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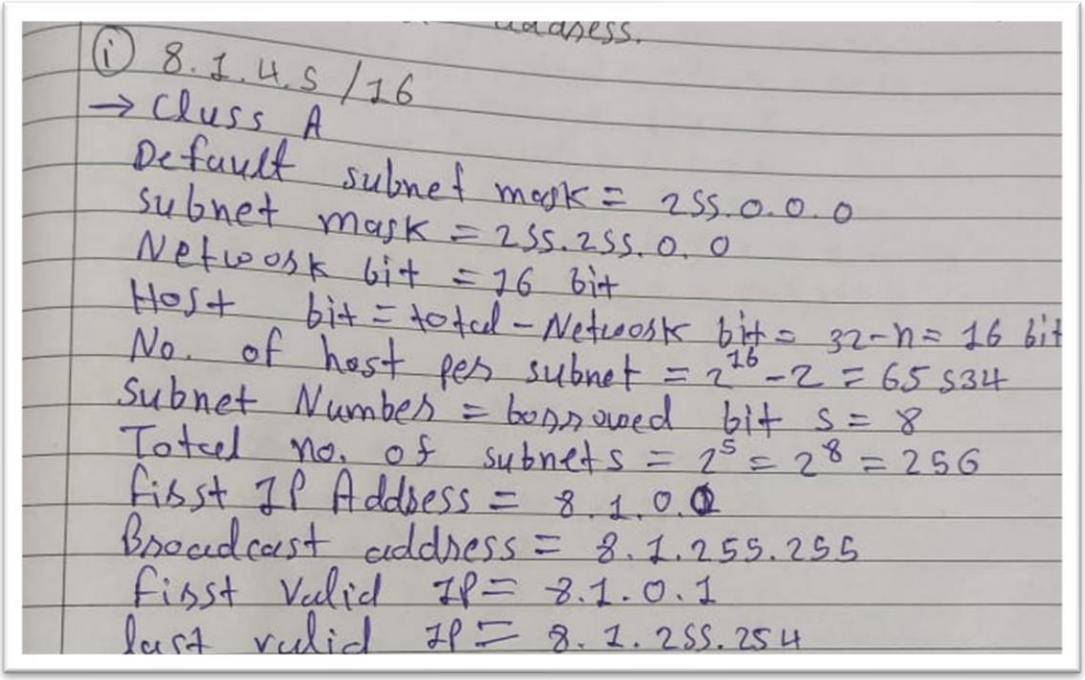
Lab Practical #10:

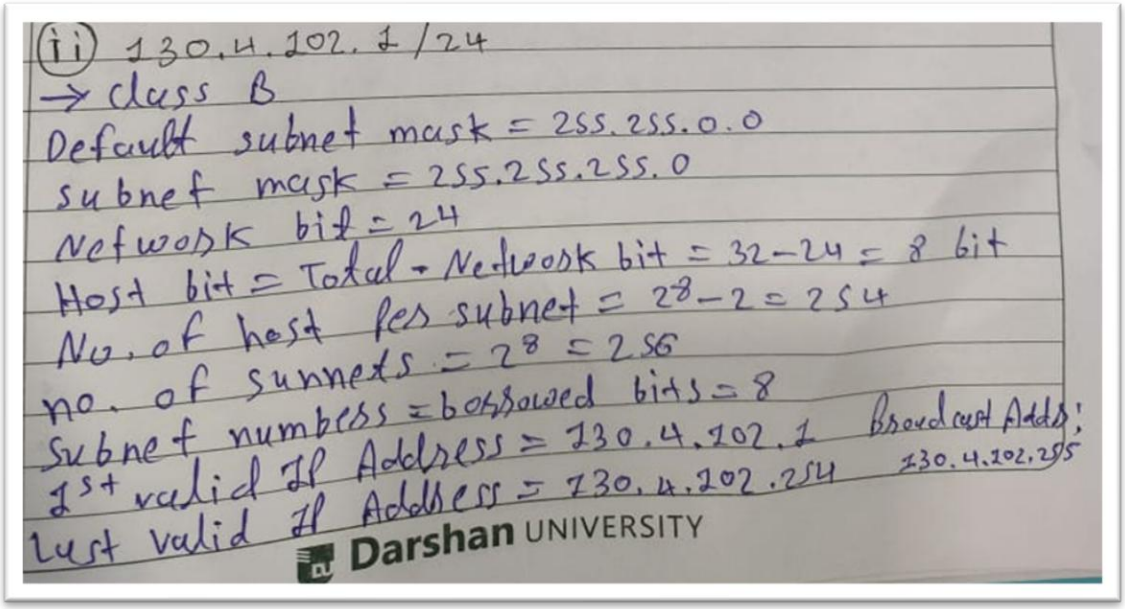
Study of IP Addressing and sub-netting.

