CS & IT ENGINEERING

Computer Network

1500 Series

Lecture No.- 01

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Recap of Previous Lecture

Topic One topic

Topic Two topic

Topics to be Covered

Topic — IPv4 Addressing

Topic — Subnetting

Topic — Supernetting

[MCQ]

#Q. Suppose ISP assigned a IP address with subnet mask 200.200.200.0/24 to an org-A. Now org-A wants to create a subnets of different number of addresses in each subnet. Which one of the following assignment is NOT possible?

A. 100, 50, 20, 25

B. 60, 60, 60, 25, 10, 14

C. 40, 40, 40, 20, 20, 10, 10

D. 100, 60, 20, 10, 14

200.200.200.0/24

NID = 24 bit, HID = 32 - 24 = 8 bit

No. of IP addresses possible = 2^8

$\frac{2^8}{4} = 2^{8-2} = 2^6$

(a)

(c)

(Not Possible)

[MCQ]

#Q. Suppose an organization wants to create sub-network containing 35,25,10 hosts in each sub-networks. What is the maximum length of subnet mask that organization should use?

A /22

B /24

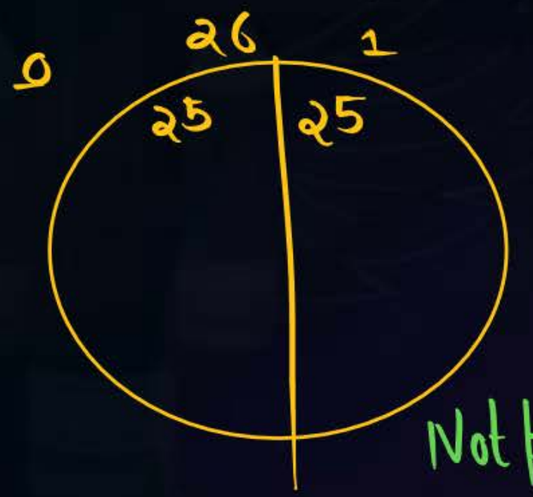
C /25

D /26

/26

NID = 26 bit, HID = 32-26 = 6 bit

No of IP Add possible = 2^6



Not possible

/25

NID = 25 bit, HID = 32 - 25 = 7 bit

No. of IP Add = 2^7

[MCQ]

#Q. You are a network administrator and have been assigned the Class C IP address of 201.222.5.0. The subnet mask 255.255.255.248 is used. What is the address of the 4th host of 4th subnet?

A 201.222.5.58

B 201.222.5.18

C 201.222.5.28

D 201.222.5.38

ADRule: २५५·२५५·२५५·11111000
NID SID HID

२०१·२२२·5·----- ---
NID SID HID

२०१·२२२·5·00011100 → २०१·२२२·5·२४

[MCQ]

#Q. A large organization with a large block address (12.44.184.0/21) is split into one medium-size company using the block address (12.44.184.0/22) and two small organizations. If the first small company uses the block (12.44.188.0/23), what is the remaining block that can be used by the second small company?

