# City University of Hong Kong
# Department of Electrical Engineering

## EE3009 Data Communications and Networking

**Solution to Tutorial 3**

1.

| i | Subnet mask | no. of subnets | no. of hosts |
|---|---|---|---|
| 2 | 255.255.255.192 | 2 | 62 |
| 3 | 255.255.255.224 | 6 | 30 |
| 4 | 255.255.255.240 | 14 | 14 |
| 5 | 255.255.255.248 | 30 | 6 |
| 6 | 255.255.255.252 | 62 | 2 |

2.

| i | Subnet mask | no. of subnets | no. of hosts |
|---|---|---|---|
| 2 | 255.255.192.0 | 2 | 16,382 |
| 3 | 255.255.224.0 | 6 | 8190 |
| 4 | 255.255.240.0 | 14 | 4094 |
| 5 | 255.255.248.0 | 30 | 2046 |
| 6 | 255.255.252.0 | 32 | 1022 |
| 7 | 255.255.254.0 | 126 | 510 |
| 8 | 255.255.255.0 | 254 | 254 |
| 9 | 255.255.255.128 | 510 | 126 |
| 10 | 255.255.255.192 | 1022 | 62 |
| 11 | 255.255.255.224 | 2046 | 30 |
| 12 | 255.255.255.240 | 4094 | 14 |
| 13 | 255.255.255.248 | 8190 | 6 |
| 14 | 255.255.255.252 | 16,382 | 2 |

3.       10010110 00100000 01000000 00100010
   AND  11111111 11111111 11110000 00000000
   Address of subnet:        10010110 00100000 01000000 00000000
                             150.32.64.0
   IP address is from 150.32.64.1 to 150.32.79.254

4. To support 20 subnets and 5 hosts per subnet, 5 bits are borrowed from the last byte.
   So, subnet mask is 255.255.255.248, and the three smallest subnet addresses are:
   201.222.5.8, 201.222.5.16 and 201.222.5.24
   For subnet 201.222.5.8, the host addresses are from 201.222.5.9 to 201.222.5.14

5.  128.56.24.0/24  = 10000000.00111000.00011000.00000000
    128.56.25.0/24  = 10000000.00111000.00011001.00000000
    128.56.26.0/24  = 10000000.00111000.00011010.00000000
    128.56.27.0/24  = 10000000.00111000.00011011.00000000
    Mask            = 11111111.11111111.11111100.00000000
    The resulting prefix is 128.56.24.0/22

6.

    a.  ::F53:6382:AB00:67DB:BB27:7332

    b.  ::4D:ABCD

    c.  ::AF36:7328:0:87AA:398

    d.  2819:AF::35:CB2:B271

7.  Typically the wireless router includes a DHCP server. DHCP is used to assign IP addresses to the 5 PCs and to the router interface. Yes, the wireless router also uses NAT as it obtains only one IP address from the ISP.