Practical Assignment #10:

1. Find default subnet masks, network bits, host bits, hosts per subnet, no of subnets, subnet number, 1st valid IP address, last valid IP address, and broadcast address.
   i. 8.1.4.5/16



   ii. 130.4.102.1/24



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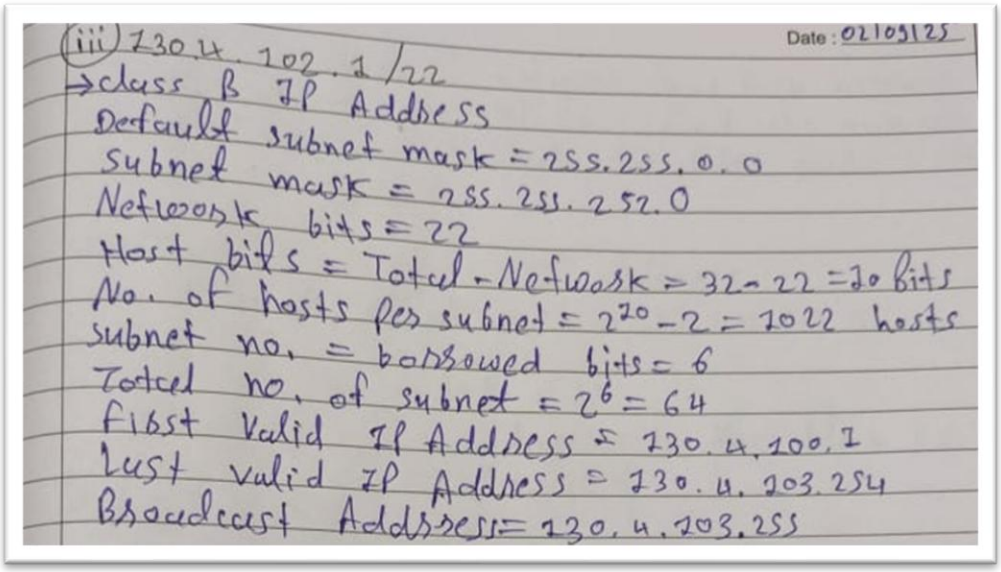
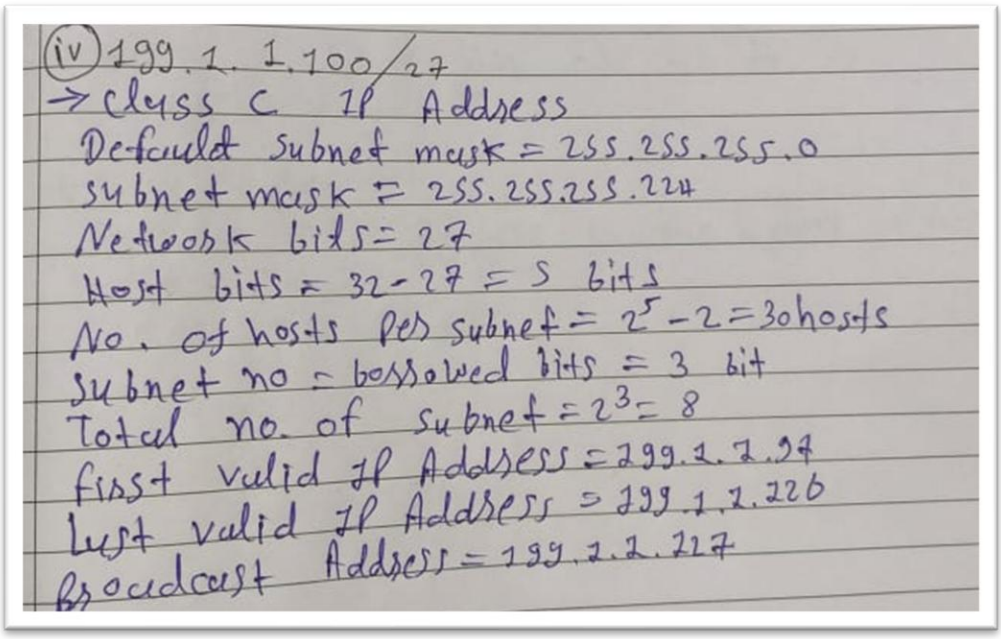
iii. 130.4.102.1/22



