(1) a)

Forward Proxy Server — Router — Firewall — Internet — Firewall — Router — Reverse Proxy Server — Switch — wireless access Point — Mobile Phone — Desktop — Web Servers

b) i) ~~dsc~~ dsc1:0042:db2c:0000:0000:a4d9:0000:0b4d

⬇

dsc1:42:db2c::a4d9:0:b4d

ii) Leading zeros in a field are optional

Successive fields of 0 represented as :: (only once in an address)

②

~~RRH~~ 141.128.0.0   (300 lans with 100 hosts)

① Since this is a class B ip, ~~Subnet mask~~ 16 bits are network portion.

② Since there should be 300 lans, we have to get 9 bits from host portion.

③ When we get 9 bits to network from host there are only 7 bits in host portion.

④ We can make $2^7 = 128$ hosts by using each network. So we don't want to use Variable Length Subnet masking.

a)

~~Sab~~ Since we got 9 bits from host to network portion and there are 25 bits (16 bits + 9 bits) in network portion.

11111111.11111111.11111111.10000000.~~00~~ ← Subnet address.

& i. Subnet mask = 255.255.255.128 //

b)

Since there are 7 bits in the host portion (after taking 9 bits from host to network), we can make $2^7 = 128$ hosts in each network.

But we cannot use network & broadcast addresses (all 0 and all 1 for host portion).

So that we can use only $2^7 - 2$ hosts. (∴ Max hosts = 126) //

Scanned with CamScanner

c) We can use subnet zero and all one subnets (given in the question)

Subnet zero means, in the network portion, all the bits are 0s.

All one subnet means, in the network portion, all the bits are 1s.

network portion   host portion

141. 128. 00000000 . 0|0000000

141. 128. 0000000 0 . 0|000 0000 ← 141. 128. 0. 0 (All zero Subnet address)

141. 128. 00000000 . 1|000 0000 ← 141. 128. 0. 128

141. 128. 0000000 1. 0|000 0000 ← 141. 128. 1. 0

⋮   ⋮

∴ first two LANs = 141. 128. 0. 0 and 141. 128. 0. 128.

d) ⓐ Usable addresses means host addresses without include network address and broadcast address.

ⓑ Network address means ∴ all the bits of host portion are 0s.

ⓒ Broadcast address means all the bits of host portion are 1s.

network portion

141. 128. 00000000. 0|0000000 ← 141. 128. 0. 0 (1st LAN) we can't use this as usable address (∵ this is a network address)

141. 128. 00000000. 0|0000001 = 141. 128. 0. 1

141. 128. 00000000. 0|0000010 = 141. 128. 0. 2

141. 128. 00000000. 0|0000011 = 141. 128. 0. 3

⋮

141. 128. 00000000. 0|1111110 = 141. 128. 0. 126

141. 128. 00000000. 0|1111111 ← we can't use this as usable address
(∵ this is a broadcast address)

∴ usable range of 1st LANs are 141. 128. 0. 1 - 141. 128. 0. 126

Likewise,

usable range of 2nd LANs are 141. 128. 0. 129 - 141. 128. 0. 254