_{10} = ?_8$

8	1920
8	240 – 0
8	30 – 0
	3 – 6

$1920 = 3600_8$

16	1920
16	120 – 0
	7 – 8

$= 1920_{10} = 780_{16}$

2) 255_{10}

2	255
2	127 – 1
2	63 – 1
2	31 – 1
2	15 – 1
2	7 – 1
2	3 – 1
2	1 – 1

$255_{10} = 11111111_2$

$255_{10} = ?_8$

8	255
8	31 – 7
	3 – 7

$255_{10} = 377_8$

$255_{10} = ?_{16}$

16	255	
	15 – 15	15 – F

$255_{10} = FF_{16}$

3) 126_{10}

2	126	
2	63	– 0
2	31	– 1
2	15	– 1
2	7	– 1
2	3	– 1
	1	– 1

$126_{10} = 1111110_2$

$126_{10} = ?_8$

8	126	
8	15	– 6
	1	– 7

$126_{10} = 176_8$

$126_{10} = ?_{16}$

16	126	
	7	– 14
	14	– F

$126_{10} = 7E_{16}$

4. Convert the given Binary number into its equivalent Decimal, Octal and Hexadecimal number.

1) 101110101 2) 1011010 3) 101011111

Ans. **1) 101110101**

Decimal Equivalent :

$= 1 \times 2^8 + \cancel{0 \times 2^7} + 1 \times 2^6 + 1 \times 2^5 + 1 \times 2^4 + \cancel{0 \times 2^3} + 1 \times 2^2 + \cancel{0 \times 2^1} + 1 \times 2^0$

$= 256 + 64 + 32 + 16 + 4 + 1 = 373_{10}$

Octal Equivalent :

$= \overline{101}\ \overline{110}\ \overline{101}$ → 5 6 5

$= 565_8$

Hexadecimal Equivalent :

$= \overline{10}\ \overline{1110}\ \overline{101}$ → 1 7 5

$= 175_{16}$;

$10110101_2 = 373_{10} = 565_8 = 175_{16}$

2) 1011010_2

Decimal Equivalent :

$= 1 \times 2^6 + \cancel{0 \times 2^5} + 1 \times 2^4 + 1 \times 2^3 + \cancel{0 \times 2^2} + 1 \times 2^1 + \cancel{0 \times 2^0}$

$= 64 + 16 + 8 + 2 = 90_{10}$

Octal Equivalent :

$= \overline{10}\ \overline{110}\ \overline{110}$ → 1 3 2

$= 132_8$

Hexadecimal Equivalent :

$= \overline{101}\ \overline{1010}$ → 5 10 → 5 A

$= 54_{16}$

$1011010_2 = 90_{10} = 132_8 = 5A_{16}$

3) 101011111

Decimal Equivalent :

$= 1 \times 2^8 + \cancel{0 \times 2^7} + 1 \times 2^6 + \cancel{0 \times 2^5} + 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$

$= 256 + 64 + 16 + 8 + 4 + 2 + 1 = 351_{10}$

Octal Equivalent :

$= \overline{101}\ \overline{011}\ \overline{111}$ → 5 3 7

$= 537_8$

Hexadecimal Equivalent :

$= \overline{10}\ \overline{101}\ \overline{1111}$ → 1 5 15 → 1 5 F

$= 15F_{16}$

$101011111_2 = 351_{10} = 537_8 = 15F_{16}$

5. Convert the following Octal numbers into Binary numbers. (A) 472 (B) 145 (C) 347 (D) 6247 (E) 645

Ans. **(A) 472_8**

4 7 2
↓ ↓ ↓
100 111 010

2	4	2	7	2	2
2	2 – 0	2	3 – 1	2	1 – 0
	1 – 0		1 – 1		

$472_8 = 100111010_2$

(B) 145

1 4 5
↓ ↓ ↓
1 100 101

2	4	2	5
2	2 – 0	2	2 – 1
	1 – 0		1 – 0

$145_8 = 1100101_2$

(C) 347_8

3 4 7
↓ ↓ ↓
11 100 111

2	3	2	4	2	7
2	1 – 1	2	2 – 0	2	3 – 1
	1 – 0		1 – 0		1 – 1

$347_8 = 11100111_2$

(D) 6247_8

6 2 4 7
↓ ↓ ↓ ↓
110 010 100 111

2	6
2	3 – 0
	1 – 1

$6247_8 = 110010100111_2$

(E) 645_8

6 4 5
↓ ↓ ↓
110 100 101

$645_8 = 110100101_2$

6. Convert the following Hexadecimal numbers to Binary numbers (A) A6 (B) BE (C) 9BC8 (D) BC9

Ans. **(A) $A6_{16}$**

A 6
↓ ↓
10 6
↓ ↓
1010 0110

A= 10

$A6_{16} = 10100110_2$

(B) BE_{16}

B E
↓ ↓
11 14
↓ ↓
1010 1110

B = 11 ; E = 14

$BE_{16} = 10111110_2$

(C) $9BC8_{16}$

9 B C 8
↓ ↓ ↓ ↓
9 11 12 8
↓ ↓ ↓ ↓
1001 1011 1100 1000

$9BC8_{16} = 1001101111001000_2$

D) $BC9_{16}$

B C 9
↓ ↓ ↓
11 12 9
↓ ↓ ↓
1011 1100 1001

$BC9_{16} = 101111001001_2$

7. Write the 1's complement number and 2's complement number for the following decimal numbers: (A) 22 (B) –13 (C) –65 (D) – 46

Ans. **(A) 22**

2	22	
2	11	– 0
2	5	– 1
2	2	– 1
	1	– 0

Binary equivalent of + 22 = 10110

8 bit format = 00010110

(B) – 13

2	13	
2	6	– 1
2	3	– 0
	1	– 1

Binary equivalent of + 13 = 1101
8 bit format = 00001101
1's complement = 11110010
Add 1 to LSB = +1
2's complement of –13 = 11110011

(C) – 65

2	65	
2	32	– 1
2	16	– 1
2	8	– 1
2	4	– 1
2	2	– 0
2	1	– 0

Binary equivalent of + 65 = 1000001
8 bit format = 01000001
1's complement = 10111110
Add 1 to LSB = +1
2's complement of –65 = 10111111

(D) – 46

2	46	
2	23	– 0
2	11	– 1
2	5	– 1
2	2	– 1
	1	– 0

Binary equivalent of + 46 = 101110
8 bit format = 00101110
1's complement = 1101000
Add 1 to LSB = +1
2's complement of –46 = 11010010

8. Perform the following binary computations:

(A) $10_{10} + 15_{10}$ (B) $-12_{10} + 5_{10}$

(C) $14_{10} - 12_{10}$ (D) $(-2_{10}) - (-6_{10})$.

