1.

a) Suppose there are 5 users whose traffic is being multiplexed over a single link with a

capacity of 1 Mbps.

1) Suppose each user generates 100 kbps when busy, but is only busy (i.e., has

data to send) 10% of the time. Would circuit-switching or packet-switching be

preferable in this scenario? Why? *Answer: Here, circuit switching is*

*preferable since each of the users will each get a dedicated allocation of 100*

*kbps.*

2) Now suppose that the link capacity is still 1 Mbps, but the amount of traffic

each user has to send when busy is increased to 1 Mbps, and that each of the 5

users still only has data to send 10% of the time. Would circuit-switching or

packet-switching be preferable in this scenario? Why? *Answer: Here, packet*

*switching is preferable. We can not allocate 1Mbps per user in circuitswitching*

*mode. Packet switching will work well since the aggregate average*

*traffic rate is 0.5 Mbps and the link is a 1 Mbps link*

b.

Best effort refers to a network service that attempts to deliver messages to their intended destinations but which does not provide any special features that retransmit corrupted or lost packets. Thus, there are no guarantees regarding delivery. An analogy can be made to the postal service

*c.* Suppose that Alice wants to send an email message to Bob. This will involve four

entities: Alice’s mail client (for email composition and sending), Alice’s outgoing

mail server, Bob’s incoming mail server, and Bob’s mail client (for email retrieval

and viewing). Between which of these four entities does the SMTP protocol

operate? What about the IMAP protocol?

*Answer: SMTP runs between Alices mail client andher server, and also*

*(separately) between her server and Bob’s server. IMAP runs between Bob’s*

*server and his mail client to retrieve messages from Bob’s server.*

d.

When referring to networking, encapsulation is the process of taking data from one protocol and translating it into another protocol, so the data can continue across a network. For example, a TCP/IP packet contained within an ATM frame is a form of encapsulation

5 c. Explain why most of the addresses in class A are wasted. Explain why a medium-size or large-size corporation does not want a block of class C addresses

Ans: A block in class A address is too large for almost any organization. This means most of the addresses in class A are wasted and not used. A class A subnet has 24 bits worth of addressing, which is enough for almost 17 million individual devices. Most entities have only a small fraction of this number of devices, so most of the addresses are not used.

A block in class C is probably too small for many organizations. Because its host part has only 8 bits and thus can only give ip to (2^8)256 devices which may be not sufficient.

5. d.

1K

*Network Address Translation* (NAT) is the process where a network device, usually a firewall, assigns a public address to a computer (or group of computers) inside a private network. The main use of NAT is to limit the number of public IP addresses an organization or company must use, for both economy and security purposes.

NET allows us to not assign a public IP to all the existing device(s) in an office, institution or any other entity but only requires one device to have one. So, there is lots of IP is being saved thusly.