

- 1) Define Cloud Computing? Explain its characteristics and benefits.
- 2) What are the types of VM architectures, and how do they help in making computing easier?
- 3) Explain Xen Architecture in detail.
- 4) What is the difference between LAN, SAN, and NAS, and how has Ethernet speed improved networking for distributed computing?
- 5) Explain GPU Programming Model.
- 6) What is scalable computing over the Internet, and how does it use technologies like IoT and cloud computing?
- 7) Explain Cluster Architecture in detail.
- 8) What is Virtualization? Explain full virtualization
- 9) List and explain the implementation levels of Virtualization.
- 10) What are various primitive VM operations in distributed computing environment.
- 11) Illustrate the differences between Full Virtualization and host-based virtualization.
- 12) Consider a program P where 25% will be executed sequentially and remaining parallelly. Calculate the speedup and efficiency considering fixed workload.

Ans:

Steps:

1. **Sequential Fraction (S):** The fraction of the program that must be executed sequentially.
 - o Here, $S = 0.25$ (25%).
2. **Parallelizable Fraction (P):** The fraction that can be executed in parallel.
 - o $P = 1 - S = 0.75$ (75%).
3. **Speedup (Amdahl's Law):** Speedup is calculated as:

$$\text{Speedup} = 1/(S+P/N)$$

Where:

- SS = Sequential fraction (25% or 0.25),
- PP = Parallel fraction (75% or 0.75),
- NN = Number of processors (assuming all parallel workload is evenly divided across NN).

4. **Efficiency:** Efficiency is calculated as:

$$\text{Efficiency} = \text{Speedup}/N$$

Example Calculation:

Let's calculate with **N = 4 processors** (you can substitute other values for NN):

1. **Speedup:**

$$\text{Speedup} = 1/(0.25 + 0.75/4) = 1/(0.25 + 0.1875) = 1/0.4375 \approx 2.286$$

- 13) How does OS-level virtualization enhance hardware-level virtualization, and what are its benefits for cloud computing?