B-5

Q1. Explain difference between IPv4 and IPv6

Ans.

IPV4	IPV6
• In IPV4 there are only 2^{32} possible ways to represent the address (about 4 billion possible addresses)	• In IPV6 there are 2^{128} possible ways (about 3.4×10^{38} possible addresses)
• The IPV4 address is written by dotted-decimal notation, eg: 121.2.8.12	• IPV6 is written on hexadecimal and consists of 8 groups.
• IPV4 header has a checksum	• IPV6 has no header checksum
• It has stateful auto-configuration	• It has both a stateful and a stateless address auto configuration system
• Security on IPV4 networks is limited to tunneling between two networks.	• IPV6 has been designed to satisfy the growing and expanded need for network security.
• IPsec support is optional.	• IPsec support is required.

Q2. Explain header of IPV4 with diagram.

Ans.

VER	HLEN	Service type	Total length
4 bits	4 bits	8 bits	16 bits

Identification	Flag	Fragmentation offset
16 bits	3 bits	13 bits

Time to live	Protocol 8 bits	Header checksum
8 bits	8 bits	16 bits

Source IP address

Destination IP address

Options + Padding
(0-40 bytes)

1- VER (version)
- Indicates the version of IP protocol.

2. HLEN (Header length)
- Specifies the length of IP header in 32-bit ~~ad~~ words.

3. Service type
- Indicates quality of service requested for this IP datagram.

4. Total length
- Specifies total length of the datagram, header and data.

5. Identification
- Used for uniquely identifying fragments of an IP datagram when fragmentation occurs.

6. Flags
- Contains control flags

7. Time to live
- Specifies number of routers the packet can traverse.

8. Protocol
- Identifies protocol used on TCP, UDP, ICMP.

Q3. Explain classes of IP addresses.

Ans. classes of IP addresses :-

1. Class A
- IP addresses belonging to class A are assigned to the networks that contain a large number of hosts.

i) The network ID is 8 bits long
ii) The host ID is 24 bits long

2. Class B
- IP address belonging to class B is assigned to networks that range from medium-sized to large-sized networks.

i) The network ID is 16 bits long
ii) The host ID is 16 bits long

3. Class C
- IP addresses belonging to class C are assigned to small-sized networks.

i) The network ID is 24 bits long.

ii) The host ID is 8 bits long.

4. Class D

- IP addresses belonging to class D is reserved for multi-casting.
- The higher order bits of the first octet of IP addresses belonging to class D is always set to 1110.
- Class D does not possess any subnet mask.

5. Class E

- IP addresses belonging to class E are reserved for experimental and research purposes.
- IP addresses of class E range from 240.0.0.0 – 255.255.255.255.
- This class doesn't have any subnet mask.