**1. What is a PXE Server, and what is it used for?**  
Answer: A PXE (Preboot eXecution Environment) server is a combination of protocols and services that enable a computer to boot and load an operating system over the network. It’s widely used for:

Automated OS installations (like Linux or Windows) without the need for physical media.

Diskless workstations where systems boot via network.

Mass deployment of OS in a datacenter or server farm environments.

**2. What are the main components required to set up a PXE boot server?**  
Answer: To set up a PXE boot server, the following components are needed:

DHCP Server: Provides the IP address and the location of the boot files to the client.

TFTP Server: Transfers the bootloader and necessary files to the client.

NFS/HTTP/FTP Server: Hosts the installation files or OS image.

PXELINUX Bootloader: Part of the SYSLINUX project responsible for displaying a boot menu and loading the Linux kernel and initial RAM disk (initrd).

**3. What is the role of DHCP in PXE booting?**  
Answer:In PXE booting, the DHCP (Dynamic Host Configuration Protocol) server assigns an IP address to the client and provides the location of the bootloader file, typically Specifies the TFTP server's IP.

**4. What is TFTP, and why is it used in PXE booting?**  
Answer: TFTP (Trivial File Transfer Protocol) is a simple protocol used to transfer files between the PXE client and the server. It is used in PXE booting to transfer small boot files such as the bootloader, kernel, and initrd images because it’s lightweight and has minimal overhead, suitable for environments where only a small file needs to be transferred without the need for the full functionality of FTP.

**5. How do you configure a PXE boot server on a Linux machine?**  
Answer: To configure a PXE server, follow these steps:

Install necessary packages (like tftp-server, dhcp-server, and syslinux for PXELINUX).

Configure the DHCP server to provide PXE clients with an IP address and the location of the TFTP server and bootloader.

Configure the TFTP server to serve the bootloader (pxelinux.0) and other boot files (kernel and initrd).

Prepare the OS installation files on an HTTP/FTP/NFS server for the clients to access.

Modify the PXELINUX configuration file (typically found under /var/lib/tftpboot/pxelinux.cfg/) to specify the boot options for different clients.

**6. What are pxelinux.0 and initrd?**  
Answer: pxelinux.0: It is a network bootloader file that is part of the SYSLINUX project. It loads via TFTP during PXE boot and is **responsible for displaying a boot menu and loading the Linux kernel and initial RAM disk (initrd).**

initrd: The initial RAM disk contains a temporary filesystem that is loaded into memory during boot. It holds the minimal set of drivers needed to mount the actual root filesystem before transferring control to the OS kernel.