

Fill in the blanks:

1. network number and host address
2. 32 bits(4 bytes) and 128 bits(16 bytes)
3. TCP and UDP
4. frame; packet/datagram; TPDU (transport packet data unit)
5. hub ----> physical layer
gateway --> network layer
repeater --> physical layer
router ----> network layer
bridge ----> data link layer

Short answers:

- 1(a) Internetworking: connecting two or more networks that might be using different protocols, to build a single large network.
(b) Gateway forwards packets between networks in an internetwork and also translates packets in one protocol to another protocol, when necessary.
(c) the Internet.
(d) IP (Internet Protocol).
(e) IP is a best effort datagram service. It does not provide reliability or connection service to the transport layer.
2. Fragmentation is when a datagram has to be broken up into smaller datagrams to fit the frame size of a certain network. Different networks have different MTUs (maximum transfer unit), when a datagram enters a network with a smaller MTU the gateway/router needs to fragment this packet into smaller packets that fit the new MTU.
3. The router decapsulates the data link layer header/trailer. Inspects the network layer header to determine the next hop based on the destination IP address. Encapsulates the datagram in a different data link layer header/trailer. It doesnot inspect the TCP header.
4. UDP is preferred. In real time streaming, we cannot afford the delay consequent to packet retransmissions by TCP.
5.
 - * Reliability: TCP delives data reliably.
 - * Ordered delivery: TCP delives data in order.
 - * Flow-Control: TCP makes sure the sender doesn't overflow the receiver.
 - * Congestion-Control: TCP sends less data when it detects congestion.
6. (a)Using acknowledgements and timeouts and retransmissions.
(b) Using sequence numbers.
Note: explanation is required.

7. DHCP is the Dynamic Host Configuration Protocol. It gives addresses and network configuration to hosts as they plug in the network, hence, dynamic.

Long answers:

1.(a)IP address of webservers are hard-coded. To run Internet services, the IP address should remain the same in order for them to work properly (ie. Web Server, FTP Server). DHCP cannot be used since it assigns a different IP address every time the server is rebooted.

(b)DHCP will automatically assign you a valid IP address.

(c) You have to obtain an unused IP address from the network administrator and configure your laptop manually.

2.

For 128.10.0.1, 192.5.48.3 and 10.0.0.37

class: class B, class C and class A

maximum size possible is:

64K(2^{16}), 256(2^8), 16 million(2^{24})

network number: 128.10.0.0, 192.5.48.0 and 10.0.0.0

host number: 0.1, 3 and 0.0.37

Note: explanation is required.

Problems:

1. In this question we will ignore header overhead and/or assume that it's included in the initial 16KB. We will assume no packet loss.

A will send 4 packets of size 4KB to B over Network1. These datagrams are not fragments, they are normal packets. When router R receives a packet, it will divide each packet into 4 fragments of size 1KB. When B receives the 4 fragments of an original packet it will reassemble the packet and hand it to the higher layer. 16 (1KB) fragments will be received by B, which will reassemble the 4 original packets which will be again reassembled to the 16KB message sent by the user.

2. Table of E and routing from E to A is similar to the example shown in the slides.