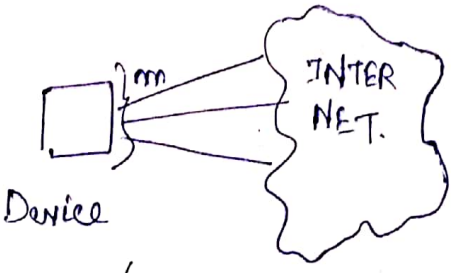
Introduction to Internet Protocol:

Logical Addressing –

1) Global Addressing Scheme –
2) IP - Address : Logical Address (In the network layer)
3) IPv4 (IP Version 4)
4) IPv6 (New generation of IP)
5) IPv4 — Length is 32-bits — total no. of addresses possible = 2^{32}.
6) IPv6 — Length is 128-bits — total no. of addresses possible = 2^{128}.

IPv4:

1) Two devices on the internet can never have the same address at the same time.
2) 

If a device has m- connections to the internet then need to have 'm' addresses

Address Space:

It can be defined as the total no. of addresses defined by a protocol.

If length of the Protocol = N, then the address space is — 2^N [$2^{32} \simeq$ 4-billion]

Representation:

Binary notation
Dotted Decimal notation

01110100.10010101.11110000.00000001

→ Binary notation

117.149.29.2

↓

Dotted Decimal notation

Q) change the following dotted-decimal-notation to Binary notation –

(a) 111.56.45.78
(b) 221.34.7.82

Q) Find the error if any —

(i) 111.56.045.78
(ii) 221.34.7.8.20.
(iii) 75.45.301.14
(iv) 11100010.23.14.67.

Classful Addressing: (obsolete)

- Address Space is divided into 5 basic classes — A, B, C, D, E

Binary notation.

Class A: 0___.___.___.___

Class B: 10___.___.___.___

Class C: 110___.___.___.___

Class D: 1110___.___.___.___

Class E: 1111___.___.___.___

Class A: 0–127

Class B: 128–191

Class C: 192–223

Class D: 224–239

Class E: 240–255

(Q) Identify classes —

(a) 00001111.00010010.00110110.11111111

(b) 252.5.15.111.

Class A: For large Organization

Class B: Midsize Organization

Class C: Small Organization.

Class D: Multicasting

Class E: Broad casting

netid and hostid:

Class A — 1-byte defines the netid and 3 bytes define the hostid.

Class B — 2-bytes define netid and 2 bytes define hostid.

Class C — 3-bytes define netid and 1 byte defines hostid.

Mask:

Default masks in classful addressing

Class	Binary	Dotted Decimal	CIDR
A	11111111.00000000.00000000.00000000	255.0.0.0	/8
B	11111111.11111111.00000000.00000000	255.255.0.0	/16
C	11111111.11111111.11111111.00000000	255.255.255.0	/24

CIDR: Classless inter-domain Routing

Subnetting: If an organization is assigned large block in class 'A' or 'B' then it could be divided into small contiguous sub-groups which in turn can be assigned to smaller networks

Supernetting: In supernetting an organization can combine several class C blocks to create a large range of addresses.