Q5. (a) An address in a block is given as 73.22.17.25. find number of addresses in the block and find first and last address.

Ans. Given IP :- 73.22.17.25

1. This address is belongs to class A as it lies in range 0-127.

2. As we know, in class the subnet mask is 8 i.e $n = 8$

73.22.17.25/8

- with the help of this we can find number of address in the block.

- **Number of Address :-** $N = 2^{32-n}$

Here $n = 8$, therefore

$2^{32-8} = 2^{24} \Rightarrow 16777216$

Total no. of address are available is 16777216.

- **First Address :-** To get first address, we add IP address to subnet mask of that class IP address.

Subnet mask for class A is :-

255.0.0.0

- Add 73.22.17.25 with 255.0.0.0, perform bitwise And operation -

```
  73.22.17.25
& 255. 0. 0. 0
---------------
  73. 0. 0. 0
---------------
```

- first address is 73.0.0.0/8 or 73.0.0.0.

- **Last Address :-** To find last address we keep the leftmost 8 bits and set the 24 bits to 1's.

last address is - 73.255.255.255.

(b) An address block is 172.16.5.1. find the number of address and first, last address of the block.

Ans. Given IP = 172.16.5.1

- This address belongs to class B because it lies b/w 128 - 191.
- So, As we know in class B value of n = 16 with the help of n we can find the number of address in this block.
- **Number of Address :-** $N = 2^{32-n}$

$n = 16$

$= 2^{32-16} = 2^{16} = 65536$

So, Number of address in this bolok is

$N = 65536$

First address :- To get first IP address perform "and" operation b/w address and subnet mask.

Subnet mask class B is 255.255.0.0

```
  172.16.5.1          10101100.00010000.00000101.00000001
255.255.0.0           11111111.11111111.00000000.00000000
-----------           -----------------------------------
172.16.0.0            10101100.00010000.00000000.00000000
```

first IP address is 172.16.0.0

Last address :- To get last IP address we keep the first 2 bytes as it and set the last 2 octect with ones : (1's)

So last address is → 172.16.255.255

Q. An address in block is 192.168.5.1. find the numbers of address in the block and first and last address of block.

Ans. Given, IP address is 192.168.5.1

- This address belongs to class C. because it lies between 192 - 233.
- So, As we know default Subnet value for class C is 24 i.e $n = 24$
- So, we can easily find number of address in this block.

⇒ **Number of address :-** To find number of addresses of given block we have one formula

$$N = 2^{32-n}$$

Here $n = 24$

$= 2^{32-24}$

$= 2^8$

$N = 256$

Total Number of addresses are 256

- **first IP address:-** To get first IP address perform And operation b/w address & Subnet mask
- Default Subnet mask for class C is

  255.255.255.0

- So, Ist address will be

  192.168.5.1
  255.255.255.0

  192.168.5.0
  ---

first Address = 192.168.5.0

Last Address :- To get last address we keep three octets as it, but set the value of last 8 bits to 1's. By doing so we get last address of the block.

last address = 192.168.5.255

- As last address is used as broadcast network, we don't allot this to any device. So, practically last address is

192.168.5.254