A. 12.44.184.0/22

B. 12.44.190.0/22

C. 12.44.190.0/23

D. None of the above

12.44.184.0/21

NID = 21 bit, HID = 32 - 21 = 11 bit

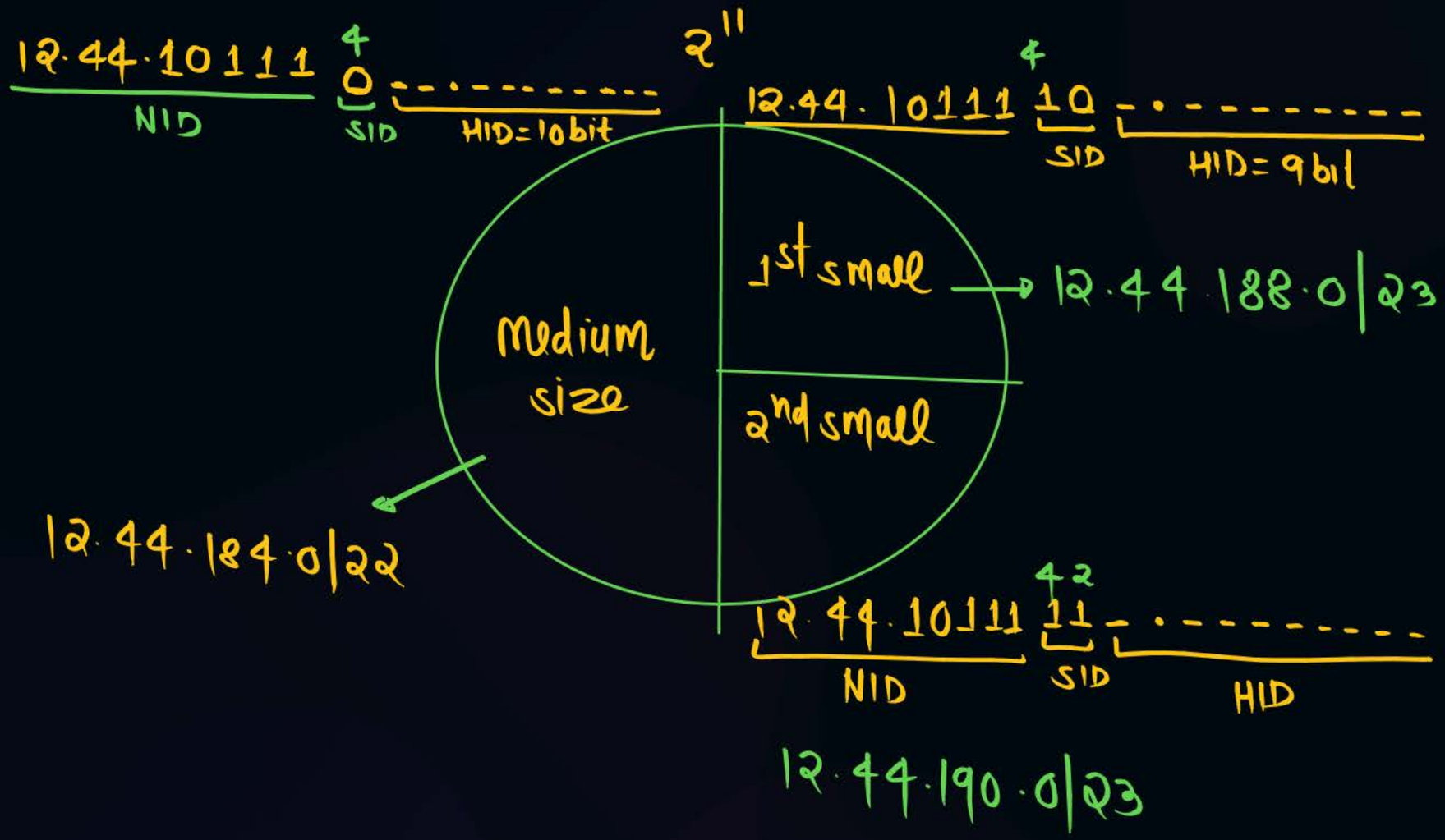
12.44.10111000.00000000

8+8+5

NID | HID

12.44.10111 ---.--------

HID


12.44.10111
4
0
NID
SID
HID=10bit
2^11
12.44.10111
4
10
SID
HID=9bit
1st small
12.44.188.0/23
Medium size
2nd small
12.44.184.0/22
4
2
12.44.10111
11
NID
SID
HID
12.44.190.0/23

[MCQ]

