

**Ans 1** Modern computer system continue to rely heavily on operating system (OS) because hardware alone does not efficiently manage the complexity of resource sharing, user interaction, and system stability. An OS acts as an intermediary between hardware and users, providing essential abstraction and services that simplify programming and enhance system performance.

- **Process Management** – The OS abstracts the CPU as processes by threads, managing their creation, execution, synchronization, and termination. It enables multitasking by scheduling processes, ensuring fair CPU allocation and suspending/renaming processes.
- **Memory Management** – The OS provides abstractions such as virtual memory, enabling processes to use an address space isolated from physical memory. It manages allocation, protection, and swapping, optimizing memory utilization.
- **I/O Management** – The OS hides hardware device complexities using device drivers and provides a uniform interface for input and output operations. It handles buffering, caching, and spooling to improve efficiency.

- **Message Management** – The OS like building three common types are block or layers. Three common types are monolithic, layered and microkernel OS.