Ans. **(A) $10_{10} + 15_{10}$**

Binary equivalent of 10 and 15
10_{10} = 00001010
15_{10} = 00001111
25_{10} = 00011001

(B) $-12_{10} + 5_{10}$

Binary addition of –12 and 5
12_{10} = 00001100
1's complement = 11110011
Add 1 to LSB = +1
2's complement = 11110100
-12_{10} = 11110100
5_{10} = 00000101
-7_{10} = 11111001

(C) $-14_{10} + 12_{10} = 14_{10} + (-12)_{10}$

12_{10} = 00001100
1's complement = 11110011
2's complement = 11110100
Binary addition of $14 - 12_{10}$
14_{10} = 00001110
-12_{10} = 00001100
2_{10} = 00000010

(D) $-(2_{10}) - (-6_{10}) = -2_{10} + 6_{10}$

(-2_{10}) :
8 bits = 00000010
1's complement = 11111101
= +1
2's complement = 11111110
–2 = 11111110
+ 6 = 00000110
+ 4 = 100000100

GOVERNMENT EXAM QUESTIONS AND ANSWERS

1 MARK

1. **How many bytes does 1 zetta byte contain.** *[Govt.MQP-2018]*

(a) 2^{90} (b) 2^{70} (c) 2^{30} (d) 2^{40}

[Ans. (b) 2^{70}]

2. **2^30 is referred as :** *[Mar. 2019]*

(a) Peta (b) Mega (c) Giga (d) Tera

[Ans. (c) Giga]

3. **2^50 is referred as** *[HY. 2019]*

(a) Kilo (b) Tera (c) Peta (d) Zetta

[Ans. (b) Tera]

4. **What is the 1's complement of 11011001?** *[Sep. 2020]*

(a) 00100110 (b) 11100110

(c) 11011000 (d) 11011111

[Ans. (a) 00100110]

2 MARKS

1. **Convert -21 to binary and write its 2's complement.**

Ans. $(-21)_{10}$ *[Govt.MQP-2018]*

2 | 21
2 | 10 – 1
2 | 5 – 0
2 | 2 – 1
1 – 0

Binary equivalent of + 21 = 10101_2

8 bit format = 00010101

1's complement = 11101010

Add the negative integer = +1

2's complement of – 21 = 111010110

2. **Convert the decimal 0.25 to binary.**

Ans. 0.25_{10} *[Govt.MQP-2018]*

$0.25 \times 2 = 0.5 = 0$

$0.5 \times 2 = 1 = 1$

Binary = 0.01_2.

3. **Convert $(41)_{10}$ into Binary Number.** *[QY. 2019]*

Ans.

2 | 41
2 | 20 – 1
2 | 10 – 0
2 | 5 – 0
2 | 2 – 1
1 – 0

$41_{10} = 101001_2$

3 MARKS

1. **(a) Add : $1101_2 + 1010_2$**

(b) Subtract : $10100_2 - 1111_2$ *[Mar. 2019]*

Ans.

(a) Add : $1101_2 + 1010_2$

$$\begin{array}{r} 1101 \\ 1010 \\ \hline 10111 \end{array}$$

Ans : 10111_2

(b) Subtract : $10100_2 - 1111_2$

$$\begin{array}{r} 10100 \\ 1111 \\ \hline 0101 \end{array}$$

Ans : 0101_2

2. **What is the decimal equivalent sequence for $(547)_8$ octal sequence?** *[March 2020]*

Ans. $(547)_8 = 5 \times 8^2 + 4 \times 8^1 + 7 \times 8^0$

$= 5 \times 64 + 4 \times 8 + 7 \times 1$

$= 320 + 32 + 7$

$= (359)_{10}$

5 MARKS

1. **Explain the following terms in detail. (1) ASCII (2) BCD (3) EBCDIC (4) Unicode (or) Discuss various encoding systems used for computers.** *[Govt.MQP-2018]*

Ans.

(i) ASCII: American Standard Code for Information Interchange (ASCII).

(ii) BCD : Binary Coded Decimal (BCD)

(iii) EBCDIC : Extended Binary Coded Decimal Interchange Code (EBCDIC)

(i) ASC11 : American Standard Code for Information Interchange (ASCII) is a 7-bit code, which means that only 128 (2^7) characters can be represented. This coding scheme with which it is possible to represent 256 characters. This 8-bit coding scheme is referred to as an

8-bit American standard code for information interchange. The symbolic representation of letter A using this scheme is $1000001_2(65_{10})$.

It is a character encoding standard developed several decades ago to provide a standard way for digital machines to encode characters. The ASCII code provides a mechanism for encoding alphabetic characters, numeric digits, and punctuation marks.

(ii) BCD : Binary Coded Decimal is a 4-bit code used to represent the numeric data alone. For example, a number like 9 can be represented using Binary Coded Decimal as 1001_2 . Binary Coded Decimal is mostly used in simple electronic devices like calculators and microwaves. This is because it makes it easier to process and display individual numbers on their Liquid Crystal Display (LCD) screens.

A Standard Binary Coded Decimal, an enhanced format of Binary Coded Decimal, is a 6-bit representation scheme which can represent non-numeric characters. This allows 64 characters to be represented.

(iii) EBCDIC : Extended Binary Coded Decimal Interchange Code (EBCDIC) is an 8-bit character-coding scheme used primarily on IBM computers. A total of 256 (28) characters can be coded using this scheme.

(iv) Unicode : This coding system is used in most of the modern computers. The popular coding scheme after ASCII is Unicode. ASCII can represent only 256 characters. Therefore English and European Languages alone can be handled by ASCII. This coding system is used in most of the modern computers.

2. Convert $(155)_{10}$ into Binary, Octal and Hexadecimal equivalent. *[Mar. 2019]*

Ans. (155_{10})

Binary :

2	155
2	77 – 1
2	38 – 1
2	19 – 0
2	9 – 1
2	4 – 1
2	2 – 0
	1 – 0

$(155)_{10} = (10011011)_2$

Binary :

8	155
8	16 – 3
	2 – 3

$(155)_{10} = (233)_8$

Hexadecimal :

16	155
	9 – 11

$(155)_{10} = (9b)_{16}$ $\quad \therefore 11 = b$

3. Convert the following Decimal numbers to Octal & Hexa decimal 511_{10} and 399_{10}. *[QY. 2019]*

Ans. (i) 511_{10}

$511_{10} = ()_8$

$5_{10} = 777_8$

8	511
8	63 – 7 ↑
	7 – 7

$511_{10} = ()_{16}$

$\boxed{15 = F}$

$511_{10} = 1FF$

16	511
16	31 – 15 ↑
	1 – 15

(ii) 399_{10}

$399_{10} = 617_8$

$399_{10} = 18F$

8	399
8	49 – 7 ↑
	6 – 1

16	399
16	24 – 15 ↑
	1 – 8

4. Convert $(98.42)_{10}$ to Binary. *[March 2020]*

Ans. 98.42_{10}

1. Integer part

2	98
2	49 – 0
2	24 – 1
2	12 – 0
2	6 – 0
2	3 – 0
	1 – 1

2. Fractional part

$0.42 \times 2 = 0.84 = 0$

$0.84 \times 2 = 1.68 = 1$

$0.68 \times 2 = 1.36 = 1$
$0.36 \times 2 = 0.72 = 0$
$0.72 \times 2 = 1.44 = 1$
$98.42_{10} = (1100010.01101....)_2$

ADDITIONAL QUESTIONS AND ANSWERS

CHOOSE THE CORRECT ANSWERS.