NID = 24 bit, HID = 32 - 24 = 8 bit

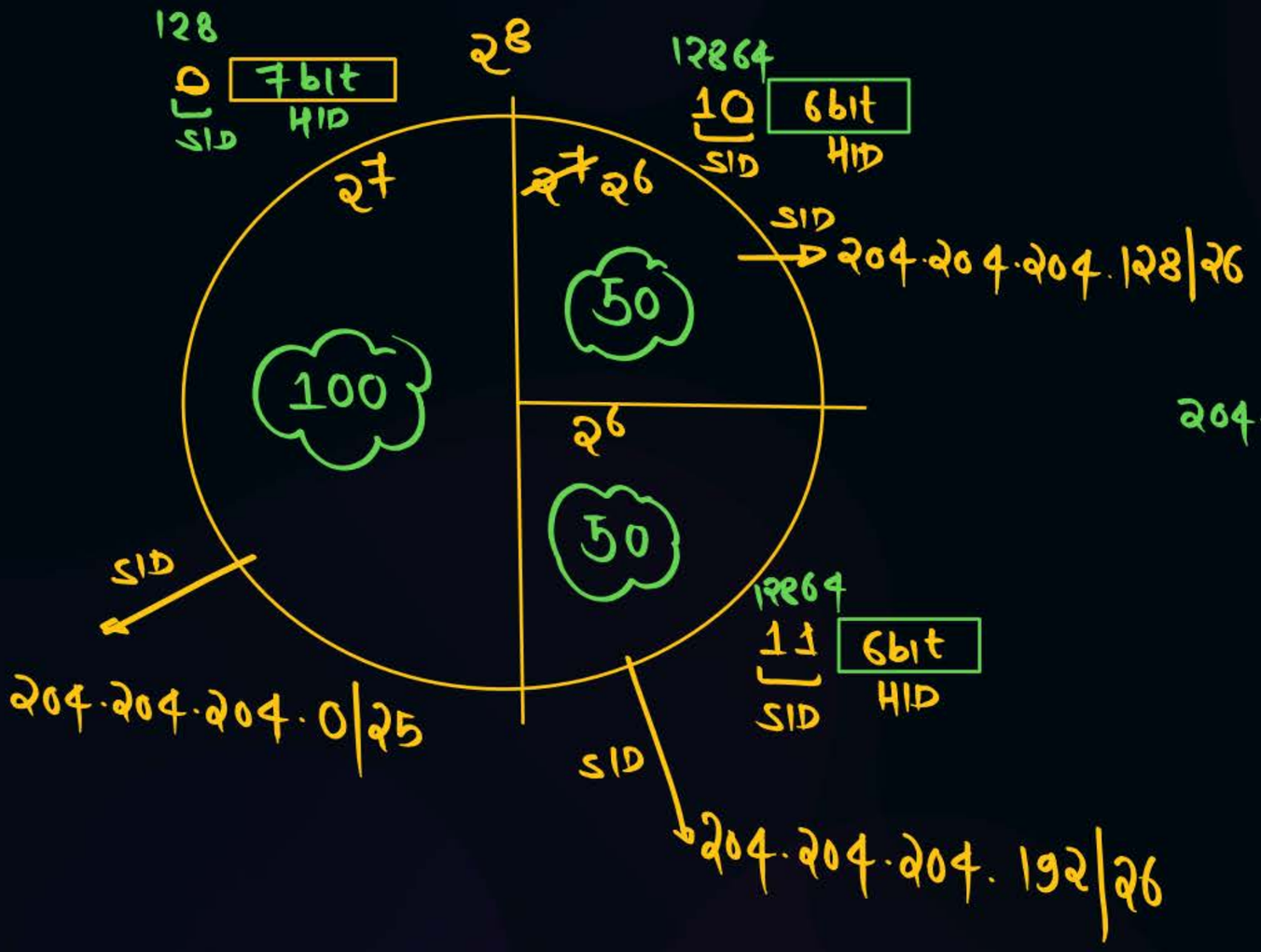
#Q. A company has a network address of 204.204.204.0/24. It wishes to have three subnets, one with 100 hosts and two with 50 hosts each. Which one of the following options represents a feasible set of subnet address?