iv. 199.1.1.100/27



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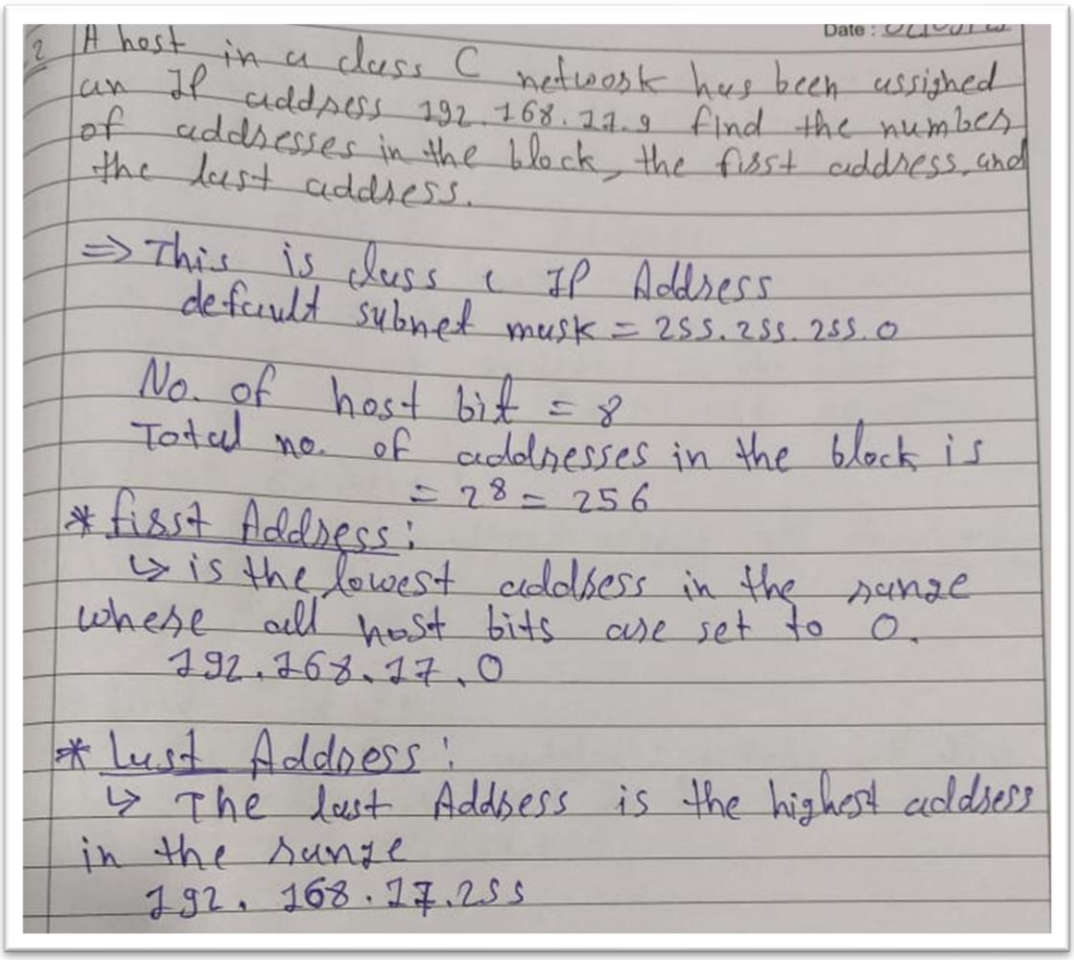
2. A host in a class C network has been assigned an IP address 192.168.17.9. Find the number of addresses in the block, the first address, and the last address.



2 A host in a class C network has been assigned an IP address 192.168.17.9 find the number of addresses in the block, the first address and the last address.

⇒ This is class C IP Address
default subnet mask = 255.255.255.0

No. of host bit = 8
Total no. of addresses in the block is
$= 2^8 = 256$

* First Address:
↳ is the lowest address in the range where all host bits are set to 0.
192.168.17.0

* Last Address:
↳ The last Address is the highest address in the range
192.168.17.255