1 MARK

I. CHOSE THE CORECT OPTIONS FOR THE BELOW QUESTIONS.

1. **How the information entered in a computer?**
(a) Knowledge (b) data
(c) ASCII Value (d) BCD **[Ans. (b) data]**

2. **In a computer, a data is converted into**
(a) ASCII form (b) BCD form
(c) Binary form (d) Octal form
[Ans. (c) Binary form]

3. **Which establishment done convention using groups of 8 bits as a basic unit of storage medium?**
(a) Apple (b) Microsoft
(c) IBM (d) DELL
[Ans. (c) IBM]

4. **Which is considered as the basic unit of measuring the memory size in the computer?**
(a) Bit (b) Byte
(c) Nibble (d) Word
[Ans. (b) Byte]

5. **Which is used to measure the number of bits in each word?**
(a) Word length (b) length
(c) Size (d) word size
[Ans. (a) Word length]

6. **Who coined the term byte?**
(a) Charles Babbage (b) John von newmann
(c) Werner Buchholz (d) Herman Hollerith
[Ans. (c) Werner Buchholz]

7. **Which of the following is not a standard number system?**
(a) Pentagon (b) Hexadecimal
(c) Decimal (d) Binary
[Ans. (a) Pentagon]

8. **Expansion of MSB is**
(a) Most Sign Bit (b) Most Significant Bit
(c) Medium Signal Bit (d) Most Significant Byte
[Ans. (b) Most Significant Bit]

9. **Expansion of LSB is**
(a) Least Significant Byte (b) Least Sign Bit
(c) Least Significant Bit (d) Left Significant Bit
[Ans. (c) Least Significant Bit]

10. **How many parameters can be considered to know the magnitude of the number?**
(a) 2 (b) 4 (c) 3 (d) 5
[Ans. (c) 3]

11. **What are the two symbols used in Binary number system?**
(a) 0, 1 (b) +, – (c) 2, 4 (d) $2^0, 2^1$
[Ans. (a) 0, 1]

12. **How many unique symbols in Octal number system?**
(a) 4 (b) 16 (c) 2 (d) 8
[Ans. (d) 8]

13. **How many procedures are there to convert from decimal to binary?**
(a) 2 (b) 4 (c) 8 (d) 3
[Ans. (a) 2]

14. **How many ways are there to represent signed binary number?**
(a) 2 (b) 4 (c) 1 (d) 6
[Ans. (c) 1]

15. **In binary numbers, the signed negative number has a prefix?**
(a) – (b) 0 (c) 1 (d) 2
[Ans. (c) 1]

16. **Which term refers to a part which together with another makes up a whole?**
(a) Signed (b) Unsigned
(c) Complement (d) Uncomplement
[Ans. (c) Complement]

17. **Which complement performs the logical negation on each individual bit?**
(a) Signed (b) Unsigned
(c) 2's (d) 1's
[Ans. (b) Unsigned]

18. **How many common coding schemes are used to represent a character?**
(a) 2 (b) 3 (c) 4 (d) 5
[Ans. (c) 4]

19. **How many coding schemes are used to represent character in India?**
(a) 2 (b) 3 (c) 4 (d) 5
[Ans. (a) 2]

20. **Expansion of BCD is**
(a) Bar Code Decoding (b) Binary Code Digit
(c) Binary Coded Decimal
(d) Byte Coded Decimal
[Ans. (c) Binary Coded Decimal]

21. **Expansion of EBCDIC is**
(a) Extended Byte Code Decimal Information Code
(b) Extended Binary Coded Decimal Interchange Code
(c) Exchanged Binary Coded Decimal Interchange Code
(d) Exchanged Byte Code Decimal Information Code
[Ans. (b) Extended Binary Coded Decimal Interchange Code]

22. **Which of the following is not a common coding schemes to represent a character?**
(a) BCD (b) Unicode
(c) ASCII Code (d) Byte code
[Ans. (d) Byte code]

23. **Expansion of ISCII is**
(a) International Standard Code for Information Interchange
(b) International Standard Code for Interchange Information
(c) Indian Standard Code for Information Interchange
(d) Indian System Coding for Information Interchange
[Ans. (c) Indian Standard Code for Information Interchange]

24. **Expansion of TSCII is**
(a) Tamil Standard Code for Information Interchange
(b) Tamil Sanskrit Code for Information Interchange
(c) Tamil Script Code for Interchange Information
(d) Tamil System Code for Information Interchange
[Ans. (a) Tamil Standard Code for Information Interchange]

25. **Which coding scheme is used to LCD?**
(a) Unicode (b) ASCII
(c) EBCDIC (d) BCD **[Ans. (d) BCD]**

26. **Which of the following programs uses ASCII code?**
(a) only C (b) only C++
(c) both C, C++ (d) Java
[Ans. (c) both C, C++]

27. **Which of the programs used Unicode?**
(a) C (b) C++
(c) Java (d) None of these
[Ans. (c) Java]

28. **Sixteen raised to the power zero is equivalent to**
(a) 0 (b) 1 (c) 16 (d) 0 and 1
[Ans. (b) 1]

29. **In a hexadecimal number system 'B' represents the digit.**
(a) 11 (b) 12 (c) 14 (d) 13
[Ans. (a) 11]

30. **The hexadecimal equivalent of 1011 is**
(a) 14 (b) 15 (c) 11 (d) 12
[Ans. (c) 11]

31. **How many parameters are considered to find the magnitude of a number.**
(a) 3 (b) 4 (c) 2 (d) 5
[Ans. (a) 3]

32. **Which of the following is the idea behind positional numbering systems?**
(a) Absolute Value (b) Place Volume
(c) Radix (d) All of these
[Ans. (c) Radix]

II. Choose and fill in the blanks.

1. **Data means ..... .**
(a) a set of values (b) a set of information
(c) a set of records (d) a set of files
[Ans. (a) a set of values]

2. **A number system can be derived from a ..... .**
(a) bit (b) byte
(c) base or radix (d) nibble or word
[Ans. (c) base or radix]

3. **1 Byte = ... bits .**
(a) 8 (b) 16 (c) 1024 (d) 512
[Ans. (a) 8]

4. **The singular form of data is ..... .**
(a) Record (b) File
(c) Datum (d) Values
[Ans. (c) Datum]

5. **"75% of Men likes cricket" is ..... .**
(a) Information (b) data
(c) knowledge (d) Record
[Ans. (c) knowledge]

6. **The processed data is called ..... .**
(a) Information (b) Knowledge
(c) datum (d) files
[Ans. (a) Information]

7. **The most basic unit of information in a digital computer is called a ..... .**
(a) word (b) data
(c) nibble (d) bit **[Ans. (d) bit]**

