IP AND SUBNETTING EXERCISES

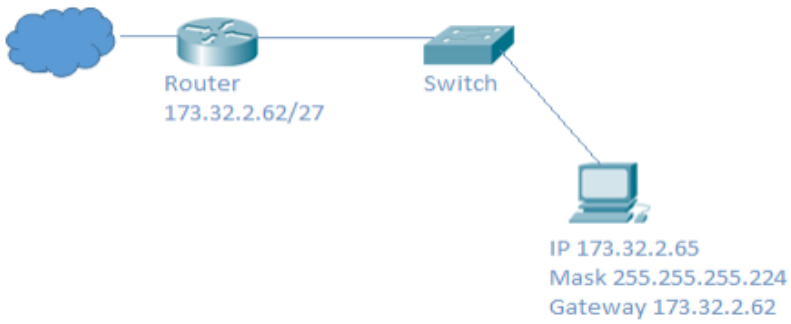
1. Write the subnet, broadcast address and valid host range for the following:
   a. 192.168.100.17, with 4 bits of subnetting
   b. 192.168.100.66, with 3 bits of subnetting
   c. 172.16.10.5/20
   d. 172.16.10.33/255.255.252.0

2. You have been asked to create a subnet that supports 126 hosts. What subnet mask is the most efficient one?

3. Given the following
   a. Network address: 192.168.10.0
   b. Subnet mask: 255.255.255.192

How many subnets are there? How many hosts? What are the valid subnets?

4. What is the problem in this Network?



5. XYZ Company would like to subnet its network so that there are five separate subnets. They will need 25 computers in each subnet. Complete the following table: NOTE: If you create more than five subnets, list the extra ones too.

Subnet	Network address	Host addresses	Broadcast address
Subnet mask: 255.255.255.___			
First subnet	192.168.162.___	192.168.162.___ - 192.168.162.___	192.168.162.___
Second subnet	192.168.162.___	192.168.162.___ - 192.168.162.___	192.168.162.___
Third subnet	192.168.162.___	192.168.162.___ - 192.168.162.___	192.168.162.___
Fourth subnet	192.168.162.___	192.168.162.___ - 192.168.162.___	192.168.162.___
Fifth subnet	192.168.162.___	192.168.162.___ - 192.168.162.___	192.168.162.___
Sixth subnet ?			
?			

6. Imagine we want to create 1000 subnets with a /8 private network. Calculate the mask and the first, second, penultimate and last networks you would obtain.

(1) 192.168.100.17./28

4 bits   0.0.0.0 | 0.0.0.0   4

nº Host = $2^4 - 2 = 16 - 2 = 14$

nº Subnet = $2^4 = 16$

128 64 32 16 8 4 2 1

NA. 192.168.100.17.

Mask. 255.255.255.0

Subn. $2^4 = 16$.

Bits. 4. 255.255.255.1111 | 0000

255.255.255.240.

128
64
192
32
224
16
240

256 - 240 = 016

	host	Direccion Red	Mask	Min Host	Max Ho	Broad.
1	$2^4 - 2 = 14$	192.168.100.16	28	192.168.100.17	192.168.100.30	192.168.100.31
		192.168.100.32				

192.168.100.66   3 bits.

128
64
32
224

128
32

255.255.255.111 | 00000
224

Nº SN: 2^3 = 8

Nº H: $2^5 - 2 = 32 - 2 = 30$.

11000000.10101000.01100100.010|00010
111|00000
010
192 168 100 64.

Subnet address	Mask	FH	LH	
192.168.100.64	/27	192.168.100.65	192.168.100.94	192.168.100.95

172.16

64
128

8 8 8 8

$128+64+32+16$
192 48 = 240

Net Address 172.16.10.5/20 0000|0000|000 00000.
1111 12

Mask. 255.255.240.0
0 0 15.255.

$N°H = 2^{12} - 2 = 4096 - 2 = 4094.$

$N_{SN} = 2^4 = 16$

00001010 00000101
11110000 00000000
00000000 00000000
172.16.0.0.

0

N A	F IP	L H	
172.16.0.0	172.16.0.1	172.16.15.254	172.16.15.255

10101100.00010000.0000|0000.00000000 Net.
10101100.00010000.0000|0000.00000001 F.IP.
10101100.00010000.00001111.11111110 L.IP
.00001111.11111111 Broad

172.16.10.33
255.255.252.0 /22

$N°H = 2^{10} - 2 = 1024 - 2 = 1022.$

111111|00.0000000000
00001010 1

172.

	First H	Last H	B Cast
172.16.8.0	172.16.8.1	172.16.11.254	172.16.11.255.

(2)

128. 64. 32.
126 host.

/25

$2^7 = 128 - 2 = 126$

11111111.1|0000000

(3)

192.168.10.0

255.255.255.192

11 | 000000

256

$2^6 - 2 = 64 - 2 = 62$ host.

$2^2 = 4$ subnets.

192.168.10.0

192.168.10.64

192.168.10.128

192.168.10.192

128
64
32
224

(4)

Router 173.32.2.62/27.

173.32.2.63

255.255.255.224.

111 | 00000

N=H = 32 - 2 = 30 (2x2x2x2x2)

NSN = 8 (2x2x2)

24
8.3=24
8

173.32.2.0 →

173.32.2.32 → → Router.

173.32.2.64 → → Diktop

173.32.2.96 →

173.32.2.128 →

173.32.2.192 →

173.32.2.224 →

Different Subnets.

(5) 192. 168. 162.
255. 255 255.

Five subnets
25. Host.

2 × 2 × 2 × 2 × 2 = 32 − 2 = 30 ≥ 25

2 × 2 × 2 = 8 subnets.

192.168.162.0   192.168.162.1. − 192

192.168.162.32	192.168.162.31	− 192.168.162.62	192.168.162.63
64	65	− 192.168.162.94	95.
96	97	126	127
128	129	158	159
160	161	190	191
192	193	222	223
224	225	254	255.

128
64

(6) /8   11111111 . 11111111 . 11 | 000000 . 00000000

$2^8 = 256$

$2^{10} = 1024.$ 255.255.255.192.0   /18.

$2^{14} =$

N° Host: $2^{14} - 2 = 16384$ por subred.

X . 0 . 0 . 0. first   11111111 . 000   01   ___
X . 0 . 64 . 0 second net.   0   1 1
X . 0 128 . 0.

X 254. 192. 0
X 255. 0 . 0
X. 255. 64 . 0
X. 255 192. 0