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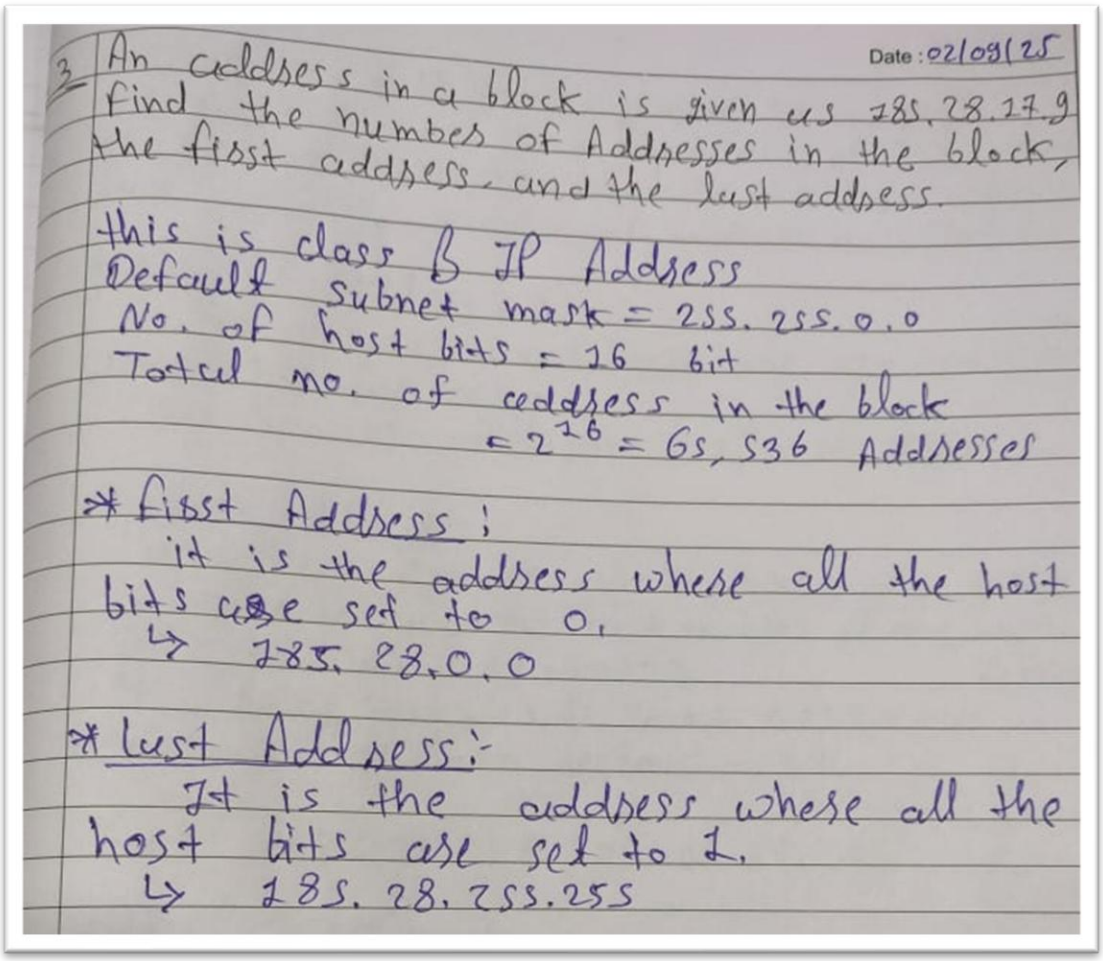
3. An address in a block is given as 185.28.17.9. Find the number of addresses in the block, the first address, and the last address.



3 An address in a block is given as 185.28.17.9 find the number of Addresses in the block, the first address and the last address.

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this is class B IP Address
Default Subnet mask = 255.255.0.0
No. of host bits = 16 bit
Total no. of address in the block
$= 2^{16} = 65,536$ Addresses

* First Address:
it is the address where all the host bits are set to 0.
↳ 185.28.0.0

* Last Address:-
It is the address where all the host bits are set to 1.
↳ 185.28.255.255

