**2.1. Explain the concepts of Default Gateway in IP?**

A default gateway is a network node that will provide outgoing access to data packets to a destination in some other network. It is a gateway that will be used by default when a host doesn’t specify another gateway. This is a default network path when the destination address doesn’t present in the same network. A routing table specifies which interface is used for transmission and which router on the network is responsible for forwarding to a specific set of addresses. If none of these forwarding rules is appropriate for a given destination address, the default gateway is chosen as the router for the data packets.

**2.2. Explain concepts of SNAT and DNAT?**

**SNAT** stands for Source Network Address Translation. This is used when an internal/private host needs to initiate a connection to an external host. The device performing NAT changes the private IP address of the source host to public IP address. It may also change the source port in the TCP/UDP headers. It is generally used when we are required to change the private address or port into a public address or port when the data packets are leaving the network.

**DNAT** stands for Destination Network Address Translation. Destination NAT changes the destination address in the IP header of a packet. It may also change the destination port in theTCP/UDPheaders. This is generally used to redirect incoming packets with a destination of a public address/port to a private IP address/port inside your network. Destination NAT is performed on incoming packets, where the firewalltranslates a public destination address to a private address. DNAT is a 1-to-1, static translation with the option to perform port translation.

**2.3. Network Architecture**

A.192.168.101.2/24

B.192.168.101.3/24

C.192.168.102.2/24

D.192.168.102.3/24

**Solution**: Subnet mask for ip addresses is 255.255.255.0. So the first three parts belong to the network and the last part is for host addresses. A, B computers belong to the same network and C, D belong to the same network.

Computer A Computer B Computer C Computer D



switch1 switch 2





Hosts A, B in network 1 connects with router via switch. Router interface address within network 1 can be assigned with a unique address and that should not be assigned to any other hosts. Similarly for router in network 2 can be assigned with a unique address.

Router in network 1 : **192.168.101.1**

Router in network 2 : **192.168.102.1**

Routers themselves can be connected to each other in other network via two interface addresses belongs to same network for example **192.168.103.10** and **192.168.103.11**

**2.4 Explain ARP?**

A collection of devices in a LAN are physically connected to the same hub or switch. LANs are configured so that any device can send a broadcast message that can be seen by all devices on the LAN. Any message being sent must be directed not to the target system's IP address, but to an address that is built into the target computer's physical network interface known as the MAC address.

To obtain a MAC address for the target system, the sending computer must broadcast a message to all devices on the LAN asking the device that has been assigned the target IP address to reply with its built-in hardware MAC address. After the device assigned to that IP address responds to the sending system, the sending device then directs the communication message that it wants to send to the MAC address of the target system. This protocol that resolves the MAC address among LAN-based devices is called the Address Resolution Protocol or "ARP"