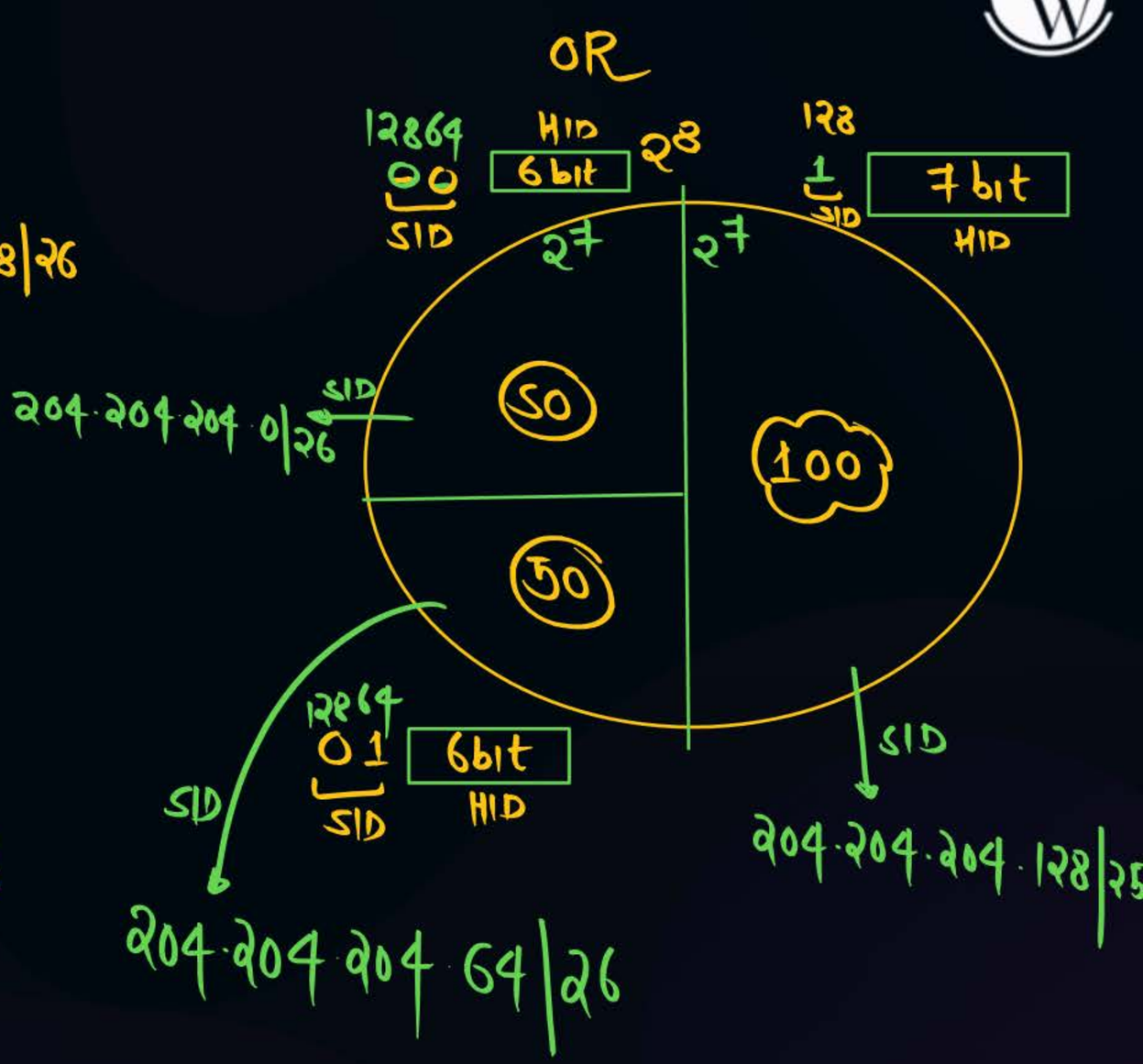
A. 204.204.204.128/26; 204.204.204.0/25; 204.204.204.64/25