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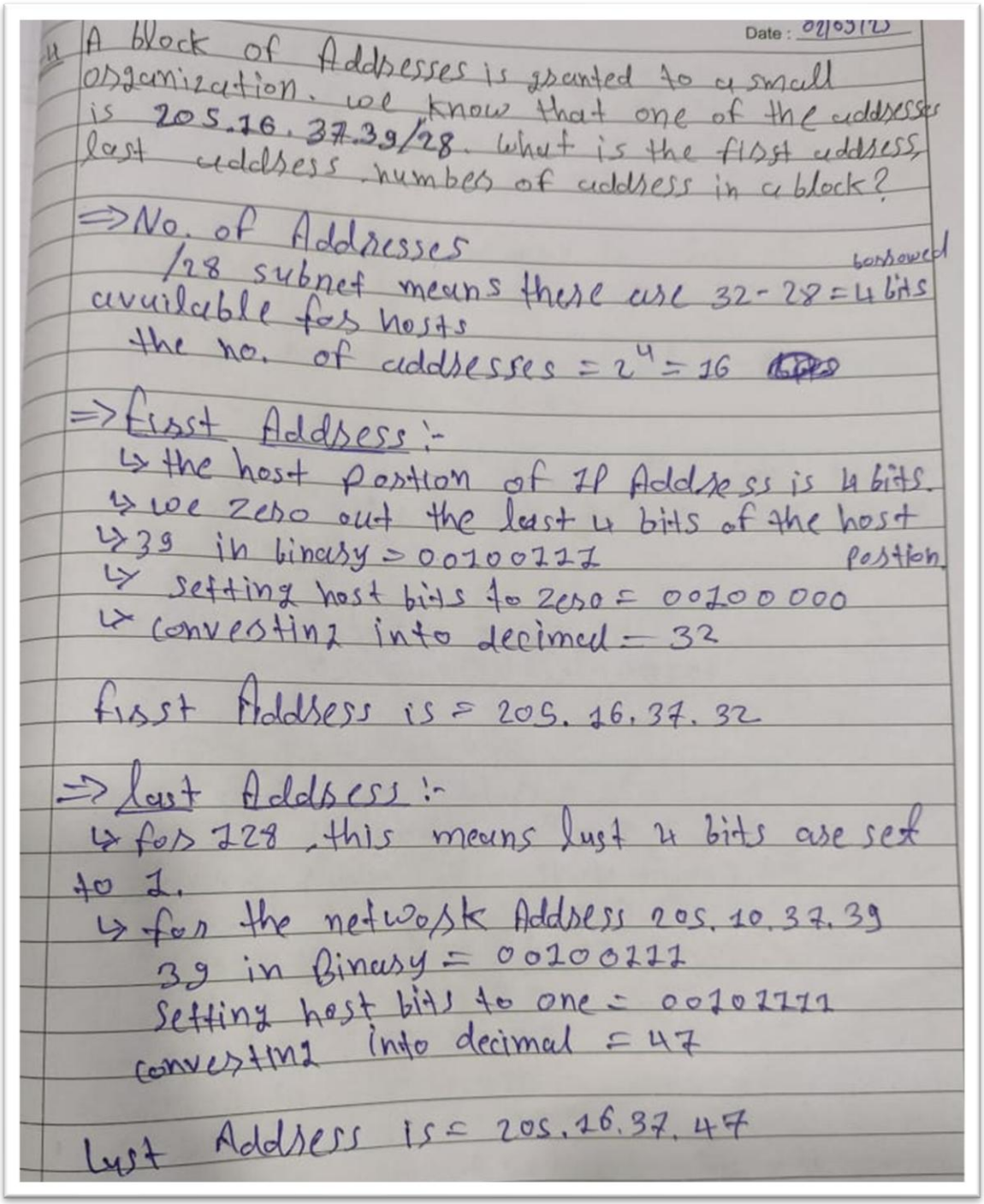
4. A block of addresses is granted to a small organization. We know that one of the addresses is 205.16.37.39/28. What is the first address, last address, number of addresses in a block?



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4) A block of Addresses is granted to a small organization. We know that one of the addresses is 205.16.37.39/28. What is the first address, last address number of address in a block?

⇒ No. of Addresses

/28 subnet means these are 32 - 28 = 4 bits borrowed available for hosts

the no. of addresses = 2^4 = 16

⇒ first Address :-

↳ the host position of IP Address is 4 bits.

↳ we zero out the last 4 bits of the host position.

↳ 39 in binary = 00100111

↳ setting host bits to zero = 00100000

↳ converting into decimal = 32

first Address is = 205.16.37.32

⇒ last Address :-

↳ for /28 this means last 4 bits are set to 1.

