EXPERIMENT- 4

Familiarization Of Network Ip, Subnetting & Supernetting

Aim :-

Study of Network IP and Sub Netting and supernetting :
→ Classification of IP addresses.
→ sub netting
→ why we develop sub netting and How to calculate subnet mask and how to identify subnet address.
→ supernetting.
→ why we develop super netting and how to calculate super net mask and how to identify super net address.

Theory :-

• **IP Address :-**

An Internet Protocol address (IP address) is a numerical label assigned to each device participating in a computer network that uses the Internet Protocol for communication. An IP address serves two principal functions : host or network interface identification and local addressing. It role has been characterised as follows : " A name indicates what we seek. An address indicates where it is. A route indicates how to get there".

* **IPv4 addresses :-** It is a 32-bit address. It can provide IP's to 2^{32} devices (about 4.3 billion) at the same time on internet. It can be divided in parts.

(i) **Classful Addressing** → The address space is divided into five classes A, B, C, D and E

Class	First Byte		Application
	Binary	Decimal	
A	0	0 – 127	Unicast
B	10	[128 - 191]	Unicast
C	110	[192 - 223]	Unicast
D	1110	[224 - 239]	Multicast
E	1111	[240 - 255]	Reserved

The whole IP address is divided into Net Id and host IP address. Thus this method only uses blocks. The no. of addresses in a block are in powers of 2.

* **Subnetting :-**

A bigger network is divided into smaller network in order to maintain security.

eg:- $Nid = 193.1.2.0$

Step 1:- Choose one bit for each subnet from host Id part. It is a class C network. So, 8 bits are there in host id. Now, we need to divide it in two subnets.

Step 3 :- Thus, we will have the network divided into two network.

For the purpose of identification of hosts we use the concept of mask. The process that we followed in the example also uses mask. The mask identifies range of a subset.

* **Supernetting :-**

Multiple networks are combined to form a single bigger network termed as supernet.

Eg :- We have 4 networks of class C

200.1.0.0, 200.1.1.0, 200.1.2.0, 200.1.3.0
We have to check conditions :

→ Contiguous networks
→ equal -sized networks
→ First IP address exactly divisible by total size so, we can form a supernet for them.

The resulting supernet is 200.1.0.0

Dotted-decimal notation

└→ 172 . 16 . 254 . ↓
      ↓   ↓   ↓   ↓

10101100 . 00010000 . 11111110 . 00000001
  8 bits   8 bits   8 bits   8 bits

Binary notation

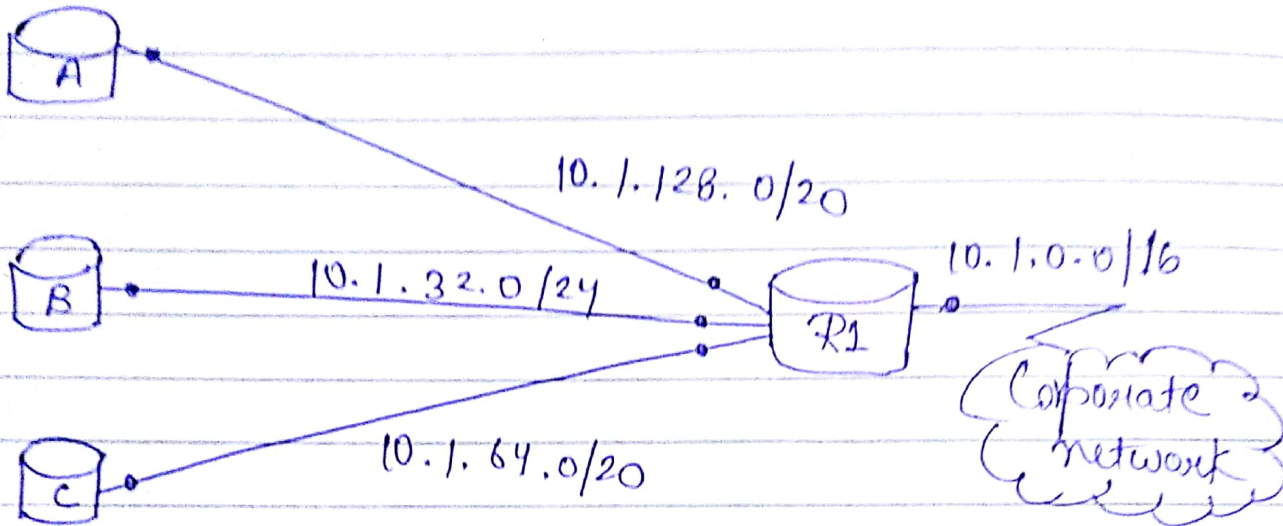$$Total = (4 \times 8) = 32 \text{ bytes}$$

IPv4 address

Before subnetting {	Network Address	Valid host address	Broadcast address

Subnet-1   Subnet-2

Network Address	Valid host Address	Broadcast Address		Network Address	Valid host Address	Broadcast Address

After subnetting

10. 1. 128. 0/20

10. 1. 32. 0/24

10. 1. 0. 0/16

R1

Corporate network

10. 1. 64. 0/20

Supernetting