8. **Expansion of BIT is ..... .**
(a) BASIC DIGITS
(b) BINARY DIGIT
(c) BINARY INFORMATION TECHNOLOGY
(d) BASE DIGIT
[Ans. (b) BINARY DIGIT]

9. **4 bits = ...**
(a) Bit (b) Byte
(c) Nibble (d) Word
[Ans. (c) Nibble]

10. **The number of bits a processor can read / write at a time is called ..... .**
(a) nibble (b) word
(c) byte (d) none of these
[Ans. (c) byte]

11. **A word can have a length of ..... .**
(a) 2,5,10 bits (b) 15,25,50 bits
(c) 16,32,64 bits (d) 64,128,255 bits
[Ans. (c) 16,32,64 bits]

12. **The Radix of Hexadecimal is ..... .**
(a) 6 (b) 10 (c) 16 (d) 8
[Ans. (c) 16]

13. **Which digit is not allowed in hexadecimal number system?**
(a) G (b) B (c) E (d) D
[Ans. (a) G]

14. **A Latin prefix Deci means ..... .**
(a) 2 (b) 8 (c) 16 (d) 10
[Ans. (d) 10]

15. **The base value of a number is also known as ..... .**
(a) length (b) radix
(c) data (d) Position
[Ans. (b) radix]

16. **Each binary digit weight is expressed as a power of ..... .**
(a) 1 (b) 0 (c) 0, 1 (d) 2
[Ans. (d) 2]

17. **The decimal value of 1010.01_2 is ..... .**
(a) 10.5 (b) 10.25
(c) 10.05 (d) 10.025
[Ans. (b) 10.25]

18. **The left most bit on the binary digit carries the largest weight is called ..... .**
(a) LSB (b) MSB
(c) Word (d) Byte **[Ans. (b) MSB]**

19. **The Right most bit on the binary digit carries the smallest weight is called ..... .**
(a) LSB (b) MSB (c) RMB (d) LMB
[Ans. (a) LSB]

20. **The most commonly used number system is .....**
(a) Binary (b) Hexademical
(c) Decimal (d) Octal
[Ans. (c) Decimal]

21. **Repeated division method is also known as .....**
(a) Expansion method (b) Divide by 2 method
(c) Double dabble method
(d) None of these **[Ans. (c) Double dabble method]**

22. **The decimal equivalent of 0.011_2 is ..... .**
(a) 0.6875 (b) 0.1875
(c) 0.1785 (d) 0.5
[Ans. (b) 0.1875]

23. **The 4 bit binary equivalent of –5 is ..... .**
(a) 1101 (b) 0101 (c) 1100 (d) –101
[Ans. (a) 1101]

24. **The most popular way of representing negative numbers in computer systems is ..... .**
(a) 1's complement (b) Signed bit
(c) 2's complement (d) All of these
[Ans. (c) 2's complement]

25. **BCD is ..... bit code**
(a) 16 (b) 8 (c) 4 (d) 2
[Ans. (c) 4]

26. **Enhanced BCD is ..... bit code.**
(a) 2 (b) 4 (c) 6 (d) 8
[Ans. (c) 6]

27. **EBCDIC primarily used in ..... computers.**
(a) IBM (b) APPLE
(c) PENTIUM (d) LAPTOP
[Ans. (a)IBM]

28. **EBCDIC uses ..... bit coding scheme.**
(a) 2 (b) 4 (c) 8 (d) 16
[Ans. (c) 8]

29. **The total number of characters coded using EBCDIC is ..... .**
(a) 32 (b) 64 (c) 128 (d) 256
[Ans. (d) 256]

30. **Unicode is a ..... bit code.**
(a) 8 (b) 4 (c) 16 (d) 32
[Ans. (c) 16]

31. **The Tamil alphabets have ..... .**
(a) soup (b) grantha
(c) numerals (d) All of these
[Ans. (d) All of these]

32. **The number of Tamil glyphs is about ..... .**
(a) 255 (b) 128 (c) 170 (d) 256
[Ans. (c) 170]

33. **ISCII has been used by ..... .**
(a) IBM (b) Apple
(c) Microsoft (d) IBM & Apple
[Ans. (d) IBM & Apple]

34. **TSCII is proposed by ..... .**
(a) IWG - TSC (b) Apple
(c) IBM (d) Microsoft
[Ans. (a) IWG - TSC]

35. **Entire Tamil alphabets handled by the coding schemes ..... .**
(a) EBCDIC (b) ASCII (c) ISCII (d) TSCII
[Ans. (d) TSCII]

36. **Binary Multiplication is possible with .....**
(a) 0 and 1 (b) 0 and 0
(c) 1 and 1 (d) All the above
[Ans. (d) All the above]

37. **The base of an octal number system is represented by .....**
(a) 2 (b) 8 (c) 7 (d) None
[Ans. (b) 8]

38. **To convert an hexadecimal number to trinary equivalent, each hexadecimal digit is expressed as .....**
(a) 3 bits form (b) 4 bits form
(c) 8 bits form (d) 2 bits form
[Ans. (b) 4 bits form]

39. **An octal number system uses the digits from .....**
(a) 0 to 8 (b) 1 to 8 (c) 0 to 7 (d) 1 to 7
[Ans. (c) 0 to 7]

40. **The binary equivalent of a hexadecimal digit C is repressed by .....**
(a) 1010 (b) 1011 (c) 1101 (d) 1100
[Ans. (d) 1100]

41. **The base value is also known as .....**
(a) Absolute (b) Place (c) Radix (d) System
[Ans. (c) Radix]

III. Match the following.

1.

i)	Binary Number System	1)	Base 16
ii)	Bexa Decimal Number System	2)	Base 8
iii)	Decimal Number System	3)	Base 2
iv)	Octal Number System	4)	Base 10

(a) 3,1,2,4 (b) 1,2,4,3 (c) 3,1,4,2 (d) 4,3,1,2

[Ans. (c) 3,1,4,2]

3.

i)	0 to 9 , A o F	1)	Binary
ii)	0, 1	2)	Hexadecimal
iii)	0 to 9	3)	Octal
iv)	0 to 7	4)	Decimal

(a) 2,1,4,3 (b) 2,1,3,4 (c) 3,4,1,2 (d) 4,3,1,2

[Ans. (c) 3,4,1,2]

IV. Pick the Odd one Out.

1. (a) Unicode (b) Decimal
(c) Octal (d) Hexadecimal

[Ans. (a) Unicode]

Reason : The popular coding scheme after ASCII is Unicode. Other three are different types of number systems.

V. Which one of the Following is Not Correctly Matched?

1. (a) Decimal base value – 10
(b) Binary base value – 4
(c) Octal base value – 8
(d) Hexadecimal base value – 16

[Ans. (b) Binary base value – 4]

VI. Consider the Following Statement.

1. **Assertion (A) :** Radix or base is the general idea behind positional numbering system.

Reason (R) : A hexadecimal number is represented using base 8.

