

WEEKLY TEST – 03

Subject : Computer Networks

Topic : Classless Addressing and Supernetting



Maximum Marks 15

Q.1 to 5 Carry ONE Mark Each

[NAT]

1. How many networks can be joined with class C supernet mask 255.248.0.0?

[NAT]

2. Suppose, IP address of the block is 200.196.78.79 and subnet mask contain 29 ones in the network. Then the subnet number will be _____.

[MCQ]

3. A block contains 512 IP addresses. Which of the following can be first address of the block to assign any host?
- (a) 118.17.15.0 (b) 118.17.14.0
(c) 118.17.14.15 (d) 118.17.14.1

[MCQ]

4. How many maximum networks can be combined with supernet mask 255.252.0.0?
- (a) 4 (b) 512
(c) 1024 (d) None of these

[MCQ]

5. A company needs 720 addresses which of the following supernet mask is possible if it is for class C address?
- (a) 255.255.0.0
(b) 255.252.0.0
(c) 255.255.255.255
(d) None of these

Q.6 to 10 Carry TWO Mark Each

[NAT]

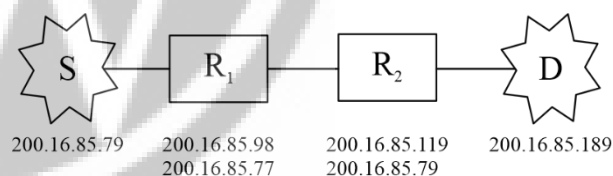
6. Suppose a class B network is divided into 4096 subnets. How many subnets are possible if we use variable length subnet mask? _____

[MCQ]

7. Suppose IP address of the block is 69.169.9.74 and subnet mask is 255.252.0.0. What is the 186th host of 11th subnet?
- (a) 0100101.00101100.10111010.00000000
(b) 01000101.00101100.00000000.10111010
(c) 01000101.00101000.00000000.10111010
(d) None of these

[MCQ]

8. Consider the following scenario given below:



In above scenario sources 'S' is connected to destination 'D' through two routers R₁ and R₂. Suppose, the netmask is used in the network is 255.255.255.224. Which subnet number and how many subnets is /are same subnets are guaranteed to already exist in the network with respect to source 'S'?

- (a) 3 and 2 (b) 4 and 3
(c) 2 and 3 (d) 3 and 3

[MCQ]

9. Consider two systems S_1 and S_2 with their IP address and subnet mask are given below:

System	IP address	Subnet mask
S_1	212.128.17.58	11111111.11111111 .11111111.11110000
S_2	212.128.17.33	11111111.11111111 .11111111.11000000

Which of the following is correct for above given two systems?

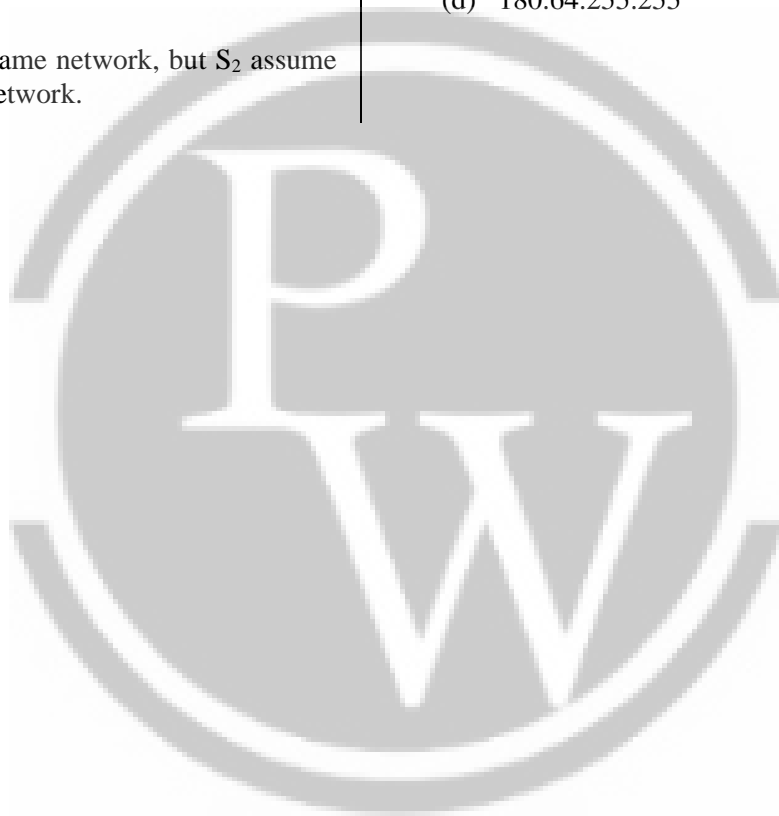
- (a) S_1 and S_2 both assume they are on the same network.
- (b) S_1 assume S_2 is on same network, but S_2 assume S_1 is on a different network.

