41. What is the supernet mask for the given networks below? 100.10.32.0/24, 100.10.33.0/24, 100.10.34.0/24, ... 100.10.47.0/24

A. /26 **B. /20** C. /21 D. /24

Answer: Option B

Explanation:

100.10.00100000.00000000
100.10.00100001.00000000
100.10.00100010.00000000

100.10.00101111.00000000

1st Rule: contiguous ✓
2nd Rule: all network size should be same (28) ✓
3rd Rule: 1st IP should be divisible by total size ✓
∴Total size=24*28=212

∴ 1st IP is divisible [12×0's(least significant) are there in 1st IP]

∴ Changing bits are '4'.

⟹24 − 4 = 20

42. A router uses the following routing table:

Destination	Mask	Interface
144.16.0.0	255.255.0.0	Eht 0
144.16.64.0	255.255.224.0	Eth 1
144.16.68.0	255.255.255.0	Eth 2
144.16.68.64	255.255.255.224	Eth 3

A packet bearing an estimated address 144.16.68.117 arrives at the router.
On which interface will it be forwarded ?

A. Eht 1
B. Eth 2
C. Eth 3
D. Eth 0

Answer: B
Explanation:

Perform the bitwise AND of the given IP address with a subnet mask; the resultant is the destination address. According to the concept, we will choose the interface with the highest 1s in the subnet mask.
Therefore, Eth2 has the highest number of 1s in the subnet mask.
For example:
144. 16. 68. 117 AND 255.255.255.0 = 144. 16. 68.0, so it can be forwarded to this interface eth2

43. What is the supernet mask for the given below networks?

95.72.32.0/24, 95.72.33.0/24, 95.72.34.0/24, ... 95.72.47.0/24

A. /26 **B. /20** C. /21 D. /24

Answer: Option B

Explanation:

95.72.00100000.00000000
95.72.00100001.00000000
95.72.00100010.00000000
…….
…….
95.72.00101111.00000000

1st Rule: contiguous ✓
2nd Rule: all network's size should be same (2^8) ✓
3rd Rule: 1st IP should be divisible by total size ✓
∴Total size = $2^4 * 2^8 = 2^{12}$
∴ 1st IP is divisible [Bcz 12 least significant 0's are there in 1st IP]

∴ Changing bits are '4'.

⟹24 – 4 = 20

44. A router has the following (CIDR) entries in the routing table.

Address/ mask	Next hop
138.48.56.0/22 138.48.60.0/22	I-0 I-1
192.150.48.0/23	R-1
default	R-2

Next hop for a packet with IP address 138.48.63.10

A. I-0 B. I-1 C. R-1 **D. R-2**

Answer: Option D

Explanation:

Mask for I-0=255.255.252.0, I-1=255.255.252.0, R-1=255.255.254.0
Given IP = 138.48.52.2, Do logical AND with Mask, result NID will not be matched to any of the hope, Goes to Default.

45. Which of the following IP addresses is matched by the address prefix 153.234.99.10/20?

A. 153.235.31.10 B. 153.234.95.23
C. 153.234.102.10 D.153.257.140.10

Answer: Option C

Explanation:

The last address is not even a valid IP address so that we can rule it out. (because 257 octet is not valid). The masks are given as 20, so addresses must have the same first 20 bits for the prefix to match. i.e., the first 20 bits should be matched with the IPs given in the options. We can rule out 123.235.31.10 because the 2nd octet is different.
For the other two addresses, we need to look at how their 3rd octet can match with the prefix(first 20 bits of given IP)
The third byte of the prefix is of the form 0110 ****, i.e., only the first 4 bits matter given the mask size of 20 (8+8+4 = 20). We have: 95 = 0101 1111,
102 = 0110 0110.
Hence, the prefix is a match only for 123.234.102.10

46. In an organisation, a class B address is given by the ISP. There are a total of 6 projects going in 6 different blocks, and each project wants its own subnet to do experiments. Each block in the organisation can be expanded at any time if a requirement arises. The company bought all the routers very long back so the routers are not upgraded with the "ip subnet zero" command. If you are the network administrator, what is the best subnet mask to use in this scenario?

Note: The routers configured with "ip subnet-zero" are the only routers to support the usage of first(with all the 0's in subnet bits place) and last subnet(with all the 1's in subnet bits place)

A. 255.255.0.0 B. 255.255.248.0

C. 255.255.224.0 D. 255.255.240.0

Answer: Option C

Explanation:

The default mask for a Class B is 255.255.0.0.

Option C extends that mask by three bits, creating 8 subnets (2^3=8). Because of routers are not upgraded with "ip subnet zero" command the first subnet (all 0's in subnet bits place) and the last subnet(all 1's in subnet bits place). So we are left with six subnets.

Option A is incorrect because it is the default mask for a Class B and not subnetted at all.

Option B and D are incorrect because although they create sufficient subnets, they do not maximise the number of hosts per subnet and so are not the best answer.

