Practical sheet 08
Computer networks - I

1.

(i) 2^11 - 2

(ii)

	Network address	Broadcast address	Subnet mask
Subnet 1	192.100.1.0	192.100.4.255	/22
Subnet 2	192.100.5.0	192.100.6.255	/23
Subnet 3	192.100.7.0	192.100.7.255	/24

Subnet 1

1024 = 2^10

10 bits

Network address :- 192.100.0000 0001.0000 0000

Broadcast address :- 192.100.0000 0001.0000 0000 + 1023
192.100.0000 0100.1111 1111

Subnet 2

512 = 2^9

9 bits for host

Network address :- 192.100.0000 0101.0000 0000

Broadcast address :- 192.100.0000 0101.0000 0000 + 511
192.100.0000 0110.1111 1111

Subnet 3

256 = 2^8

8 bits for host

Network address :- 192.100.0000 0111.0000 0000

Broadcast address :- 192.100.0000 0111.0000 0000 + 255
192.100.0000 1000. 1111 1111

(iii)

Total allocated = 2048

Remaining = 2048 - (1024 + 512 + 256)

= 256

2.

(i) Total address space = 2^9 = 512

Segment	Network address	Broadcast address	Subnet mask(CIDR)
LAN 1	10.55.210.0	10.55.210.255	/24
LAN 2	10.55.211.0	10.55.211.127	/25
LAN 3	10.55.211.128	10.55.211.192	/26
Leased line	10.55.211.192	10.55.211.195	/30

Address space = 10.55.1101 0010.0000 0000

LAN 1

256 = 2^8
8 bits

Network address = 10.55.210.0
Broadcast address = 10.55.210.255

LAN 2

128 = 2^7
7 bits

Network address = 10.55.211.0 / 10.55.211.0000 0000
Broadcast address = 10.55.211.0111 1111/10.55.211.127

LAN 3

64 = 2^6
6 bits

Network address = 10.55.211.128
Broadcast address = 10.55.211.1011 1111/10.55.211.191

Leased line

Hosts = 2

2^2 = 4

2bits

Network address = 10.55.211.192/10.55.211.1100 0000
Broadcast address = 10.55.211.1100 0011/10.55.211.195

(ii)

Unallocated addresses = 512 - (256 + 128 + 64 + 4) = 60

3.

(i)

Segment	Network address	Broadcast address	Subnet mask
LAN 1	212.42.144.0	212.42.155.255	/21
LAN 2	212.42.156.0	212.42.159.255	/22
LAN 3	212.42.160.0	212.42.160.255	/24

Total no.of addresses available = 2^12 = 4096

LAN 1
2048 = 2^11

11 bits

Network address = 212.42.1001 0000.0000 0000/212.42.144.0

Broadcast address = 212.42.155.255

LAN 2

1024 = 2^10

10 bits

Network address = 212.42.156.0
Broadcast address = 212.42.1001 1111.1111 1111/ 212.42.159.255

LAN 3

256 = 2^8
8 bits

Network address = 212.42.160.0
Broadcast address = 212.42.160.255

(ii)

Unallocated addresses = 4096 - (256 + 1024 + 2048)
= 768

4.

Total no.of addresses allocated = 2^12 = 4096

Segment	Network address	Broadcast address	Subnet mask
LAN 1	220.142.144.0	220.142.151.255	/21
LAN 2	220.142.152.0	220.142.153.255	/23
LAN 3	220.142.154.0	220.142.154.255	/24

LAN 1

2048 = 2^11
11 bits needed

Network address :- 220.142.144.0 / 220.142.1001 0000.0000 0000
Broadcast address :- 220.142.1001 0111.1111 1111 / 220.142.151.255

LAN 2

512 = 2^9
9 bits needed

Network address :- 220.142.152.0
Broadcast address :- 220.142.1001 1001.1111 1111 / 220.142.153.255

LAN 3

256 = 2^8

8 bits are needed

Network address :- 220.142.154.0
Broadcast address :- 220.142.154.255

(ii)

Unused addresses = 4096 - (512 + 256 +2048)
= 1280

5.

Addresses available = 2^15 = 32768

Segment	Network address	Broadcast address	Subnet mask
LAN 1	183.177.128.0	183.177.191.255	/18
LAN 2	183.177.192.0	183.177.207.255	/20
LAN 3	183.177.208.0	183.177.215.255	/21

LAN 1

183.177.128.0

16384 = 2^14

Network address = 183.177.128.0
Broadcast address = 183.177.191.255

LAN 2

4096 = 2^12

12 bits

Network address = 183.177.192.0
Broadcast address = 183.177.1100 1111.1111 1111 / 183.177.207.255

LAN 3

2048 = 2^11

11 bits

Network address = 183.177.208.0
Broadcast address = 183.177.1101 0111.1111 1111/ 183.177.215.255
Unallocated addresses = 32768 - (16384 + 4096 + 2048)
= 10240

6.

Total no. of addresses available = 2^9 = 512

Segment	Network address	Broadcast address	Subnet mask
Subnet 1	100.2.0.0	100.2.0.255	/24
Subnet 2	100.2.1.0	100.2.1.127	/25
Subnet 3	100.2.1.128	100.2.1.191	/26
Subnet 4	100.2.1.192	100.2.1.195	/30

Subnet 1

256 = 2^8

8 bits allocated

Network address = 100.2.0.0
Broadcast address = 100.2.0.255

Subnet 2

128 = 2^7

7 bits allocated

Network address = 100.2.1.0
Broadcast address = 100.2.1.0111 1111/ 100.2.1.127

Subnet 3

64 = 2^6
6 bits

Network address = 100.2.1.128
Broadcast address = 100.2.1.1011 1111/ 100.2.1.191

Subnet 4

2^2 = 4

2 bits

Network address = 100.2.1.192
Broadcast address = 100.2.1.195