※ IP Addressing & Sub-netting

[1] i) 8.1.4.5 /16

→ class A
→ Subnet Mask : 255.255.0.0
→ Borrowed Bit : 8
→ Network Bit : 16
→ Host Bit : 16
→ Host per subnet $2^{16} - 2 = 65534$ hosts
→ No. of subnets = 2^8
→ 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 Bit : 8
→ Network Bit : 24
→ Host Bit : 8
→ Host per subnet $2^8 - 2 = 254$ hosts
→ No. of subnets = 2^8
→ 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

iii) 130.4.102.1 / 22

→ class A
→ subnet Mask : 255.255.255.0
→ Borrowed Bit : 6
→ Network Bit : 22
→ Host Bit : 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 : 130.4.103.254
→ Broadcast Address : 130.4.103.255

iv) 199.1.1.100 / 27

→ class C
→ subnet Mask : 255.255.255.224
→ Borrowed Bit : 3
→ Network Bit : 27
→ Host Bit : 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

[2] IP = 192.168.17.9

class C

No. of Address in the block 2^8 = 256
First Address : 192.168.17.0
Last Address : 192.168.17.255

[3] IP = 185.28.17.9

class B

No. of Address in the block 2^{16} = 65536
First Address : 185.28.0.0
Last Address : 185.28.255.255

[4] IP = 205.16.37.39 /28

class C
No. of Address 2^4 = 16
host bit = 4
borrowed bit = 4
First Address : 205.16.37.32
   39 → 00100111 → 00100000
Last Address : 205.16.37.47
   39 → 00100111 → 00101111

[5] IP = 216.21.5.0, 30 hosts in each subnet

Class C

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

$$30 = 2^{hostbit} - 2$$

$$\therefore host\ bit = 5$$

Network bit = 27 (Borrowed bit = 3)

New Subnet Mask : 255.255.255.224

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

[6] 192.10.20.0 into 52 hosts in each subnet

Class C

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

$52 = 2^{hostbit} - 2$

∴ hostbit = 6

Network bit = 26 (Borrowed Bit = 2)

New subnet Mask : 255.255.255.192

No. of subnets $2^2 = 4$

No. of host 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] 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