IAE Important questions

Part A

1. Define the term Computer Architecture.
2. If a computer A runs a program in 15 seconds and computer B runs the same in 20 seconds, how much faster is A than B?
3. Surmise the need of Big-endian and Little-Endian format.
4. Define Bus and List its types.
5. Define fast adder.
6. State the overflow conditions in arithmetic operations.
7. Give two examples of memory operations in a computer system and explain its purpose.
8. Explain the role of a bus structure in data transfer within a computer system.
9. How do memory addresses facilitate the identification and manipulation of data in computer memory?
10. How do fast adders improve the speed of addition operations?
11. Explain the role of floating-point operations in scientific simulations and numerical computations.
12. Define carry propagation delay.
13. Perform the 2's complement subtraction of smaller number (101011) from larger number (111001).
14. State the overflow conditions in arithmetic operations.

Part B

1. (i) Explain the functional units of computer with neat diagram.
   (ii) Elaborate the basic operational concepts of computers.
2. Summarize the various addressing modes with suitable diagrams.
3. Analyze the concept of a bus in computer architecture and discuss its impact on the performance of a computer system. Illustrate your answer with example.
4. Describe the concept of instruction-level sequencing in computer architecture with example and discuss its role in the execution of instructions.
5. Explain addition and subtraction of signed numbers with examples.
6. Elucidate the design of fast adder with neat diagram.

PART C - (1 X 14 = 14 Marks)

1. Explain the concept of arithmetic operations in computer architecture and discuss their significance in computer systems. Provide examples to illustrate your answer.

2. Our favourite program runs in 10 seconds on computer A, which has a 2GHz clock. We are trying to help a computer designer build a computer B, which will run this program in 6 seconds. The designer has determined that a substantial increase in the clock rate is possible, but this increase will affect the rest of the CPU design, causing computer B to require 1.2 times as many clock cycle as computer A for this program. What clock rate should we tell the designer to target?

3. Consider the following case study: A software development company is working on a project that requires optimizing a critical section of code in assembly language. The code is performance-sensitive and needs to execute as quickly as possible. Evaluate the benefits, challenges, and impact of using assembly language for this project. Discuss the role of assembly language in system performance, code optimization, and hardware interaction. Provide examples and comparisons to support your answer.