**Question 2 \_Networks: For Both Backend and Full Stack**

2.1Explain the concepts of Default Gateway in IP

Answer: When devices want to communicate within the same network they can do so using the ARP table. But when communication is to be happened with devices outside its network, it happens through the Default Gateway. It is a L3 device that is used to route the traffic. It receives any request that does not have a specific router identified and ensures that it reaches its destination.

2.2Explain the concepts of SNAT and DNAT

Answer: SNAT and DNAT are Network Address Translation(NAT) types. These are responsible for translation of IPs.

* SNAT: SNAT is Source Network Address Translation and it allows internal host to connect with the internet. It does so by translating its private IP address to public IP address. 3 types of SNAT are DIPP, Dynamic IP and static IP.
* DNAT: DNAT is Destination Network Address Translation and it allows external host to connect with the private network. It translates public IP of external host to IP of the private internal host.

2.3

A.192.168.101.2/24

B.192.168.101.3/24

C.192.168.102.2/24

D.192.168.102.3/24

A,B,C,D are the IPs to be assigned to four computers ;

2.1What network elements are need to arrive at the above network architecture ; explain their configurations in terms at L3/L2

Details of the IP assignments to be given to each node ;

Answer: Whenever a request comes network layer will add the source and destination Ip addresses. Then the packet is handed over to the data link layer. Mac address is needed at the data link layer. The mapping between IP and MAC address will be done by ARP. The network layer will first check the ARP cache or ARP table if the entry exists. If not found then source machine will broadcast the ARP request message to all. The device whose IP matches will send the reply with its MAC and others will drop the message. Then this MAC is passed on to the data link layer.

2.4 - Explain ARP

Answer: ARP is Address Resolution Protocol. It is used to map IP addresses to physical addresses or MAC in a local area network. It works between the data link layer and the network layer. It is needed because the IPV4 address is 32 bits long whereas the MAC address is 48 bits long. When a new incoming request is arrived, first it goes to the gateway that asks ARP program to map it to a physical address. It maintains a ARP cache containing the mappings.