(a) Both (A) and (R) are true and (R) is the correct explanation of A.
(b) Both (A) and (R) are true and (R) is not the correct explanation of A.
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

[Ans. (c) (A) is true, but (R) is false]

VII. Choose the Correct Statement.

1. **(i) The ASCII code equivalent to the uppercase letter 'A' is 65.**

(ii) The EBCDIC coding system is formulated by International Business Machine (IBM).

(iii) ISCII is a 8-bit coding system

(a) (i) is correct
(b) (ii) is correct
(c) (i) and (ii) are correct
(d) (i), (ii) and (iii) are correct

[Ans. (d) (i), (ii) and (iii) are correct]

VIII. Point out the Wrong Statement in the Following.

1. **(i) Decimal number system is the oldest and most popular number system used in our day to day life.**

(ii) Each octal digit has its own positional value or weight as a power of 10.

(iii) Hexadecimal or Hex numbers are used as a shorthand form of binary sequence.

(a) (ii) is wrong
(b) (i) and (ii) are wrong
(c) (i) and (iii) are wrong
(d) (i), (ii) and (iii) are wrong

[Ans. (a) (ii) is wrong]

Very Short Answers. 2 MARKS

1. List the types of information stored in a computer.

Ans. **(i)** Numbers **(ii)** Text
(iii) Graphics **(iv)** Animations
(v) Audio **(vi)** Video etc.

2. Name the four types of Number system.

Ans. **(i)** Decimal Number system
(ii) Binary Number system
(iii) Octal Number system
(iv) Hexadecimal Number system

3. Write the radix of Decimal, Binary, Octal, Hexadecimal Number systems.

Ans. The radix of Decimal is 10, Binary is 2, Octal is 8 and Hexadecimal is 16.

4. What is information?

Ans. Information is a set of processed data.

5. What is knowledge? Give example.

Ans. Knowledge is identified from the information.

Example : 10% of Men around the worlds likes football.

6. How the data classified based of their size?

Ans. Bits, Nibble, Bytes and Word.

7. What is bit?

Ans. The most basic unit of information in a digital computer is called a bit. A bit is a binary digit which can be 0, or 1.

8. What is byte?

Ans. Byte is a group of 8 bits which is used to represent a character. A byte is considered as the basic unit of measuring the memory size in the computer.

9. What is Nibble?

Ans. A nibble is half a byte, which is usually a grouping of 4 bits. Word is the number of bits a processor can bundle (read/write) at a time.

10. What is word length?

Ans. The term word length is used as the measure of the number of bits in each word. For example, a word can have a length of 16 bits, 32 bits and 64 bits.

11. What is a number system?

Ans. A number system is a set of digits used to represent the values derived from a common base or radix.

12. Why do we need Radix or Base for the number system?

Ans. Radix (or Base) is the general idea behind positional numbering systems. In the numbering system, any numeric value will be represented through increasing powers of a radix (or base).

13. Which parameters are used to determine the magnitude of a number or the value of each digit in a number?

Ans. **(i)** Absolute value
(ii) Place value or positional value
(iii) Base value

14. Convert $(128)_8 \rightarrow (?)_{10}$

Ans. $(128)_8$

$$(128)_8 = 1 \times 8^2 + 2 \times 8^1 + 8 \times 8^0$$
$$= 64 + 16 + 8$$
$$(128)_8 = 88_{10}$$

15. Which number system is called positional value system?

Ans. Decimal, octal, binary and hexadecimal number systems are called Positional value system.

16. Name the frequently used number system.

Ans. Decimal number system is the frequently used number system.

17. How many procedures for converting from decimal to binary?

Ans. **(i)** There are two procedures for converting from decimal to binary.

(ii) They are

- Expansion Method
- Repeated division by 2.

18. What is double dabble method?

Ans. The conversion of decimal number into the binary using Repeated-division method is called double dabble method.

19. Convert 101101_2 to its decimal equivalents using double dabble method.

Ans. The Left Most Bit (LSB) : 1

Multiply by 2, add next bit $(2 \times 1) + 0 = 2$

Multiply by 2, add next bit $(2 \times 0) + 1 = 5$

Multiply by 2, add next bit $(2 \times 5) + 1 = 11$

Multiply by 2, add next bit $(2 \times 11) + 0 = 22$

Multiply by 2, add next bit $(2 \times 22) + 1 = 45$

$(101101)_2 = 45_{10}$

20. How the binary number represented by signed and unsigned bit?

Ans. In binary, a negative number may be represented by prefixing a digit 1 to the number while a positive number may be represented by prefixing a digit 0.

21. Write the one's complement of 10102 and 1001012?

Ans. **(i)** One's complement of 1010_2 is 0101_2 (replace 1 by 0 and 0 by 1)

(ii) One's complement of 100101_2 is 011010_2

22. What is use of coding scheme?

Ans. The coding scheme is used to represent a character in the bits.

23. Expand EBCDIC and BCD.

Ans. (i) EBCDIC - Extended Binary Coded Decimal Interchange Code
(ii) BCD - Binary Coded Decimal

24. Expand ASCII and ISCII.

Ans. (i) ASCII - American Standard Code for Information Interchange.
(ii) ISCII - Indian Standard Code for Information Interchange.

25. What is BCD?

Ans. Binary Coded Decimal is a 4-bit code used to represent the numeric data alone.

26. What is Standard BCD?

Ans. A standard Binary Coded Decimal, an enhanced format of Binary Coded Decimal, is a 6-bit representation scheme which can represent non-numeric characters.

27. If a user types 256 (in Decimal) using BCD coding. What is the number stored in the memory of the computer?

Ans. The number stored as 001001010110.

28. What is EBCDIC?

Ans. Extended Binary Coded Decimal Interchange Code (EBCDIC) is an 8-bit character-coding scheme used primarily on IBM computers.

29. What is ASCII?

Ans. American Standard Code for Information Interchange (ASCII) is a 7-bit code, which means that only 128 (27) characters can be represented.

30. Name any four languages which supports ISCII.

Ans. (i) Devanagari (ii) Tamil
(iii) Telugu (iv) Kannada

31. What is TSCII?

Ans. Tamil Standard Code for Information Interchange is the Tamil encoding scheme designed to handle the entire Tamil alphabet. TSCII is proposed by Internet Working Group for the Tamil Standard Code (IWG-TSC).

32. What is sign bit?

Ans. The sign bit indicates the sign of a number and determines whether the numerical value is positive or negative.

33. What is Tamil glyphs?

Ans. Meaning in Tamil, Audio pronunciation, synonyms.

