

FUNDAMENTALS OF COMPUTER

BRANCH: - CSE

SEMESTER – FIRST

These important questions have been prepared using your previous exam papers (PYQs), verified concepts, and additional reference from trusted online academic sources. For deeper understanding, please refer to your class notes as well.

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1 HIGH & LONG IMPORTANT QUESTIONS

UNIT 1: BASICS OF LOGIC DESIGN

1. Number System Conversion & Arithmetic:

- Explain the characteristics of Binary, Octal, Decimal, and Hexadecimal number systems. **Convert** the following:
 - $(125.625)_{10}$ to Binary and Hexadecimal.
 - $(FA)_{16}$ to Octal.
 - $(457)_8$ to Binary and Decimal.
- Perform the following subtraction using **2's complement** method:
 - $(110101)_2 - (10111)_2$

2. Boolean Algebra & Logic Simplification:

- State and prove **De-Morgan's Theorems**. Explain the **Boolean Laws** (Distributive, Associative, Commutative, etc.).
- Simplify the following Boolean expression using Boolean algebra rules:

$$F(A, B, C) = AB + A(B+C) + B(B+C)$$

3. Logic Gates:

- With the help of a **truth table** and **circuit diagram**, explain the working of **NAND** and **NOR** gates. Why are they called **Universal Gates**?

UNIT 2: LOGIC CIRCUITS

4. **Combinational Circuits (Adders):**

- Design and explain the working of a **Full Adder** circuit. Draw the logic diagram and write the truth table. How does it differ from a Half Adder?

5. **Combinational Circuits (MUX/DEMUX):**

- Explain the operation of a **4:1 Multiplexer (MUX)**. Draw its block diagram and logic circuit. State at least two applications of a Multiplexer.
- Describe the working of a **3-to-8 Decoder**.

6. **Sequential Circuits (Flip-Flops):**

- Explain the working of a **Master-Slave JK Flip-Flop** with a neat circuit diagram and truth table. Why is the Master-Slave configuration necessary?

7. **Sequential Circuits (Registers & Counters):**

- What is a **Shift Register**? Explain the operation of a **4-bit PISO (Parallel-In Serial-Out)** or **SISO (Serial-In Serial-Out)** shift register with a diagram.

UNIT 3 & 4: COMPUTER CONCEPTS & ORGANIZATION

8. **Functional Units & Stored Program Concept:**

- Draw and explain the **functional block diagram of a general computer system**. Describe the role of the **ALU, Control Unit (CU), and Memory Unit** in detail.
- What is the **Stored Program Concept**?

9. **Memory Hierarchy & Types:**

- Explain the concept of **Memory Hierarchy** in a computer system. Describe the characteristics of **Cache Memory, Main Memory (RAM/ROM)**, and **Auxiliary Memory**.

2 IMPORTANT & SHORT QUESTIONS

UNIT 1: BASICS OF LOGIC DESIGN

10. Codes:

- Differentiate between **BCD** and **ASCII** codes. Write the advantages of **Gray Code**.

11. Complements:

- Explain the use of 1's complement and 2's complement in binary arithmetic.

12. Boolean Rules:

- State the basic **Boolean algebra rules** (Identity, Idempotent, Involution, Absorption).

UNIT 2: LOGIC CIRCUITS

13. Comparison:

- Differentiate clearly between **Combinational Circuits** and **Sequential Circuits**.

14. Flip-Flops/Counters:

- Explain the difference between a **Synchronous Counter** and an **Asynchronous (Ripple) Counter**.
- Draw the logic diagram and truth table for a **SR Flip-Flop**.

UNIT 3: INTRODUCTION TO COMPUTER CONCEPTS

15. Classification & Generation:

- Explain the **Generations of Computers** based on the technology used. (Abstract description required).
- Briefly classify computers based on **size and capacity** (Micro, Mini, Mainframe, Super).

16. Software Types:

- Differentiate between **System Software** and **Application Software**. Give examples.
- What is the difference between **Open Source** and **Proprietary Software**?

17. **Security:**

- List and briefly explain any four **types of computer threats** (e.g., Virus, Worm, Trojan Horse, Phishing).

UNIT 4: INTRODUCTION TO COMPUTER ORGANIZATION & OS

18. **Firmware:**

- Explain the function of **BIOS** and **UEFI**. How is UEFI an improvement over BIOS?

19. **OS Concepts:**

- List and briefly explain any four essential **Services of an Operating System (OS)**.
- Differentiate between **Multitasking OS** and **Multiprocessing OS**.

UNIT 5: INTRODUCTION TO COMPUTER PROGRAMMING

20. **Basics:**

- Define **Algorithm** and **Flowchart**. What are the advantages of using a flowchart?

3 ***“AA BHI SAKTA HAI” QUESTIONS (Low probability but smart picks)***

These questions cover specific, often overlooked, but high-value topics, or newer concepts that might be used to slightly vary the paper.

21. **Unit 3: Data Processing:**

- Briefly explain the concepts of **Real-time Processing** and **Time-sharing Processing**.

22. **Unit 3: Peripherals:**

- Explain the basic working principle of a **Laser Printer**.

23. **Unit 4: Architecture:**

- Briefly explain **Flynn's Classification of Computers** (mention SISD, SIMD, MISD, MIMD).

24. **Unit 5: Programming Application:**

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- Write an **Algorithm** and draw a **Flowchart** to find the **largest of three numbers**.

25. Unit 5: Programming Languages:

- Briefly describe the key characteristics of **High-Level Languages (3GL)** and **Natural Languages (5GL)**.

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