Ans. to Qre. 2

VLSM or variable length subnet mask is used to combine subnet masks of different length in the same subnetting network.

For example - we have a network where \28 subnetting is used. Within this network we can have \29 subnetting. In this way, in the same network there are subnets with network bits of 28 and network bits of 29. So, it is called Variable Length Subnet Mask. Here, the subnet mask to get the network address won't be fixed rather it will change depending on the subnet. For \28 the mask is 255.255.255.240 but for \29 it is 255.255.255.248.

In classful IP addressing there are bits to denote classes and rest of the bits are used for host address.

For class-A, we have 8 bit for network and 24 bit for hosts.

Class-A.

$$\underline{\hspace{2cm}} . \underline{\hspace{2cm}} . \underline{\hspace{2cm}} . \underline{\hspace{2cm}}$$

N   H   H   H
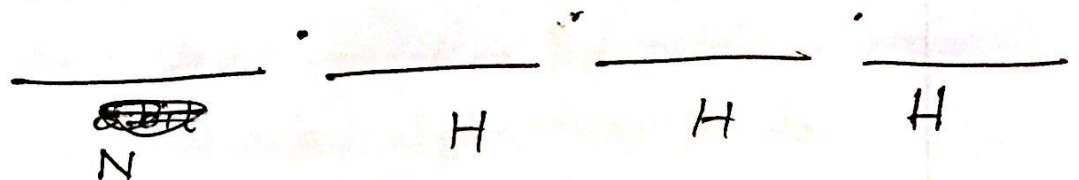
Here for class-A, we have $2^{24}-2$ hosts. But for a network such a huge number of hosts lead to ~~waste~~

wastage of address spaces. There are billions of devices and it will be difficult to connect them with wastage of address spaces. Even, class-C has 2^8-2 hosts which is a huge number leading to high wastage.

For this reason we moved to classless addressing in IPv4. CIDR or Classless Interdomain Routing is used which uses $(\backslash n)$ bits for network address and rest for host. Thus wastage of address space is reduced.

Ans. to Q. no. 1

A class-B network is

$$\underline{\quad\quad} \cdot \underline{\quad\quad} \circ \underline{\quad\quad} \cdot \underline{\quad\quad}$$
$$\text{N} \qquad \text{N} \qquad \text{H} \qquad \text{H}$$

The first two octets have network bits and last 2 ~~two~~ octets have host bits. So, there are 16 bits for network address and 16 bit for host address. We can borrow some bits from host addressing and subdivide the network further by adding those borrowed bits to network layer. This is done using CIDR where $(\backslash n)$ is used to represent total no. of bits for subnetting. The procedure of subdividing the

network in this way is called subnetting.

Subnet Mask: To get the ~~IP and~~ network address from any address we have to (AND) it with the IP address and a number called subnet mask.

For class-B we can ~~borrow 1 bit~~ to have (\17 ---- \30) subnetting. $\square$.

Let, 158.160.10.0 is an IP address. The default mask will be 255.255.0.0 because by doing AND ~~it~~ with IP address we get a network address

For \17 submask will be 255.255.128.0

\18 '' '' '' 255.255.192.0

Router

158.16.10.0

subnet-1 (\17)   158.16.

subnet-2 (\17)   158.16
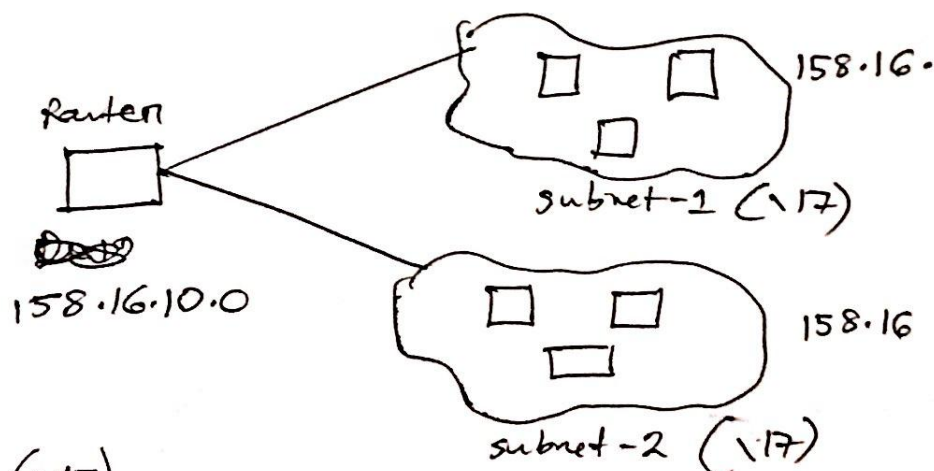
Block size = 128

For (\17)

subnet address	158.16.0.0	158.16.128.0
first address	158.16.0.01	158.16.128.01
last address	158.16.0.126	158.16.255.254
broadcast address	~~158~~ 158.16.127.255	158.16.255.255

For subnet address the last bits (host bits) will be zero.
For broadcast address the last bits (" ") will be one.