↳ for the network Address 205.16.37.39

39 in binary = 00100111

Setting host bits to one = 00101111

converting into decimal = 47

last Address is = 205.16.37.47

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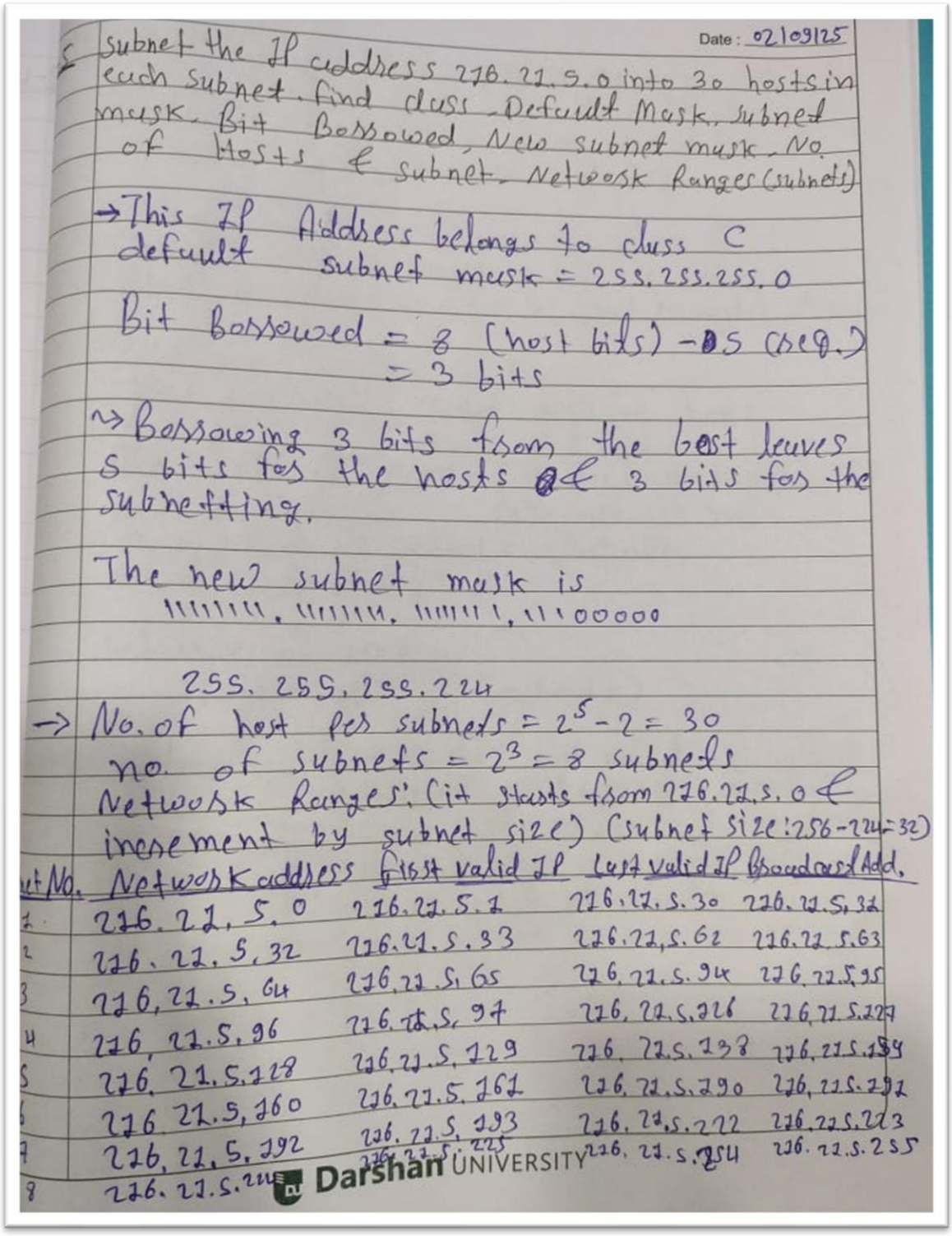
5. Subnet the IP address 216.21.5.0 into 30 hosts in each subnet. Find Class, Default Mask, subnet mask, Bit Borrowed, New subnet mask, No. of Hosts & Subnet, Network Ranges (Subnets).



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Subnet the IP address 216.21.5.0 into 30 hosts in each subnet. find class, Default Mask, subnet mask, Bit Borrowed, New subnet mask, No. of Hosts & Subnet, Network Ranges (subnets)

→ This IP Address belongs to class C
default subnet mask = 255.255.255.0

Bit borrowed = 8 (host bits) - 05 (req.)
= 3 bits

↝ Borrowing 3 bits from the host leaves 5 bits for the hosts & 3 bits for the subnetting.

The new subnet mask is
11111111. 11111111. 11111111. 11100000

255. 255. 255. 224

→ No. of host per subnets = $2^5 - 2 = 30$
no. of subnets = $2^3 = 8$ subnets
Network Ranges: (1st starts from 216.21.5.0 & increment by subnet size) (subnet size: 256-224=32)

No.	Network address	first valid IP	Last valid IP	Broadcast Add.
1	216.21.5.0	216.21.5.1	216.21.5.30	216.21.5.32
2	216.21.5.32	216.21.5.33	216.21.5.62	216.21.5.63
3	216.21.5.64	216.21.5.65	216.21.5.94	216.21.5.95
4	216.21.5.96	216.21.5.97	216.21.5.126	216.21.5.127
5	216.21.5.128	216.21.5.129	216.21.5.158	216.21.5.159
6	216.21.5.160	216.21.5.161	216.21.5.190	216.21.5.191
7	216.21.5.192	216.21.5.193	216.21.5.222	216.21.5.223
8	216.21.5.224	216.21.5.225	216.21.5.254	216.21.5.255