B. 204.204.204.0/26; 204.204.204.192/25; 204.204.204.64/25

C. 204.204.204.128/25; 204.204.204.192/26; 204.204.204.224/26

D. 204.204.204.128/25; 204.204.204.64/26; 204.204.204.0/26


128
0
SID
7 bit
HID
2⁸
128 64
10
SID
6 bit
HID
2⁷
2⁷ 2⁶
SID
204.204.204.128/26
50
100
2⁶
50
SID
204.204.204.0/25
128 64
11
SID
6 bit
HID
SID
204.204.204.192/26


OR
128 64
00
SID
HID
6 bit
2⁸
128
1
SID
7 bit
HID
2⁷
2⁷
SID
204.204.204.0/26
50
100
50
128 64
01
SID
6 bit
HID
SID
204.204.204.64/26
SID
204.204.204.128/25

[MCQ]

#Q. An ISP is granted a block of addresses starting with 148.40.0.0/16. The ISP wants to distribute these blocks to 2600 customers as follows:

a. The first group has 200 large-size companies; each needs approximately 128 addresses.

b. The second group has 400 Medium-size companies; each needs approximately 16 addresses.

c. The third group has 2000 Small-size companies ; each needs 4 addresses.

The prefix length (number of 1's in the subnet mask) for first, second and third group respectively is

A 17, 19, 19

B 25, 25, 25

C 25, 26, 27

D 25, 28, 30

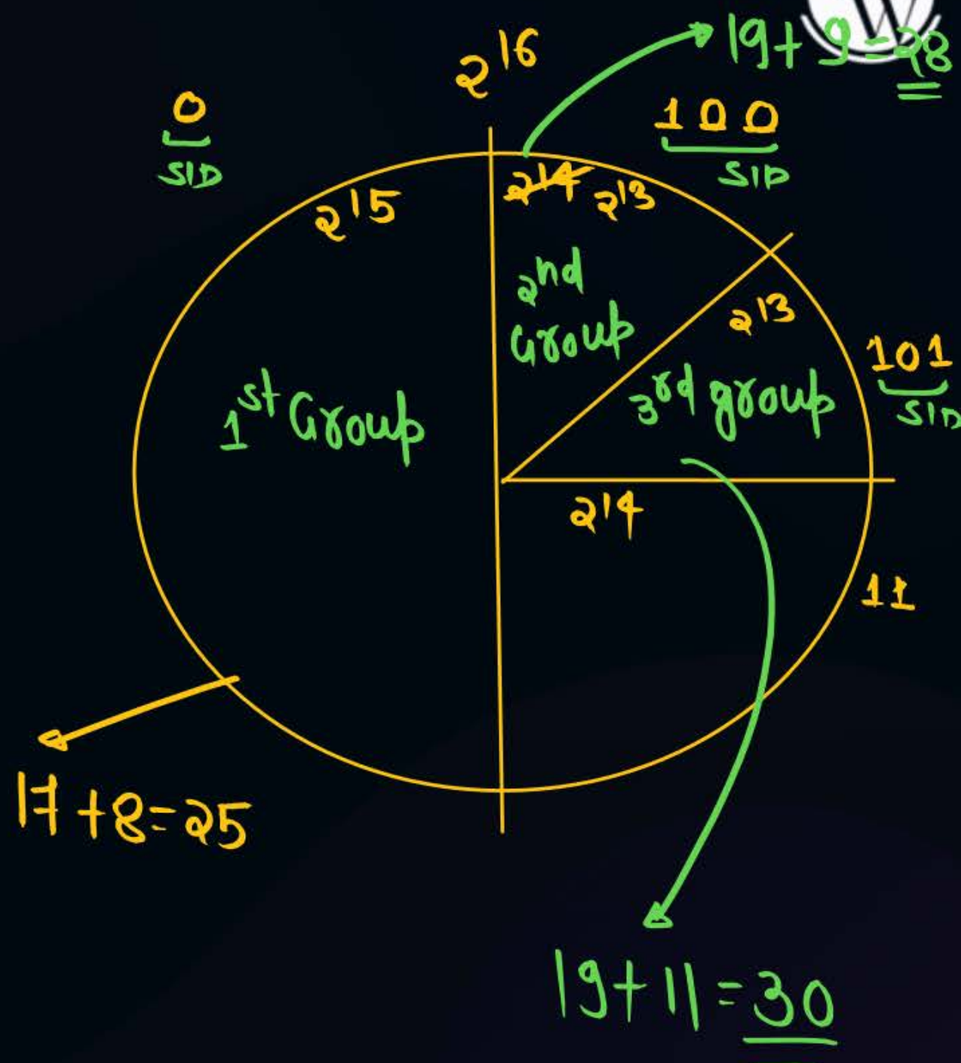
1st Group: 200 * 128 Addresses = $2^8 * 2^7 = 2^{15}$

