SCS 2205 – Computer Networks
Take Home Assignment

Index No: 19000294

Question 1

Single public IP address is mapped to multiple hosts in a private network.

Question 2

All the requests for a single server divide among the many servers. This is calling load balancing.

- Each of the servers is assigned to the private IP addresses.
- NAT device act as a proxy for requests to the server from the public network.
- The NAT device changes the destination IP address of arriving packets to one of the private addresses for a server.
- A sensible strategy for balancing the load of the servers is to assign the addresses of the servers in a round-robin fashion.

Question 3

Department 1 – 130 hosts – needs 256
Department 2 - 100 hots – needs 128
Department 3 – 50 hots – needs 64
Leased Line – needs 4

192.10.210.0/23 is the given network IP address

192.10.1101 001 0. 0000 0000

For network for hosts

To identify 2 departments, 1 bits needed, for that reserve first 1 bits from the hosts

Department 1- 192.10.1101 001 0.0000 0000 (192.10.210.0/24)

to

192.10.1101 001 0.1111 1111 (192.10.210.255/24)

Department 2 – 192.10.1101 001 1.0 000 0000 (192.10.211.0/25)
To
192.10.1101 001 1.0 111 1111 (192.10.211.127/25)

Department 3 – 192.10.1101 001 1.10 00 0000 (192.10.211.128/26)
To
192.10.1101 001 1.10 11 1111 (192.10.211.191/26)

.
Leased line – 192.10.1101 001 1.11 00 00 00 (192.10.211.192/30)
To
192.10. 1101 001 1.1100 00 11 (192.10.211.195/30)

i)

	Network address	Broadcast address	Subnet mask
Dept 1	192.10.210.0	192.10.210.255	/24
Dept 2	192.10.211.0	192.10.211.127	/25
Dept 3	192.10.211.128	192.10.211.191	/26
Leased line	192.10.211.192	192.10.211.195	/30

ii)

	No of unallocated IP addresses	Network address	Subnet mask
Dept 1	124	192.10.210.0	/24
Dept 2	26	192.10.211.0	/25
Dept 3	12	192.10.211.128	/26
Leased line	0	192.10.211.192	/30

Question 4

1. Li-Fi

Li-Fi (light-fidelity) technology will allow to connect to the internet using light from lamps, streetlights or LED televisions. Instead of the radio waves, in here light waves are used. In addition to being cheaper, safer and faster than Wi-Fi, it does not need a router. All you need to do is point your mobile or tablet towards a light bulb to surf the web. Li-fi is a bidirectional wireless connection. Li-Fi can theoretically transmit at speeds of up to 100 Gbit/s and for approximately 10 meters range.

2. Google Loon

Google's internet balloons are wireless Internet connectivity towers that float in the stratosphere. They beam Internet signals to earth-based stations, which then transmit the internet to users through internet service providers.

These floating giant balloons are propelled to the stratosphere – a height of about 20km above the earth. Artificial intelligence software installed in the balloons' computers controls the floating movements using wind power. A single balloon can provide internet connectivity to an area of about 80km in diameter and serve about 1,000 users on the ground.

3. Virtual private network

Virtual private network (VPN) is an encrypted connection via encrypted link over the internet from a device to network or between two private networks connected on internet. VPN prevents access for unauthorized people who are trying to hack our device via IP address.

By using a VPN tunnel, a user's device will connect to another network, hiding its IP address and encrypting the data. This is what will hide private information from attackers. The tunnel will connect a user's device to an exit node in another distant location, which makes it seem like the user is in another location. So VPN server location is showed as the user's location.

VPN uses tunneling protocols to encrypt data at the sending end and the decrypt it at the receiving end. IP security protocol, point to point tunneling protocol, OpenVPN are some of VPN protocols.

Question 5

1. RIP

    Routing information protocol (RIP) is a dynamic routing protocol which route data packets by finding the best hop count between the source and the destination.

    RIP prevents routing loops by limiting the number of hops allowed in a path from source and destination. The maximum hop count allowed for RIP is 15 and hop count of 16 is considered as network unreachable.

    There are three versions of routing information protocol – RIP Version1, RIP Version2, and RIPng.

2. OSPF

Open shortest path first (OSPF) protocol is an internal routing protocol and it is based on the link- state routing. Dijkstra's algorithm is used to find the shortest path. This protocol has unlimited hop count.