

Date: 9/5/2025

Lab Practical #10:

Study of IP Addressing and sub-netting.

Practical Assignment #10:

1. Find default subnet masks, network bits, host bits, hosts per subnet, no of subnets, subnet number, 1st valid IP address, last valid IP address, and broadcast address.

8.1.4.5/16

130.4.102.1/24

130.4.102.1/22

199.1.1.100/27

Ans:

i) 8.1.4.5/16

- Class A
- Subnet Mask: 255.255.0.0
- Borrowed bits: 8
- Network bits: 16
- Host bits: 16
- Host per subnet = $2^{16} - 2 = 2^{16} - 2 = 65534$ hosts
- No. of subnets = $2^8 = 256$
- Network Address: 8.1.0.0
- First Valid IP: 8.1.0.1
- Last Valid IP: 8.1.255.254
- Broadcast Address: 8.1.255.255

ii) 130.4.102.1/24

- Class B
- Subnet Mask: 255.255.255.0
- Borrowed bits: 8
- Network bits: 24, Host Bits: 8
- Host per subnet: $2^8 - 2 = 254$ hosts
- No. of subnets = $2^8 = 256$
- Network address: 130.4.102.0
- First Valid IP: 130.4.102.1
- Last Valid IP: 130.4.102.254
- Broadcast Address: 130.4.102.255

Date: 9/5/2025

iii) 130.4.102.1/22

- class B
- subnet mask : 255.255.255.0
- Borrowed bits: 6
- Network bits: 22, Host bits: 10
- Host per subnet : $2^{10} - 2 = 1022$ hosts
- No. of subnets: 2^6
- Network Address: 130.4.100.0
- First Valid IP: 130.4.100.1
- Last valid IP: 130.4.100.254
- Broadcast Address: 130.4.100.255

iv) 199.1.1.100/27

- Class C
- subnet mask : 255.255.255.224
- Borrowed bits: 3
- Network bits: 27, host bits: 5
- Host per subnet : $2^5 - 2 = 30$ hosts
- No. of subnets = 2^3
- Network Address: 199.1.1.96
- First Valid IP: 199.1.1.97
- Last Valid IP: 199.1.1.126
- Broadcast Address: 199.1.1.127

Date: 9/5/2025

2. A host in a class C network has been assigned an IP address 192.168.17.9. Find the number of addresses in the block, the first address, and the last address.

Ans:

IP = 192.168.17.9
Class C
No. of addresses in the block, $2^8 = 256$
First Address : 192.168.17.0
Last Address : 192.168.17.255

3. An address in a block is given as 185.28.17.9. Find the number of addresses in the block, the first address, and the last address.

Ans:

IP = 185.28.17.9
Class B
No. of addresses in the block, $2^{16} = 65536$
First Address : 185.28.0.0
Last Address : 185.28.255.255

4. A block of addresses is granted to a small organization. We know that one of the addresses is 205.16.37.39/28. What is the first address, last address, number of addresses in a block?

Ans:

IP = 205.16.37.39/28
Class C
No. of addresses in the block, $2^4 = 16$
host bits = 4
borrowed bits = 4
First Address : 205.16.37.32
39 \rightarrow 00100111 \Rightarrow 0010000000
Last Address : 205.16.37.47
39 \rightarrow 00100111 \Rightarrow 0010011111

Date: 9/5/2025

5. Subnet the IP address 216.21.5.0 into 30 hosts in each subnet. Find Class, Default Mask, subnet mask, Bit Borrowed, New subnet mask, No. of Hosts & Subnet, Network Ranges (Subnets).

Ans:

IP = 216.21.5.0, 30 hosts in each subnet

⇒ Class C

No. of host in each subnet = $2^{hb} - 2$

$\therefore 2^{hb} - 2 = 30$

$\therefore hb = \text{host bits} = 5$

⇒ Net-work bits = 27

⇒ Borrowed bits = 3

⇒ ~~Alt~~ No. of subnets : $2^3 = 8$

No. of host per subnet = 30

⇒ Network Ranges,

216.21.5.0 → 216.21.5.31

216.21.5.32 → 216.21.5.63

216.21.5.64 → 216.21.5.95

216.21.5.96 → 216.21.5.127

216.21.5.128 → 216.21.5.159

216.21.5.160 → 216.21.5.191

216.21.5.192 → 216.21.5.223

216.21.5.224 → 216.21.5.255

Date: 9/5/2025

6. Subnet the IP address 192.10.20.0 into 52 hosts in each subnet. Find Class, Default Mask, Bit Borrowed, New subnet mask, No. of Hosts & Subnet, Network Ranges (Subnets).

Ans:

192.10.20.0 into 52 hosts in each subnet

→ Class C

→ No. of hosts in each subnet = $2^{hb} - 2$
 $\therefore 52 = 2^{hb} - 2$
 \therefore host bits = $hb = 6$

→ Network bits = 26

→ borrowed bits = 2

New subnet mask: 255.255.255.192

No. of subnets $2^2 = 4$

No. of hosts per subnet $2^6 - 2 = 62$

192.10.20.0 - 192.10.20.63
192.10.20.64 - 192.10.20.127
192.10.20.128 - 192.10.20.191
192.10.20.192 - 192.10.20.255

7. Determining the Subnet mask for Devices A and B:

a) Device A: 172.16.17.30/20

b) Device B: 172.16.28.15/20

Ans:

Device A: 172.16.17.30/20
↳ subnet mask: 255.255.240.0

Device B: 172.16.28.15/20
↳ subnet mask: 255.255.240.0