2nd Group: 400 * 16 Addresses = $2^9 * 2^4 = 2^{13}$

3rd Group: 2000 * 4 Addresses = $2^{11} * 2^2 = 2^{13}$

148.40.0.0/16, NID = 16 bit, HID = 16 bit

No. of IP Addresses = 2^{16}



1st Group:

148.16.0 ---------- (SID)

148.16.0.0000000.00000000 → 148.40.0.0/17

⋮

148.16.0.1111111.11111111 → 148.40.127.255/17

148.40.0.0/17

NID = 17 bit, HID = 15 bit

NID	HID
17	15

200 Companies or 200 subnet

17	8	7
NID	SID	HID

Ans: 17+8 = 25 (NID) OR $32 - 7^{HID} = 25$

[MCQ]

#Q. An ISP is granted a block of addresses starting with 190.100.0.0/16. The ISP needs to distribute these addresses to four groups of customers as follows:

a. The first group has 128 customers; each need 256 addresses.

b. The second group has 128 customers; each need 128 addresses

c. The third group has 128 customers; each need 64 addresses.

d. The fourth group has 128 customers; each need 32 addresses.

Which of the following is the more accurate prefix length of all four groups respectively?

A 24,25,26,26

B 25,25,25,25

C 24,25,26,27

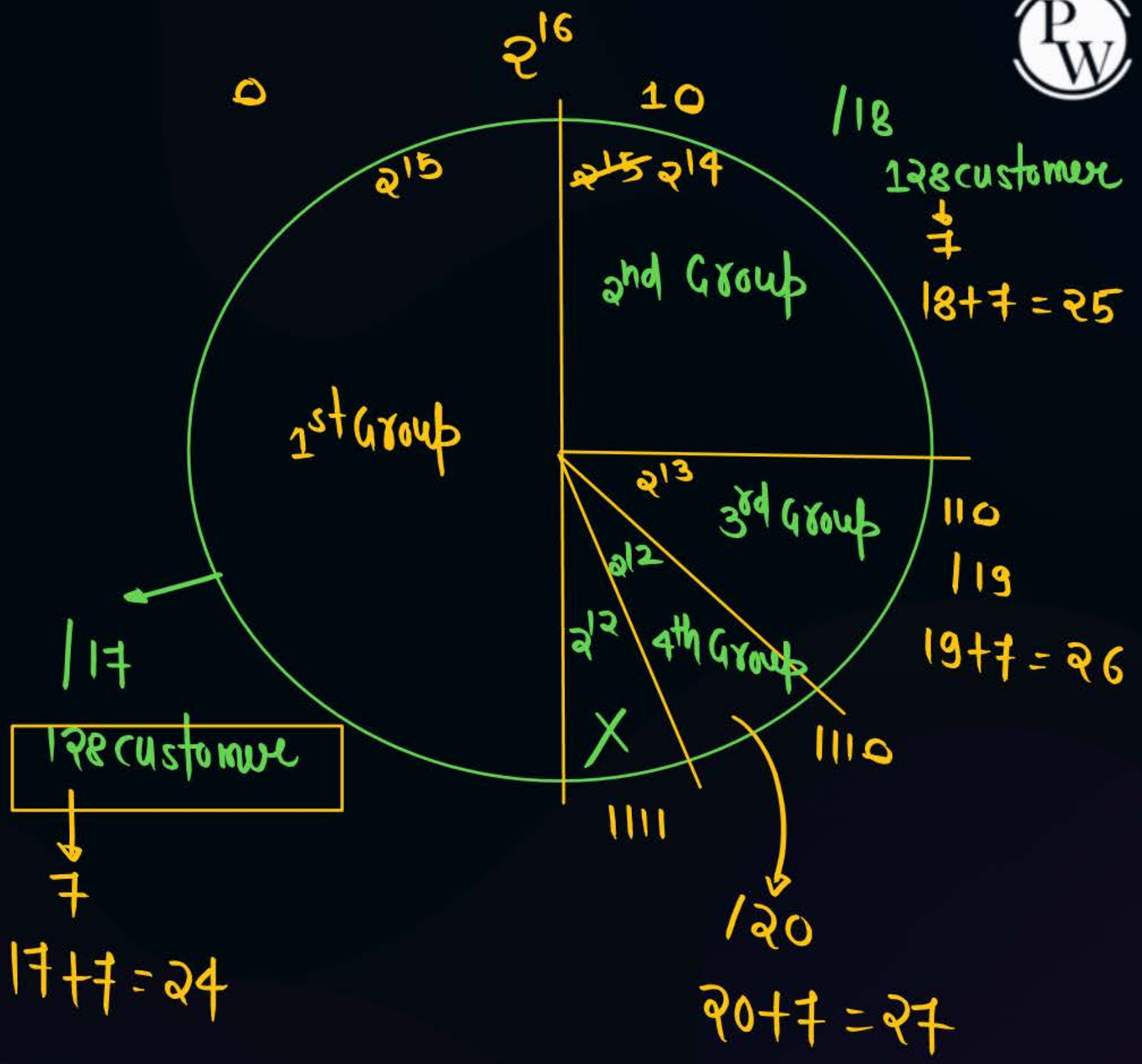
D 23,24,25,26

1st Group = 128 * 256 = $2^7 * 2^8 = 2^{15}$

2nd Group = 128 * 128 = $2^7 * 2^7 = 2^{14}$

3rd Group = 128 * 64 = $2^7 * 2^6 = 2^{13}$

4th Group = 128 * 32 = $2^7 * 2^5 = 2^{12}$



[MCQ]

#Q. An organization has the following routing prefix: 142.37.22.0/23. It is required to have 4 subnets in organization, one subnets has 210 hosts and the 3 other subnets has 55 hosts each. What are the 4 subnet network addresses and their corresponding prefixes?