34. Convert 22.25_{10} to binary

Ans. Integer part

2	22	
2	11	– 0
2	5	– 1
2	2	– 1
	1	– 0

Fractional part

$0.25 \times 2 = 0.50$	0
$0.50 \times 2 = 1.00$	1

$= \mathbf{10110.01_2}$

35. Convert 1010100.011_2 to decimal number.

Ans. 1010100.0112

$= 1 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 0 \times 2^{-1} + 1 \times 2^{-2} + 1 \times 2^{-3}$

$= 64 + 0 + 16 + 0 + 4 + 0 + 0 + 0 + 0.25 + 0.125$

$= 84.325_{10}$

36. Convert 11011110101110_2 to hexadecimal

Ans. 11011110101110_2

Group in fours	$\overline{11}$	$\overline{0111}$	$\overline{1010}$	$\overline{1110}$
Convert each number	3	7	A	E

$= \mathbf{37AE_{16}}$

37. Convert $4A8C_{16}$ to binary

Ans.

Given	4	A	8	C
Convert each Digit	0100	1010	1000	1100

$= \mathbf{100101010001100_2}$

38. Convert $EB4A_{16}$ to decimal

Ans. $EB4A_{16} = 14 \times 16^3 + 11 \times 16^2 + 4 \times 16^1 + 10 \times 16^0$

$= 57344 + 2816 + 64 + 10$

$= \mathbf{60234_{10}}$

39. Convert 7295_{10} to hexadecimal.

Ans.

Successive Division		Remainders	Hex Notation
16	72905	9	9
16	4556	12	C
16	284	12	C
16	17	1	1
	1	1	1

$= \mathbf{9CC11_{16}}$

Short Answers. 3 MARKS

1. Why is the number conversion necessary?

Ans. The number conversion is necessary because the user enters the data into the computer in decimal form only and the computer is then expected to convert the decimal number to other number system which it understands.

2. $(101010)_2 \rightarrow (?_{10}) \rightarrow (?_{10})$

Ans. 101010_2

$= 0010 \quad 1010$

$= 2 \quad 10$

$= 2 \quad A$

$(101010)_2 = (2A)_{16}$

$(101010)_2 = (1 \times 2^5) + (0 \times 2^4) + (1 \times 2^3) + (0 \times 2^2) + (1 \times 2^1) + (0 \times 2^0)$

$= 32 + 0 + 8 + 0 + 2 + 0 = 42_{10}$

$(101010)_2 = (2A)_{16} = (42)_{10}$

3. $(300)_{10} \rightarrow (?_2) \rightarrow (?_8) \rightarrow (?)_{16}$

Ans.

2 | 300		8 | 300		16 | 300	
2 | 150	– 0	8 | 37	– 4	16 | 18	– 12
2 | 75	– 0	4	– 5	1	– 2
2 | 37	– 1				
2 | 18	– 1				
2 | 9	– 0				
2 | 4	– 1				
2 | 2	– 0				
1	– 0				

$(300)_{10} \rightarrow (100101100)_2 \rightarrow (454)_8 \rightarrow (12C)_{16}$

4. Perform the following expressions.

(i) $(FACE)_{16} = (?)_2$ (ii) $(C0FFEE)_{16} = (?)_2$

Ans. **(i)** $(FACE)_{16}$

F	A	C	E
↓	↓	↓	↓
1110	1111	1010	1110

$(FACE)_{10} = (1111101011001110)_2$

(ii) $(C0FFEE)_{16}$

C	0	F	F	E	E
↓	↓	↓	↓	↓	↓
1100	0000	1111	1111	1110	1110

$(C0FFEE)_{16} = (110000001111111111101110)_2$

5. Complete the following Octal numbers.
365, 366, 367, ... , ... , ...

Ans. $(365)_8$

$= 3 \times 8^2 + 6 \times 8^1 + 5 \times 8^0$

$= 192 + 48 + 5 = (245)_{10}$

$(366)_8 = 3 \times 8^2 + 6 \times 8^1 + 6 \times 8^0$

$= 192 + 48 + 6 = (246)_{10}$

$(367)_8 = 3 \times 8^2 + 6 \times 8^1 + 7 \times 8^0$

$= 192 + 42 + 6 = (247)_{10}$

In decimal form, the given sequence will be 245, 246, 247, 248, 249, 250. To complete the sequence of Octal number, we need to find the octal equal of 248, 249 and 250.

$(248)_{10} =$

8 | 248	
8 | 31 –	0
3	– 7

$(249)_{10} =$

8 | 249	
8 | 31 –	1
3	– 7

$(250)_{10} =$

8 | 250	
8 | 31 –	2
3	– 7

So the sequence is 365, 366, 367,370,371,372.

6. Describe the parameters are used to determine the value of each digit in a number.

Ans. **(i)** The absolute value is the magnitude of a digit in a number.

(ii) For example, the digit 5 in 7458 has an absolute value of 5 according to its value in the number line.

(iii) The place value of a digit in a number refers to the position of the digit in that number such as tens, hundreds, and thousands.

(iv) The total value of a number is the sum of the absolute value x place value of each digit that the number consists of.

(v) The base value of a number is also known as the radix, which depends on the type of the number systems that are being used.

(vi) The value of any number depends on the radix.

7. Write a note on Decimal Number system.

Ans. (i) The term Decimal is derived from a Latin prefix deci, which means ten.

(ii) The Decimal number system has ten digits ranging from 0-9.

(iii) Because this system has ten digits. It is also called as a base ten number system or denary number system.

(iv) Decimal number should always be written with a subscript 10.

8. Describe binary number system.

Ans. (i) Computers use binary number system for counting and arithmetic operations.

(ii) The number system has base 2 and it uses 2 digits 0 and 1.

(iii) A string which have any combination of these two digits is called binary number. It would be written as $(1001)_2$.

9. Describe Octal Number system.

Ans. (i) The octal number system is playing a vital role in digital computer work.

(ii) The octal number system has a base of 8. It means that it has eight unique symbols such as 0,1 ,2 ,3,4,5 ,6 and 7.

(iii) Thus, each digit of an octal number can have any value from 0 to 7.

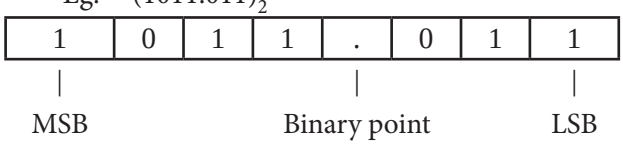
10. What is MSB, LSB and Binary point? Give example.

Ans. (i) MSB (Most Significant Bit) – The left most bit carries the largest weight and hence, is called the MSB.

(ii) LSB (Lease Significant Bit) – The right most bit carries the smallest weight and hence, is called the LSB.

(iii) Binary Point – It is used to separate the integer and fractional part of the binary number.

Eg. $(1011.011)_2$



11. Write a note on hexadecimal number system.

Ans. (i) The base or radix is 16. Thus it has 16 possible digit symbols. It uses the digits 0 to 9 plus the letters A, B, C, D, E and F (with respect to 10, 11, 12, 13, 14, 15).

(ii) It is generally used in micro computers.

Eg. $(ABC)_{16}$.

12. Write the three common ways of representing a signed binary number?

Ans. In computer technology, there are three common ways of representing a signed Binary number.

(i) Prefixing an extra sign bit to a Binary number.

(ii) Using one's complement.

