Q1) Explain the types of computers in detail.

Computers are classified based on size, processing power, and application area.

1. Micro Computers

• Smallest type
• Single-user system
• Portable or desktop
• Used for education, office work, entertainment
Example → PC, Laptop

2. Mini Computers

• Multi-user system
• Supports multitasking
• Used in small businesses and organizations

3. Mainframe Computers

• High performance machine
• Supports hundreds or thousands of users
• Used in banking, railway ticketing, telecom billing
Features → High input/output (I/O) speed and huge data handling

4. Super Computers

• Most powerful and fastest computers
• Used in scientific research, nuclear simulation, weather prediction, space science

Q2) Explain functional units of computer with block diagram.

A computer system performs input, processing, storage and output operations using major units.

1. Input Unit

• Accepts data and instructions
• Converts user input into binary form
Examples: Keyboard, mouse, scanner

2. Output Unit

• Displays processed results
Examples: Monitor, printer, speaker

3. Memory Unit

Stores data temporarily and permanently
Two types:
• Primary (RAM, ROM)
• Secondary (HDD/SSD)

4. CPU – Central Processing Unit

CPU is the brain of computer and contains:

Arithmetic Logic Unit (ALU)
• Performs arithmetic operations (add, subtract)
• Performs logical comparisons (AND, OR, compare)

Control Unit (CU)
• Fetches instructions
• Decodes and directs execution
• Controls all components

Block Diagram (draw in exam):

INPUT → CPU (ALU + CU) → MEMORY → OUTPUT

Q3) Explain Bus Structure of Computer System.

A **bus** is a group of wires used for communication between computer components.

There are three main types of buses:

1. Data Bus

• Transfers actual data between CPU, memory and I/O devices
• Bi-directional

2. Address Bus

• Used to identify memory locations
• Carries memory address
• Uni-directional

3. Control Bus

• Carries control signals
• Manages read/write commands, timing and coordination

Importance of Bus

• Enables smooth communication
• Directly affects system performance

Q4) Explain factors affecting computer performance.

Computer performance depends on:

1. CPU Clock Speed

Higher speed → faster execution

2. Memory Capacity

More RAM → better performance

3. Cache Memory

Fast memory between CPU and RAM
More cache → higher speed

4. Bus Speed and Width

Wider & faster buses = faster communication

5. I/O System Performance

Slow disk or network → overall performance decreases

6. Operating System & Software Efficiency

Optimized OS and programs improve system speed

Q5) Explain Fixed-Point and Floating-Point Number Representation.

Computers represent numbers in binary form.

Fixed-Point Representation

• Used for **integer values**
• Decimal or binary point at fixed position
• Fast calculations
Example:
Binary 00011010 = Decimal 26

Floating-Point Representation

• Used for **fractional/real values**
• Uses scientific notation

Format:

Number = Mantissa × Base^Exponent

Example:
1.101×2^3

Difference Table

Fixed Point	Floating Point
Integer only	Fractional numbers
Fast	slower
Limited range	wide range
Less storage	more storage

Q6) Explain Error Detection Codes with example.

During data transmission, errors may occur.
Error detection codes help check whether data received is correct.

Parity Bit Method

• A **parity bit** is added to maintain either:

➡ Even parity (total 1s even)

➡ Odd parity (total 1s odd)

Example:
Message = 1011
(no. of 1's = 3)
Even parity bit = 1
Result = **10111** (four 1s)

Used in memory checking, networking, communication.

Q7) Explain Basic Operational Concepts of Computer.

Computers follow a systematic working:

1. **Input** — data entered
2. **Processing** — executed by CPU
3. **Output** — results displayed
4. **Storage** — output saved for future use

This complete sequence is **IPO cycle**.

Q8) Explain Data Representation inside computer.

Computers represent data using binary code.

Binary used to store:

✔ characters (ASCII, Unicode)

✔ numbers

✔ symbols

Example:
Character 'A' = 65 decimal = 01000001 binary

Q9) Explain Multiprocessor & Multi computer.

✔ **Multiprocessor System:**

Single computer with multiple CPUs

• Faster execution

• Parallel processing

✔ **Multi computer System:**

Multiple computers connected together

• Distributed computing

• Used in networks and cloud systems

Q10) Explain Floating-Point Representation with diagrammatic explanation.

Floating point format consists of 3 parts:

Sign Bit | Exponent | Mantissa

Example: $+1.101 \times 2^3$

This increases number range and precision.

Unit-2 Short Answers (2–3 Marks)

Full form of CPU → Central Processing Unit

What is ALU? → Arithmetic Logic Unit

What is Control Unit? → Unit that controls execution

What is bus? → Data transmission path

What is parity bit? → Bit added to detect error

Unit-2 MCQ Quick Answers

Which bus carries data? → Data bus

Fastest computer type? → Supercomputer

CPU consists of? → ALU + Control Unit

ASCII represents? → Characters