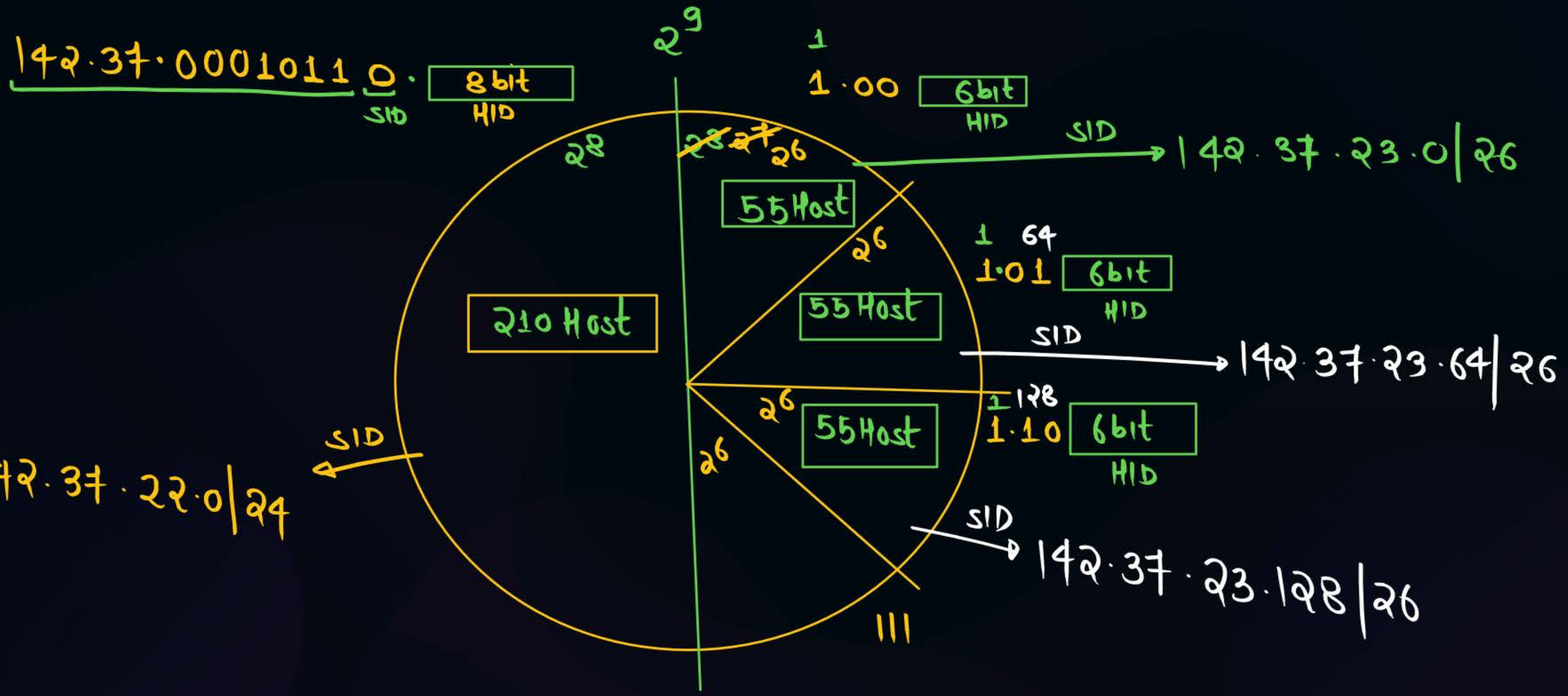
A. 142.37.22.0/24, 142.37.22.0/26, 142.37.23.64/26, 142.37.23.128/26

B. 142.37.22.0/24, 142.37.23.0/26, 142.37.23.64/26, 142.37.23.128/26

C. 142.37.22.0/24, 142.37.23.0/25, 142.37.23.64/26, 142.37.23.128/27

D. 142.37.22.0/24, 142.37.22.0/26, 142.37.22.64/26, 142.37.22.128/26

142.37.22.0/23, NID = 23 bit
HID = 9 bit



[MCQ]

#Q. Consider the following four IP addresses:

212.56.146.0/24 , HID = 8

212.56.147.0/24 , HID = 8

212.56.148.0/24 , HID = 8

212.56.149.0/24 , HID = 8

The single CIDR aggregation of the above four IP addresses is

A 212.56.146.0/21

B 212.56.146.0/22

C 212.56.146.0/23

D Not possible to perform in single aggregation

① Contiguous (True)

② same size = 2^3 & No. of N/W = $4 = 2^2$

③ 1st NID must be div by total size of supernet

Total size of subnet $= 2^8 + 2^8 + 2^8 + 2^8$

$= 2^{10}$

212.56.10010010.00000000 | 2^{10} (False bcz Rem is Non zero)

Rem or HID

[MSQ]

#Q. An ISP has the following CIDR based IP-address available with it:

200.200.128.0/20.

The ISP wants to give half of this IP-address to Org-A and quarter to Org-B. If first IP-Address will be assigned to a network which consumes more number of IP-address, then what is possible value of 3rd octed of Org-B_____?

H.W

A 136

B 140

C 128

D 132

[MCQ]

#Q. Which one of the following hosts in any subnet of 192.168.32.0 is not valid. Assume the subnet mask used is 255.255.255.240

A 192.168.32.33

B 192.168.32.112

C 192.168.32.119

D 192.168.32.126

H·W

2 mins Summary

Topic One — IPv4 Addressing

Topic Two — Subnetting

Topic Three — Supernetting

Topic Four

Topic Five

THANK - YOU

Error control