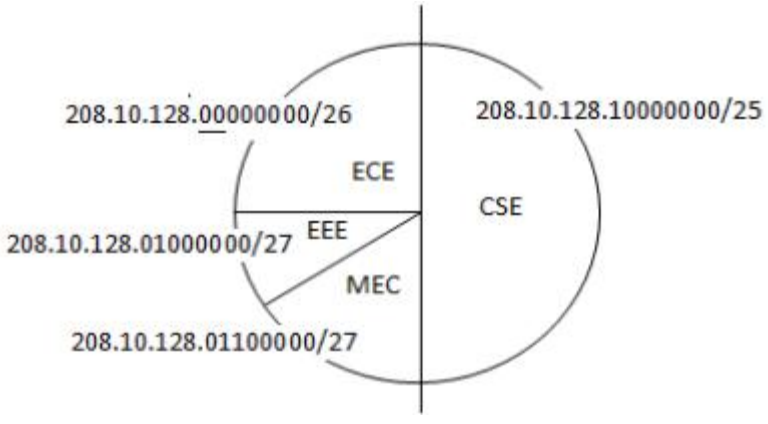
47. In an engineering college, the network administrator has IP 208.10.128.0/24. He needs to divide this network into 4 segments (ECE = 60, CSE = 120, EEE = 30, MEC = 30). ECE block got 208.10.128.0/26 as its address. Then what will be MEC block address?

A. 208.10.128.64/27 **B. 208.10.128.96/27**

C. A or B D. None

Answer: Option B

Explanation:



48. Which of the below range of hosts belong to a particular subnet in class B with IP address 182.168.0.0, if 4 bits are borrowed for subnetting from host ID part?

A. 182.168.17.1 to 182.168.22.254

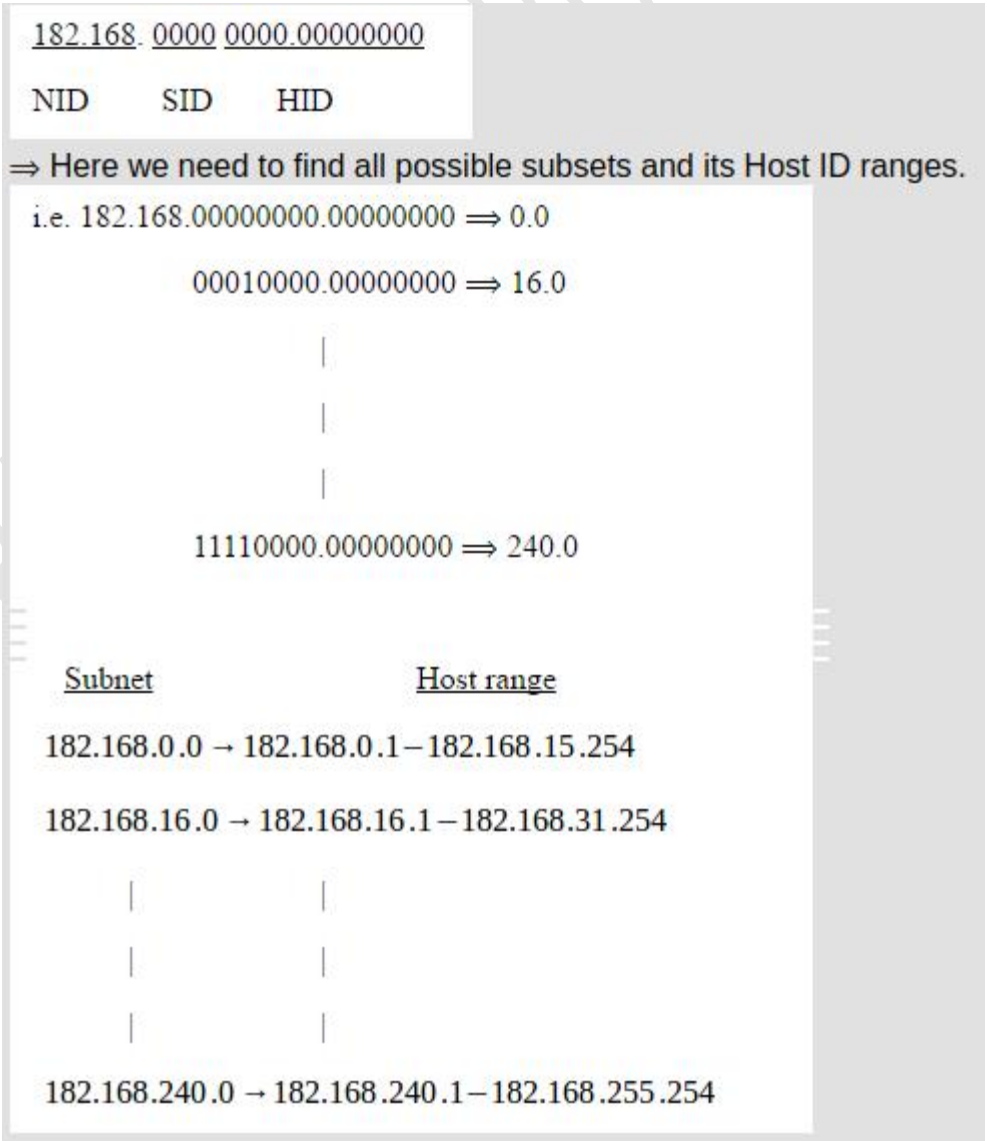
B. 182.168.255.1 to 182.168.22.255

C. 182.168.17.1 to 182.168.32.255

D. 182.168.16.0 to 182.168.22.255

Answer: Option A

Explanation:



49. Consider the following addresses as the first IP addresses of subnets in Oxford University. Among those starting IPs, 4 IPs are given below, whose size is 1024 (i.e block has 1024 IP's). Which of the following IPs is/are a block of 1024 IPs?

1. 205.16.37.32 2.190.16.42.0

3. 17.17.32.0 4.123.45.24.52

A. 1 only **B. 3 only** C. 2 and 1 D. 4 and 3

Answer: Option B

Explanation:

First address of subnet is nothing but the subnet ID of the subnet.
A block(subnet) that contains the 1024 address means the first address(subnet ID) of the subnet is divisible by 1024.

To be divisible by $1024 = 2^{10}$, 10 rightmost bits of an address should be 0.
Only the address 17.17.32.0 meets this condition.

50. How many subnets and number of hosts per subnet is possible?

For a class B network, which has a subnet mask of 255.255.248.0

(A) 30, 1024 **(B) 30, 2046**
(C) 32, 2046 (D) 126, 512

Answer: Option B
Explanation:

Its class B network therefore first 16 bit is for NID, remaining bits are for SID and HID.
So, No of bits for SID is 5 bits and for HID is 11 bits.
The number of subnets possible is $2^5 - 2 = 30$
Number of Host addresses possible is $2^N - 2 = 2046$ (N=11)

51. Consider a network having ID as 198.128.10.10/28. There is a wifi router connected to this network and 2 mobiles and a tablet are connected to this router. Apart from these devices, 2 more desktops with 2 interfaces where the desktops are part of 2 different networks and a laptop exists in this network. How many IP addresses are still available after all the specified devices are connected?

A. **8** B. 10 C. 14 D. 12

Answer: Option A

Explanation:
Given 198.128.10.10/28, NID = 28, HID = 32 - 28 = 4
With 4-bit HID, 2^4 - 2 = 14 possible IP's are available to allocate hosts.
Total devices connected are = 2 mobiles + 1 tab + 2 desktop systems + 1 laptop = 6
Total IPs remaining = 14 - 6 = 8

Note:
Even Though the desktop has 2 interfaces, for one network, one IP will be assigned to one interface and some other IP of another network will be assigned to another interface. Because these are part of 2 different networks. Even though we are accessing through wifi, one IP will be assigned to a device.

52. You would like to set up an office LAN connected to the Internet via a dedicated router. There should be up to 511 hosts with IP addresses connected to the LAN. What is the longest possible netmask for the subnet (the LAN)?

A. 255.255.248.0 **B. 255.255.252.0**
C. 255.255.240.0 D. 255.255.0.0

Answer: Option B
Explanation:
You need 511+2 (first and last can't be used for hosts) + 1 (for router) IP addresses, hence you need 10 bits at least. The longest netmask is 255.255.252.0. (They asked longest possible mask)

53. Which of the following is not a valid private IP address?

(A) 192.38.44.52 (B) 192.168.65.84
(C) 172.19.192.224 (D) 172.30.11.22

Answer : Option A
Explanation : Valid private IP ranges

192.168.0.0 - 192.168.255.255 (65,536 IP addresses)
172.16.0.0 - 172.31.255.255 (1,048,576 IP addresses)
10.0.0.0 - 10.255.255.255 (16,777,216 IP addresses)

54. Perform CIDR on the following /24 IP addresses, 200.96.86.0/24; 200.96.87.0/24; 200.96.88.0/24; 200.96.89.0/24; What is the resulting prefix?

A. 200.96.80.0/20 B. 200.96.86.0/22
C. 200.96.80.0/22 D. 200.96.86.0/20

Answer: Option A

Explanation:

The first 20 bits are fixed and rest 12 bits are variant. Therefore SM is 255.255.240.0. if we do bitwise AND with the first IP and SM, the NID would be 200.96.80.0/20. Which is prefix.

55. Consider a DNS request sent from your laptop. If it is connected to Ethernet, what is the sequence of packet headers on this request packet starting from the outermost header? (We are using the term header loosely when it comes to DNS.)

A. Ethernet, IP, UDP, DNS B. DNS, UDP, IP, Ethernet
C. IP, TCP D. Ethernet, TCP, IP, DNS

Answer: Option A