



# KARACHI INSTITUTE OF ECONOMICS & TECHNOLOGY

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ASSIGNMENT : 01

SUBJECT : Internet & Intranet Architecture

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Q1). For /28

- \* what is the block size:  $2^{32-28} = 2^4 = 16$
- \* how many usable host does the subnet have:

$$2^4 = 16 - 2 = 14$$

- \* what is the subnet mask:

11111111.11111111.11111111.11110000 /28

255.255.255.240

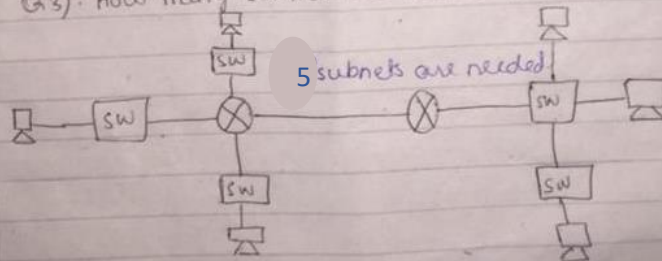
- \* How many subnets of this size are possible:

$$2^{16} = 65536$$

Q2) what is the maximum number of valid hosts one will have from the network 15.0.0.0/19

$$2^{32-19} = 2^{13} = 8192 - 2 = 8190$$

Q3). How many subnets are needed for the following topology



Q4) what is the maximum number of valid subnets one will have from the network 172.26.92.172 255.255.252.0. Assume this is a class B address

$$\begin{array}{ccccccc} 172.26.92.172 & 255.255.252.0 & & & & & \\ & 8 & 8 & 6 & & & = 22 \\ & & & & 11111111.11111111.11111100 & & \end{array}$$

$$172.26.92.172/22$$

$$2^{32-22} = 2^{10} = 1024$$

$$1024 \div 3 = 341 \text{ subnets}$$

Q5) what is the network address of this IP: 10.246.145.151/11

$$\begin{array}{ccc} 10.246.145.151/11 & & \\ \hline 8 & 3 & \end{array}$$

$$\begin{array}{ccccccc} 11111111.11100000.0.0 & & & & & & \\ 255.224.0.0 & & & & & & \end{array}$$

$$11111111.11101110.145.0$$

$$11111111.11100000.0.0 \quad (\text{AND})$$

$$11111111.11100000.0.0$$

$$10.224.0.0 \quad \text{Network Address}$$

Q6) What is the valid host on the network that  
172.22.19.137/19 is a part of?

172.22.00010011.10001001      IP Address  
255.255.11100000.00000000      (OR) Subnet mask

172.22.11110011.136  
172.22.243.136

Q7) What is the network <sup>mask</sup> for the subnet 255.255.255.128?

netmask = no. of network bits  
255.255.255.128  
8   8   8   1   = 25

Q8) What is the first valid host on the network that  
10.92.110.106 255.240.0.0 is a part of?

92  
10.01011100.110.106  
255.11110000.0.0      (AND)  
240

10.01010000.0.0  
10.80.0.0      Network Address  
10.80.0.1      First valid host

Q9) what is the broadcast address of block this  
IP of 172.16.160.151 /18

$$172.16.160.151 / 18 \quad \begin{matrix} 8 & 8 & 2 & = 18 \end{matrix}$$

$$160 = 10100000 \quad 255.255.192.0$$

$$192 = 11000000$$

$$172.16.10100000.151$$

$$255.255.11000000.0 \quad (02)$$

$$11100000$$

$$172.16.224.151 / 18 \quad \text{Broadcast address}$$

Q10) For 1000 Hosts subnet the following network 172.0.0.0/16

$$172.0.0.0 / 16 \rightarrow \text{Network Address } 2^{10} = 1024 - 2 = 1022$$

$$172.0.0.1 \rightarrow \text{First IP}$$

$$172.0.0.255$$

$$172.0.1.0$$

$$172.0.1.255$$

$$172.0.2.0$$

$$172.0.2.255$$

$$172.0.3.0$$

$$172.0.3.255 \rightarrow$$

$$172.0.4.0 \rightarrow \text{Broadcast Address}$$

$$255.255.0.0 \rightarrow \text{subnet mask}$$