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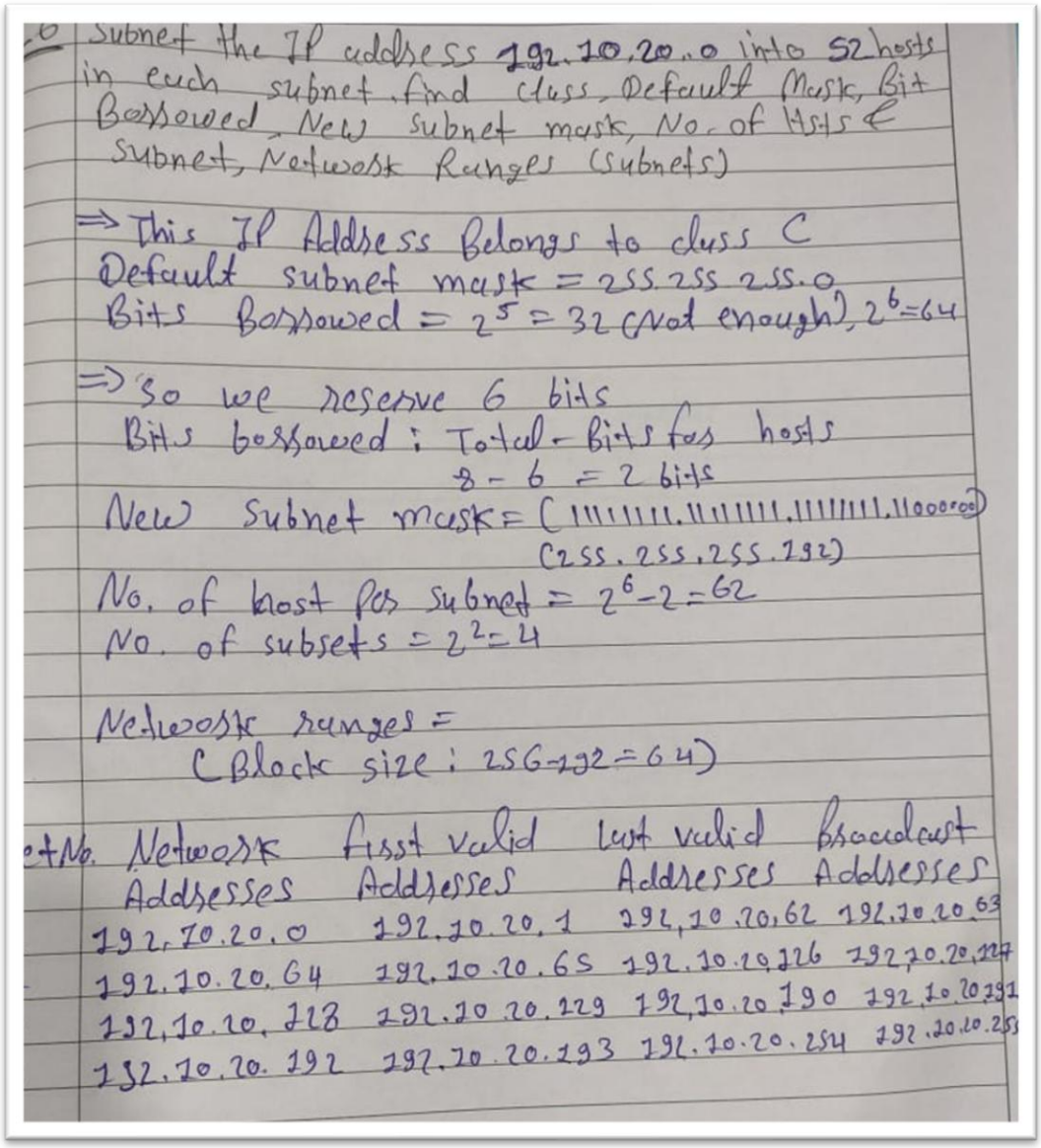
6. Subnet the IP address 192.10.20.0 into 52 hosts in each subnet. Find Class, Default Mask, Bit Borrowed, New subnet mask, No. of Hosts & Subnet, Network Ranges (Subnets).