(iii) Using two's complement.

13. What are the advantages of two's complement number?

Ans. The most popular way of representing negative numbers in computer systems is two's complement. The advantages of using this method are :

(i) There are no two ways of representing a zero as in the case with the above two methods.

(ii) Addition and subtraction can be performed effectively.

14. Write the steps to find 2's complement.

Ans. **Step 1 :** Find 1's complement (Replace 1 by 0 and 0 by 1

Step 2 : Add 1 to the 1's complement.

15. Find the answer for the following

(a) $1011_2 + 111_2$ (b) $100_2 + 1_2$

Ans. **(a) $1011_2 + 111_2$**

$$\begin{array}{r} 1011 \\ +\ 111 \\ \hline 10010_2 \end{array}$$

$1011_2 + 111_2 = 10010_2$

(b) $100_2 - 1_2$

$$\begin{array}{r} {\scriptstyle 0\ 1\ 2} \\ \not{1}\not{0}\not{0} \\ +\ \ -1 \\ \hline 011 \end{array}$$

$100_2 - 1_2 = 011_2$

16. Write the common coding schemes.

Ans. The common coding schemes are:

(i) Binary Coded Decimal (BCD),

(ii) Extended Binary Coded Decimal Interchange Code (EBCDIC) and
(iii) American Standard Code for Information Interchange (ASCII).
(iv) Unicode

17. What is use of BCD?

Ans. (i) Binary Coded Decimal is mostly used in simple electronic devices like calculators and microwaves.
(ii) This is because it makes it easier to process and display individual numbers on their Liquid Crystal Display (LCD) screens.

18. What negative value does 1001 1011 represent?

Ans. The 2's complement fo 10011011 is 01101010 This represents a 101_{10}.
Therefore $10011011_2 = -101_{10}$

19. Convert $B2F_{16}$ to octal.

Ans. B2F16 = 1011 0010 1111 (Convert to binary)
= 101 100 101 111 (Group bits by 3s)
= 5457_8 (Convert to octal)

20. Add the binary numbers 110101_2 and 101111_2

Ans.
$$\begin{array}{rr} & 1\,1\,0\,1\,0\,1 \\ + & 1\,0\,1\,1\,1\,1 \\ \hline & 1\,1\,0\,0\,1\,0\,0 \end{array}$$

21. Subtract 101111 from 110101

Ans.
$$\begin{array}{rr} & 1\,1\,0\,1\,0\,1 \\ - & 1\,0\,1\,1\,1\,1 \\ \hline & 0\,0\,0\,1\,1\,0 \end{array}$$

22. Multiply 111 with 101

Ans.
$$\begin{array}{r} 1\,1 \times 1\,0\,1 \\ \hline 1\,1\,1 \\ 0\,0\,0 \\ 1\,1\,1 \\ \hline 1\,0\,0\,0\,1\,1 \end{array}$$

23. Divide 11110 by 110

Ans.
$$\begin{array}{r|l} & 1\,0\,1 \\ \hline 1\,0\,1 & 1\,1\,1\,1\,0 \\ & 1\,1\,0 \\ \hline & 1\,1\,0 \\ & 1\,1\,0 \\ \hline & 0 \end{array}$$

24. Complete the sequence of following binary numbers :
100, 101, 110, _____, _____, _____, _____

Ans. 100, 101, 110, 111, 1000, 1001, 1010

25. Complete the sequence of following octal numbers:
525, 526, 527,_____, _____, _____

Ans. 525, 526, 527, 530, 531, 532

26. Add $71A3_{16} + 142B_{16}$

Ans.
7 1 A 3 — 3 + B = 3 + 11 = 14 = E
= 1 4 2 B — A + 2 = 10 + 2 = 12 = C
8 5 C E

27. Complete the table.
1. 0 + _____ = 0
2. _____ + 0 = 1
3. 1 + 1 = _____
4. 0 + 1 = _____

Ans. 1. 0 2. 1 3. 1 4. 1

28. Complete the table.
1. 0 – 0 = _____
2. _____ – 0 = 1
3. 1 – 1 = _____
4. 0 – 1 = _____

Ans. 1. 0 2. 1 3. 0 4. 1

29. Complete the table.
1. 0 × 0 = _____
2. 1 × 1 = _____
3. 1 × _____ = 0
4. _____ × 0 = 0

Ans. 1. 0 2. 1 3. 0 4. 0

30. Complete the table.
1. 0 ÷ _____ = 0
2. 0 ÷ 1 = _____
3. 1 ÷ _____ = 1
4. 0 ÷ 1 = _____

Ans. 1. 0 2. 0 3. 1 4. Infinite

31. Answer the following.
1. A real number consists of _____ part and _____ part
2. 1's complement of 110012 = _____
3. ASC16 stands for _____
4. 4793 = 0.4793 × _____

Ans. 1. Integral and Fraction

2. 00110_2
3. American standard code for information interchange
4. 10^4

32. Answer the following.

1. **In a decimal to binary conversion, the first remainder is known as _____ and last remainder is _____.**
2. **The binary system consists of _____ and _____.**
3. **The hexadecimal number system uses the digits from _____ and _____.**
4. **2° = _____**

Ans. 1. LSB and MSB 2. 0 and 1
3. 0 and F 4. 1

33. Name the different types of operations that can be performed in Binary arithmetics.

Ans. 1. Addition 3. Multiplication
2. Subtraction 4. Division

34. How will you convert decimal number into Octal number?

Ans. The Conversion of a decimal number to an octal number can be performed by successively dividing number by 8 and collect the remainder from top to bottom. The remainders also must be taken in octal.

35. How will you convert decimal number into hexadecimal number?

Ans. The conversion of the given decimal number into a hexadecimal number requires the application of hex-dabble method which is similar to the double-dabble method with the exception that one has to successively divide the given number by 16 instead of 2.

36. Illustrate with an example how binary fraction converted into decimal.

Ans. To find the decimal equivalent of binary fraction, take the sum of the product of each digit value (0 to 1) and its positional value. To illustrate:

2^{-1}	2^{-2}	2^{-3}	2^{-4}
0	1	0	1

$= (0\times2^{-1}) + (1\times2^{-2}) + (0\times2^{-3}) + (1\times2^{-4})$

$= 0 + 0.25 + 0 + 0.0625$

$= 0.375$

Long Answers. 5 MARKS

1. Explain Unicode.

Ans.
(i) Unicode is the newest concept in digital coding. In Unicode, every number has a unique character.

(ii) Unicode is the universal character encoding standard used for representation of text for computer processing.

(iii) It can be used to store and process all significant current and past languages. Unicode provides a unique hex encoded number for every character.

(iv) Unicode is a 16 bit code, which allows for about 65,000 different representations. This is enough to encode the popular Asian languages (Chinese, Korean, Japanese, etc.).

(v) It also turns out that ASCII codes are preserved. Therefore, conversion between ASCII and Unicode is a simple method (take all one byte ASCII codes and zero-extend them to 16 bits).

