

# Computer networks 503442-3

## Assignments

### Chapter:4 Network layer

#### Q1- Choose the correct answer.

- 1) ..... network provides network-layer *connectionless* service  
(datagram, *virtual-circuit*)
- 2) ..... network provides network-layer *connection* service  
(*datagram*, virtual-circuit)
- 3) In ..... simple inside network, complexity at “edge”  
(datagram, *virtual-circuit*)
- 4) In ..... complexity inside network  
(*datagram*, virtual-circuit)
- 5) ..... Provides strict timing, reliability requirements need for guaranteed service  
(*datagram*, virtual-circuit)
- 6) .....is the high order bits of IP address  
(subnet part , host part )
- 7) ..... is the low order bits of IP address  
(subnet part , host part )
- 8) In RIP, advertisements sent in ..... packets, periodically repeated  
(TCP, UDP)

#### Q2- Complete the following sentences.

- 1) **Forwarding** move packets from router’s input to appropriate router output
- 2) **Routing** determine route taken by packets from source to destination.

- 3) *Time to live* field in IP Datagram header represent max number remaining hops (decremented at each router)
- 4) The minimum length of IP Datagram header *20* bytes
- 5) *IP address* 32-bit identifier for host, router interface
- 6) *Interface* connection between host/router and physical link
- 7) in *NAT* local network uses just one IP address as far as outside world is concerned
- 8) *ICMP* internet control message protocol used by hosts & routers to communicate network-level information
- 9) IPv6 datagram format fixed-length *40 byte* header
- 10) *Priority* field in IPv6 datagram identify priority among datagrams in flow
- 11) *Flow label* field in IPv6 datagram identify datagrams in same “flow.”
- 12) The length of IP address in IPv6 is *128 bits*
- 13) In *tunneling* IPv6 datagram carried as payload in IPv4 datagram among IPv4 routers
- 14) In distance vector algorithm, distance metric represents *number of hops*
- 15) In RIP, routing updates (DVs) are exchanged between neighbors approximately every *30 sec* seconds in response message
- 16) In RIP, if no advertisement heard after *180* seconds, neighbor/link declared dead

**Q3: Answer the following Questions**

a) what's a subnet ?

*a device interfaces with same subnet part of IP address  
can physically reach each other without intervening router*

b) What is the main security feature of NAT?

*devices inside local net not explicitly addressable, visible by outside world*

c) Briefly describe NAT router operation with *outgoing datagrams and incoming datagrams*.

**outgoing datagrams:** replace (source IP address, port number) of every outgoing datagram to (NAT IP address, new port number)

. . . remote clients/servers will respond using (NAT IP address, new port number) as destination address

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**incoming datagrams:** replace (NAT IP address, new port number) in destination fields of every incoming datagram with corresponding (source IP address, port number) stored in NAT table

d) What are the motivations of IPv6?

- 1- 32-bit address space soon to be completely allocated.*
- 2- header format helps speed processing/forwarding*
- 3- header changes to facilitate Quality of services*

- 4- Suppose that A datagram of 3,500 bytes arrives at a router and must be forwarded to a link with an MTU of 1,300 bytes. Assume IP header of 20 bytes. Fragment the datagram, and specify the flag, and offset fields of all fragments.

length = 3500	ID = X	frag flag = 0	offset = 0	
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length = 1280	ID = X	frag flag = 1	offset = 0	
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length = 1280	ID = X	frag flag = 1	offset = 160	
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length = 990	ID = X	frag flag = 0	offset = 320	
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