Q5) Understand what happens when duplicate IPs configured in a network:

When two devices are configured with the same IP address in a network, it leads to **IP address conflict**, which causes disruptions in communication. Below is a structured analysis of what happens when duplicate IPs exist in a network.

**1.Detection of IP Conflict**

**ARP Conflict Detection:** When a device with a duplicate IP comes online, it sends an **ARP request** to resolve the MAC address. The existing device with the same IP responds with its MAC address, creating a mismatch.  
**OS-Level Detection:** Modern operating systems detect IP conflicts and display warnings such as **“IP address conflict detected”** in Windows or Linux logs.

**DHCP Conflict Detection:** If a **DHCP server** assigns an IP already in use, it detects the conflict and may send a **Decline (DHCPDECLINE)** message.

**2)Network Impact of Duplicate IPs**

**Communication Failure:** Since two devices have the same IP, the network cannot differentiate between them, leading to intermittent or complete communication failure.  
 **Packet Loss & Unstable Connection:** Devices will **compete for responses**, causing **packet loss**, dropped connections, or failed pings.  
 **Routing Issues:** If a router has two devices with the same IP in its ARP table, it may send packets to the wrong MAC address, causing unexpected behavior.  
 **Security Risks:** An attacker can **spoof an IP** to intercept traffic (Man-in-the-Middle attack), leading to **data leaks or unauthorized access**.