6. Subnet the IP address 192.10.20.0 into 52 hosts in each subnet. find class, Default Mask, Bit Borrowed, New subnet mask, No. of Hsts & Subnet, Network Ranges (subnets)

⇒ This IP Address Belongs to class C
Default subnet mask = 255.255.255.0
Bits Borrowed = 2^5 = 32 (Not enough), 2^6=64

⇒ So we reserve 6 bits
Bits borrowed : Total - Bits for hosts
8 - 6 = 2 bits
New Subnet mask = (11111111.11111111.11111111.11000000)
(255.255.255.192)
No. of host per subnet = 2^6-2=62
No. of subsets = 2^2=4

Network ranges =
(Block size : 256-192=64)

No.	Network Addresses	first valid Addresses	last valid Addresses	broadcast Addresses
	192.10.20.0	192.10.20.1	192.10.20.62	192.10.20.63
	192.10.20.64	192.10.20.65	192.10.20.126	192.10.20.127
	192.10.20.128	192.10.20.129	192.10.20.190	192.10.20.191
	192.10.20.192	192.10.20.193	192.10.20.254	192.20.20.255

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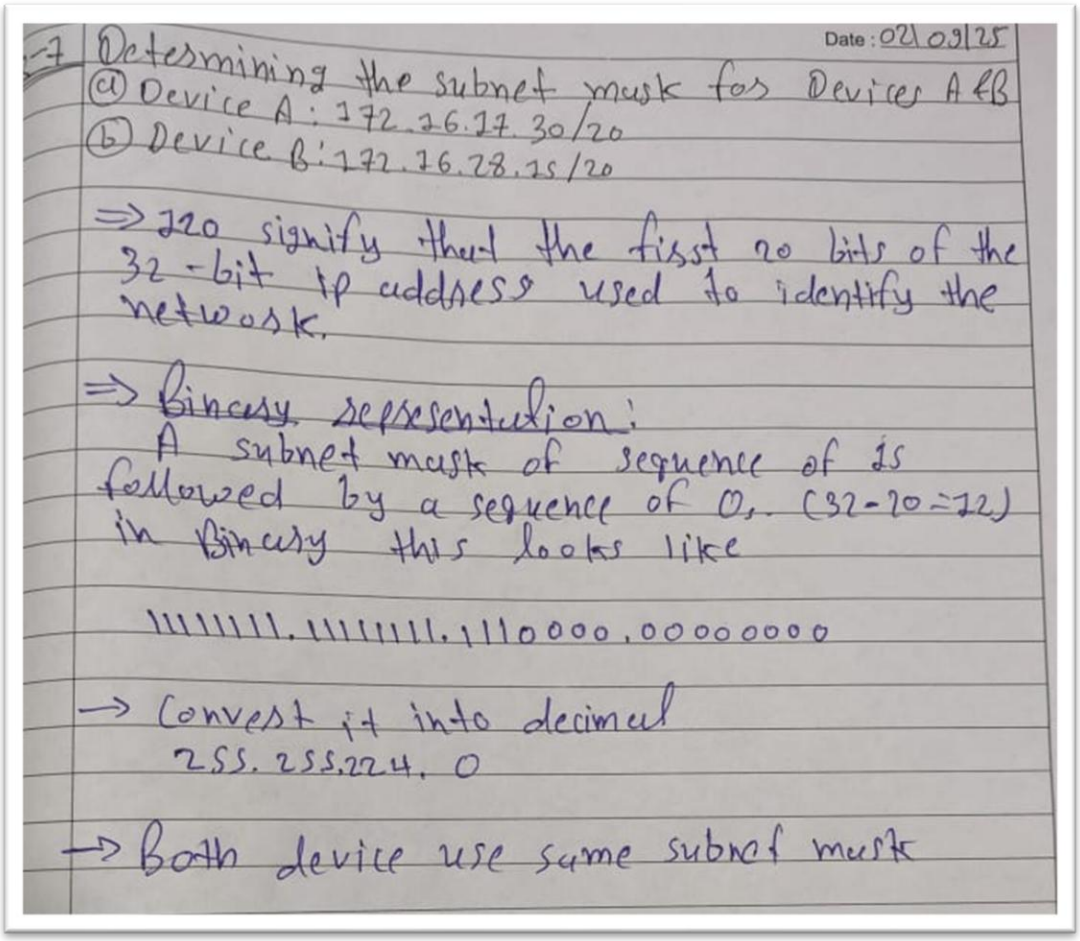
7. Determining the Subnet mask for Devices A and B:
   a) Device A: 172.16.17.30/20
   b) Device B: 172.16.28.15/20



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7 Determining the subnet mask for Devices A & B
(a) Device A : 172.16.17.30/20
(b) Device B : 172.16.28.15/20

⇒ /20 signify that the first 20 bits of the 32-bit IP address used to identify the network.

⇒ Binary representation:
A subnet mask of sequence of 1s followed by a sequence of 0s. (32-20=12)
in Binary this looks like

11111111.11111111.1110000.00000000

→ Convert it into decimal
255.255.224.0

→ Both device use same subnet mask