(vi) This will be the Unicode version of the ASCII characters.

(vii) The C, C++ programs use the ASCII Code, and Java programs have already used Unicode.

(viii) The Unicode Standard has been adopted by industry leaders such as Apple, HP, IBM, Microsoft, Oracle, SAP, Sun, Sybase, and Unisys.

(ix) Unicode is required by web users and modern standards.

2. Write the steps for converting Decimal to Binary numbers.

Ans. **Steps for Decimal to Binary Conversion.**

Step 1: Divide the decimal number which is to be converted by two which is the base of the binary number.

Step 2: The remainder which is obtained from step 1 is the least significant bit of the new binary number.

Step 3: Divide the quotient which is obtained from the step 2 and the remainder obtained from this is the second least significant bit of the binary number.

Step 4: Repeat the process until the quotient becomes zero.

Step 5: The last remainder obtained from the division is the most significant bit of the binary number. Hence, arrange the number from the most significant bit to the least significant bit (i.e., from bottom to top).

3. Suppose a number system has been designed with radix 10 with symbols (ordered from small to large) A, B, C, D, G, H, I, L, M, N. Convert the following number to equivalent hexadecimal number; $(INDIAN)_{10}$.

Ans. A, B, C, D, G, H, I, L, M, N are presents 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 respectively of decimal number system (base 10) so, $(INDIAN)_{10} = (693609)_{10}$

To find its hexadecimal equivalent.

16	693609	
16	43350	– 9
16	2709	– 6
16	169	– 5
	10	– 9

Thus $(INDIAN)_{10} = (693609)_{10} = (A9569)_{16}$

4. What is number system? Describe different number systems in detail.

Ans. A number system is a set of digits used to represent the values derived from a common base or radix.

Decimal Number System :

(i) The term Decimal is derived from a Latin prefix deci, which means ten.

(ii) The Decimal number system has ten digits ranging from 0-9. Because this system has ten digits.

(iii) It is also called as a base ten number system or denary number system.

(iv) Decimal number should always be written with a subscript 10.

Binary Number System :

(i) The decimal number system is not convenient to implement in digital system.

(ii) For instance, it is very difficult to design electronic equipment so that it can work with 10 different voltage levels (each one representing one decimal character, 0 through 9).

(iii) On other hand, it is very easy to design simple, accurate electronic circuits that operate with only 2 voltage levels.

(iv) For this reason, almost every digital system utilizes the binary number system (base 2) as the basic number system of its operation;

(v) In a binary system, there are only two symbols or possible digit values, 0 and 1.

Octal Number System :

(i) The octal number system is playing a vital role in digital computer work.

(ii) The octal number system has a base of 8.

(iii) It means that it has eight unique symbols such as 0,1 ,2 ,3,4,5 ,6 and 7.

(iv) Thus, each digit of an octal number can have any value from 0 to 7.

(v) The places to the left of the octal point are positive powers of 8 and places to the right are negative powers of 8.

Hexademical Number System :

(i) The hexadecimal system uses base 16 in digital systems.

(ii) It has 16 possible symbols.

(iii) It uses the digits 0 through 9 plus the letters A, B, C, D, E and F as the 16 different symbols.

(iv) Hexadecimal System is a positional value system, wherein each hexadecimal digit has its own value or weight expressed as a power of 16.

5. Explain the following terms in detail.
(1) ISCII (2) TSCII

Ans. **1. ISCII. (Indian Script Code for Information Interchange)**

(i) In order to encode Indian languages on computers, a common standard for coding Indian scripts is developed which is called as ISCII. In 1991, the Bureau of Indian Standards adopted the Indian Standard Code for Information Interchange (ISCII).

(ii) ISCII standard is evolved by a standardization committee during 1986-88. The ISCII document is available as IS13194:1991 from the BIS offices.

(iii) Assamese, Bengali (Bangla), Devanagari, Gujarati, Gurumukhi, Kannada, Malayalam, Oriya, Tamil, and Telugu are supported in ISCII. ISCII has been used by IBM for PC-DOS, Apple for ILK, and several companies are developing products and solutions based on this representation.

2. TSCII. (Tamil Standard Code for Information Interchange)

(i) Tamil Standard Code for Information Interchange is the Tamil encoding scheme designed to handle the entire Tamil alphabet. TSCII is proposed by Internet Working Group for the Tamil Standard Code (IWG-TSC).

(ii) The Tamil alphabets have soup (247), grantha characters (13) and the Tamil numerals (13). The number of unique Tamil glyphs to consider is about 170. Since the number of slots available in upper-ASCII segment (#128-255) is much less than the required slot for each character in Tamil.

(iii) Therefore, few Tamil alphabets are to be included in the native form, and the others are generated using modifiers (several keystrokes in sequence).

6. Convert the following.

a. $(101.10)_{16} \rightarrow (?_2) = (?)_{10}$ **b.** $(3648)_8 \rightarrow (?_2) = (?)_{10}$ **c.** $(101011001)_2 \rightarrow (?_{16}) = (?)_8$

Ans. **(a)** $(101.10)_{16} \rightarrow (?_2) = (?)_{10}$

$(101.10)_{16}$ in binary form

$= 1 \quad 0 \quad 1 \quad . \quad 1 \quad 0$

$0001 \quad 0000 \quad 0001 \quad . \quad 0001 \quad 0000$

$(101.10)_2 = (000100000001.00010000)_2$

$(101.10)_{16}$ in decimal form

$(101.10)_2 = 1 \times 16^2 + 0 \times 16^1 + 1 \times 16^0 + 1 \times 16^{-1} + 0 \times 16^{-2}$

$= 256 + 0 + 1 + 0.0625 + 0 = (275.0625)_{10}$

Thus $(101.10)_{16}$ 1 = $(257.0625)_{10}$ $(0000100000001.00010000)_2$

(b) $(3674)_8 \rightarrow (?_2) = (?)_{10}$

$(3674)_8$ in binary from

$3 \quad 6 \quad 7 \quad 4$

$011 \quad 110 \quad 111 \quad 100$

$(3674)_8 = (011110111100)_2$

$(3674)_8$ in decimal form

$(3674)_8 = 3 \times 8^3 + 6 \times 8^2 + 7 \times 8^1 + 4 \times 8^0$

$= 1536 + 384 + 56 + 4 = (1980)_{10}$

Thus $(3674)_8 \rightarrow (011110111100)_2 = (1980)_{10}$

(c) $(101011001)_2 \rightarrow (?_{16}) = (?)_8$

$(101011001)_2$ in hexadecimal form

$= 1 \quad \overline{0101} \quad \overline{1001}$

$(101011001)_2 = (159)_{16}$

$(101011001)_2 = (159)_{16}$

$(101011001)_2$ Octal form

$101 \quad 011 \quad 001$

$\downarrow \quad \downarrow \quad \downarrow$

$5 \quad 3 \quad 1$

$(101011001)_2 = (531)_8$

Thus $(101011001)_2 \rightarrow (159)_{16} = (531)_8$

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