- (c) S_2 assume S_1 is on same network, but S_1 assume S_2 is on a different network.
- (d) None of these

[MSQ]

10. Which of the following is/are valid Direct Broadcast Address (DBA) for subnet mask 255.255.240.0?

- (a) 180.64.248.255
- (b) 180.64.63.255
- (c) 180.64.127.255
- (d) 180.64.255.255



Answer Key

1. (2048)
2. (10)
3. (d)
4. (c)
5. (b)

6. (1820)
7. (c)
8. (a)
9. (c)
10. (b, c, d)



Hints and Solutions

1. (2048)

Supernet mask = 255.248.0.0

NID = 13

NID in class C = 24

Number of bits for network that can be joined = 11

$$\begin{aligned}\text{Number of networks} &= 2^{11} \\ &= 2 * 1024 \\ &= 2048\end{aligned}$$

2. (10)

IP address = 200.196.78.01001111

Subnet mask

$$= 11111111.11111111.11111111. \frac{11111}{\text{SID}} \frac{000}{\text{HID}}$$

NID = 24 bit (class C IP)

SID = 5 bits

Subnet ID = 200.196.78.01001000

$$\begin{aligned}\text{Subnet number} &= 01001 \\ &= 8 + 1 + 1 \\ &= 10\end{aligned}$$

3. (d)

Number of IP addresses = 512

Number of bits = 9 bits

HID bits = 9 bits

Last 9 bits of the network must be 0.00000001 to assign first host

(a) 118.17.00001111.00000000 **Invalid**

(b) 118.17.00001110.00000000 **Invalid**

(c) 118.17.00001110.00001111 **Invalid**

(d) 118.17.00001110.00000001 **Valid**

Hence, option (d) is correct.

4. (c)

Supernet mask = 255.252.0.0

- It can be supernet mask either for class B or Class C
- For class C number of networks can be combined $= 2^{10} = 1024$
- For class B number of networks can be combined $= 2^2 = 4$

Maximum we can combine 1024 networks

5. (b)

Number of addresses = 720 (10 bits)

SM for class C = 255.255.255.0

NID = 24 bits

HID = 8 bits

- For 720 address 10 bit borrowed from NID
- Supernet mask
- $$= 11111111.11111100.00000000.00000000$$
- $$= 255.252.0.0$$

Hence option (b) is correct.

6. (1820)

- Class B
- By default SM for class B = 255.255.0.0
- To divide 4096 subnets, 12 bits needed
- First 16 bits are fix i.e 255.255
- Choose 12 bits out of 16

$$\begin{aligned}\text{Total SM} &= {}^{16}C_{12} \\ &= \frac{16 * 15 * 14 * 13}{4 * 3 * 2} \\ &= 1820\end{aligned}$$

7. (c)

IP address = 69.169.96.74

Subnet mask = 255.252.0.0

$$= \frac{11111111}{\text{NID}} \cdot \frac{111111}{\text{SID}} \frac{00.00000000.00000000}{\text{HID}}$$

Ankit Doyla Rule

<u>128</u> <u>64</u> <u>32</u> <u>16</u> <u>8</u> <u>4</u>	Subnet number
0 0 0 0 0 0	1
0 0 1 0 1 0	11 th subnet

SID of 11th subnet

$$= 69.00101000.00000000.00000000$$

$$= 69.40.0.0$$

186th host of 11th subnet = 69.40.0.186

$$= 69.40.0.10111010$$

$$= 01000101.00101000.00000000.10111010$$

Hence, option (c) is correct.

8. (a)

Source S SID = 200.16.85.79

$$\begin{array}{r} 255.255.245.224 \\ \hline \end{array}$$

$$\begin{array}{r} 200.16.85.64 \\ \hline \end{array}$$

Subnet ID = 200.16.85.01000000

Subnet number = 010

$$= 2 + 1$$

$$= 3$$

R₁ SID with IP address 200.16.85.98

SID = 200.16.85.96

$$= 200.16.85.01100000$$

Subnet number = 4

R₁ SID with IP address 200.16.85.77

SID = 200.16.85.64

Subnet number = 3

R₂ SID with IP address 200.16.85.119

SID = 200.16.85.96

Subnet number = 4

R₂ SID with IP address 200.16.85.79

SID = 200.16.85.64

Subnet number = 3

Destination 'D' SID

SID = 200.16.85.128

Subnet number = 5

- Subnet number 3 is same subnet with respect to sources i.e already exist in the network.

Hence, option (a) is correct.

9. (c)

S₁ IP = 212.128.17.58

S₂ IP = 212.128.17.33

S₂ SM = 11111111.11111111.11111111.11110000

$$= 255.255.255.240$$

S₂ SM = 11111111.11111111.11111111.11000000

$$= 255.255.255.192$$

For SM S₁:

$$\text{NID}_{S_1 S_1} = 255.255.255.240$$

$$\begin{array}{r} 212.128.17.58 \\ \hline \end{array}$$

$$\begin{array}{r} 212.128.17.48 \\ \hline \end{array}$$

$$\text{NID}_{S_2 P_1} = 255.255.255.240$$

$$\begin{array}{r} 212.128.17.33 \\ \hline \end{array}$$

$$\begin{array}{r} 212.128.17.32 \\ \hline \end{array}$$

Both NID are different with SM S₁. So, S₁ assume S₂ is on different network.

For SM S₂:

$$\text{NID}_{S_1 S_2} = 255.255.255.192$$

$$\begin{array}{r} 212.128.17.58 \\ \hline \end{array}$$

$$\begin{array}{r} 212.128.17.0 \\ \hline \end{array}$$

$$\text{NID}_{S_1 S_2} = 255.255.255.192$$

$$\begin{array}{r} 212.128.17.33 \\ \hline \end{array}$$

$$\begin{array}{r} 212.128.17.0 \\ \hline \end{array}$$

Both NID are same with SM S₂. So, S₂ assume S₁ is same Network.

Hence option (c) is correct.

10. (b, c, d)

Subnet mask

$$= 11111111.11111111.11110000.00000000$$

HID bits = 12 bits

In the network last 12 bits must be 1111.11111111

(a) 180.64.11111000.11111111 invalid

(b) 180.64.00111111.11111111 Valid

(c) 180.64.01111111.11111111 Valid

(d) 180.64.11111111.11111111 valid.

Hence, option (b, c, d) are correct.

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PW Mobile APP: <https://smart.link/7wwosivoicgd4>