

192.168.1.15/26

Network Bits

Q1 \Rightarrow Subnet Mask in Decimal

Class-C

By Default N/w Bits \Rightarrow 24

But here \Rightarrow 26

\downarrow
24+2

Class C Subnet Mask [11111111.11111111.11111111.00000000]

But as per Question \downarrow

11111111.11111111.11111111.11000000
255.255.255.192

$2^7 + 2^6 + \dots + 2^1 + 2^0$
 $128 + 64 + 0 + \dots + 0$
192

Subnet Mask \Rightarrow 255.255.255.192

Q2 \Rightarrow Find Block Size $\Rightarrow 2^{32-n}$

$n=26$
 $2^{32-26} \Rightarrow 2^6 \Rightarrow 64 \text{ ip}$

Block Size = 64

Q3 \Rightarrow Network id \Rightarrow Set right most 32-n bits to 0.

192.168.1.15/26
11000000.10101000.00000001.00001111
 \downarrow
Set as 0
11000000.10101000.00000000.00000000

$32-26$
 $\Rightarrow 6$

N/w id \Rightarrow 192.168.1.0

36 No. of ip in Subnet $\Rightarrow 64$

\Rightarrow So Range of ip

192.168.1.0 \leftarrow Network id

\downarrow

192.168.1.1 \leftarrow first usable ip

\vdots

192.168.1.62 \leftarrow last usable ip

192.168.1.63 \leftarrow Broadcast address

Total No. of Subnet \Rightarrow No. of bit taken from Host part

$\Rightarrow \frac{24}{N/w}, \frac{18}{Host}$

But Here 26 N/w

So total 2 bit borrowed that we are representing as m bit.

No of Subnet $\Rightarrow 2^m$
 $2^2 = 4$ Subnet

<u>Subnet 1</u>	<u>Subnet 2</u>	<u>Subnet 3</u>	
192.168.1.0	192.168.1.64	192.168.1.128	192.168.1.192
\updownarrow	\updownarrow	\updownarrow	\updownarrow
192.168.1.63	192.168.1.127	192.168.1.191	192.168.1.255

Q2 \Rightarrow How many subnets and Hosts per subnet can you get from the Network 192.168.1.0

Sol

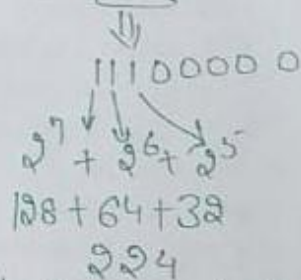
255.255.255.224

192.168.1.0

Class C, Default Mask in class C \Rightarrow

255.255.255.0

But in question \Rightarrow 255.255.255.224



Means 3 bit borrowed from Host part

$m=3$

No. of Subnet $\Rightarrow 2^m$
 $2^3 \Rightarrow 8 \text{ Subnet}$

No. of Host in every Subnet?

\Rightarrow By Default in class C 8 bit
but 3 bit converted into Network

So Remaining $8-3 \Rightarrow 5 \text{ bit}$

$2^5 \Rightarrow 32 \text{ ip}$

from 32, first ip is Network address
and last ip is Broadcast

So in each subnet there is 30 usable ip.

Q3 - Suppose you purchase the IP of class C

192.168.20.0/24

But the requirement of organization is to distribute among 8 Subnets.

Sol

ip \Rightarrow 192.168.20.0/24

By default 24 N/w bits in Class C.

To create 8 Subnet we need to borrow bit from Host part.

$$2^3 = 8$$

So borrow 3 bit

$$\text{Remaining Host Bit} \Rightarrow 8 - 3 = 5 \text{ bit}$$

$$\text{N/w Bit Now} \Rightarrow 24 + 3$$

$$\Rightarrow 27$$

As per this Subnet Mask

$$255.255.255.111$$

$$\text{Subnet Mask} = 255.255.255.224$$

$$\text{No of Host in each Subnet} \Rightarrow 2^{\text{Host Bit}}$$

$$\Rightarrow 2^5$$

$$\text{Host} \Rightarrow 32 \text{ ip}$$

Range of ip in Subnets.

192.168.20.0	192.168.20.1	192.168.20.30	192.168.20.31	20.32	20.64	46	128	160	192	224
				20.63	20.95	127	159	191	223	255