Problem1

1.1:The purpose is to help the routers to decide where the data should go and ensure the data could arrive fast.

1.2:First, it separated the concerns, designers could break a big problem into small segments, so the problem could be more easily to solve. Second, it’s more independent for each layer, each layer would concern their own problems and would not affect other layers when displace the protocol etc.

1.3:Link layer convert packets to frame, but physical layer convert frame to bits. Besides Link layer would check the data reliability using checksum or CRC method, however physical layer only transform the bits without checking.

1.4:Physical Layer:”bit” Link Layer:”frame” Network Layer:”packet” Transport Lyaer:”datagram/segment”

1.5:ex1:I log in mysjsu account to view messages.(End -to-end Connection)

Ex2:Inform sender to stop sending data by using some variables, such as rwnd which means receiver window.(Congestion Control)

Ex3:Host runs several applications and send data over internet simultaneously(Multiplexing)

Problem 2

Ex:Connection-Oriented:Using SSH(Secure shell) to upload and download files.

Ex:Connectionless-Oriented: Video chat with other people

For the Connection-Oriented, you have to establish a channel before, then the hosts could communicate, besides the data source is more reliable, because the receiver will check if the data has lost and can ask sender to resend the data.

For the Connectionless-Oriented, hosts don’t need to establish the channel, and the data is less reliable than the Connection-Oriented, since it will not do the check process, but the advantage of Connectionless is that it doesn’t need a good bandwidth compare with Connection-Oriented.

Problem 3

According to the question, physical transport will take 10+100/40=12.5h=45000 second

The upload time will be D/100\*2^20 Second, in order to let physical transport make sense we should let D/100\*2^20>45000, so the minimum Value of D will be 4718592000000 +1

Which is 47185920000001.

Problem 4

1600\*1200\*3=5760000 bytes =45000kbit=43.945 Mb=0.0429 Gb

For the (i)45000/56=803 Second.

For the(ii) 43.945 /1=43.945 Second.

For the (iii) 43.945 /10=4.3945Second.

For the (iv) 43.945 /100=0.43953 Second.

For the (v) 0.0429 /1=0.0429 Second.

Problem 5

Reference :

1.TCP/IP Illustrated Volum1 The protocols (Kevin R. Fall W. Richard Stevens).

2.GeeksForGeeks(<https://www.geeksforgeeks.org/transport-layer-responsibilities/>

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3.Difference between connectionless and Connection(<http://rishabhcs206.blogspot.com/p/difference-between-connectionless-and.html>

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4.Quora(<https://www.quora.com/How-many-bit-in-1kb>

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3.Class PPT.