1. What is Hyper-V and what is its primary function?

Hyper-V is a **virtualization platform** developed by Microsoft that allows users to create and manage virtual machines (VMs) on a physical server. Its primary functions include:

- **Running Multiple OS:** Enables multiple operating systems to run simultaneously on the same hardware.
- **Resource Optimization:** Improves resource utilization by sharing hardware among virtual machines.
- **Isolation:** Ensures each VM operates independently, improving security.
- **Backup and Recovery:** Facilitates easy backup, restoration, and migration of VMs.

2. Types of Virtual Network Switches in Hyper-V and When to Use Them

Switch Type	Description	Use Case
External	Connects VMs to the physical network, allowing them to access the internet and communicate with external devices.	Suitable for VMs that require full network connectivity.
Internal	Allows communication between VMs on the same host and the host machine itself. No external network access.	Best for testing and isolated networking within the host.
Private	Enables communication only between VMs on the same host. No communication with the host or external network.	Ideal for completely isolated VM environments.

3. Practice Virtualization with Hyper-V Practicing virtualization with Hyper-V involves several steps to ensure proper deployment and functionality:

1. **Install Hyper-V:**
   - Go to **Control Panel → Programs → Turn Windows features on or off**.
   - Select **Hyper-V** and enable the necessary services (Hyper-V Management Tools and Hyper-V Platform).
   - Restart the system to apply changes.
2. **Create a Virtual Machine (VM):**
   - Open **Hyper-V Manager**.
   - Select **New → Virtual Machine** and follow the wizard.
   - Assign memory, storage, and network configurations based on your requirements.
3. **Configure Virtual Network Switches:**
   - In **Hyper-V Manager**, go to **Virtual Switch Manager**.

- o Select the appropriate switch type (External, Internal, or Private) for your networking needs.
4. **Install Guest Operating System:**
   - o Attach an ISO file of the desired operating system.
   - o Follow the OS installation instructions to complete the setup.
5. **Manage Virtual Machines:**
   - o Use features like checkpoints for quick restoration points.
   - o Enable dynamic memory allocation for efficient resource utilization.

4. Explain the Term Virtualization in the Field of Operating Systems

Virtualization in the context of operating systems refers to the technology that enables the creation of **virtual instances** of computing resources such as:

- **Hardware Platforms:** Allows multiple operating systems to run on one physical machine.
- **Storage Devices:** Virtual storage solutions improve data management and scalability.
- **Network Resources:** Virtual networks enhance connectivity between VMs.

This abstraction enhances efficiency, scalability, and resource management.