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Data Communication and Networks

Q1: Protocol layering can be found in many aspects for our lives such as air travelling. Imagine you make a round trip to spend some time on vacation at a resort. You need to go through some you also need to go through some processes when you arrive at the resort airport. Show the protocol layering for the round trip using some layers such baggage checking\claiming, boarding\off-boarding, takeoff\landing.

Answer:

1.	Ticket (Purchase)			Ticket (Complain)
2.	Baggage (Check)			Baggage (Claim)
3.	Gates (Load)			Gates (Unload)
4.	Runway (Takeoff)			Runway (Landing)
5.	Airplane Routing	Airplane Routing	Airplane Routing	Airplane Routing
	[Deparrture Airport]	**[Intermediate Air-traffic Control]**		**[Arrival Airport]**

Q2; Give some advantages and disadvantages of combining the session, presentation and application layer in the OSI model into one signal application layer in the TCP\IP protocol Suite (Internet model).

Answer:

The advantages are:

a) Single layer to study as all the functionalities is provided at this layer.
b) Higher Bandwidth as number of layers is reduced.
c) It reflects the real-Life separation of application from the TCP-downward sections of the OSI model.

The Disadvantages are:

a) Can make reasoning about the architecture of network systems less affective
b) There will be security issues as the network security and application security will open at a signal point which may expose our network to our thread.

c) It make trouble shooting hard as multiple error may reside at a single layer

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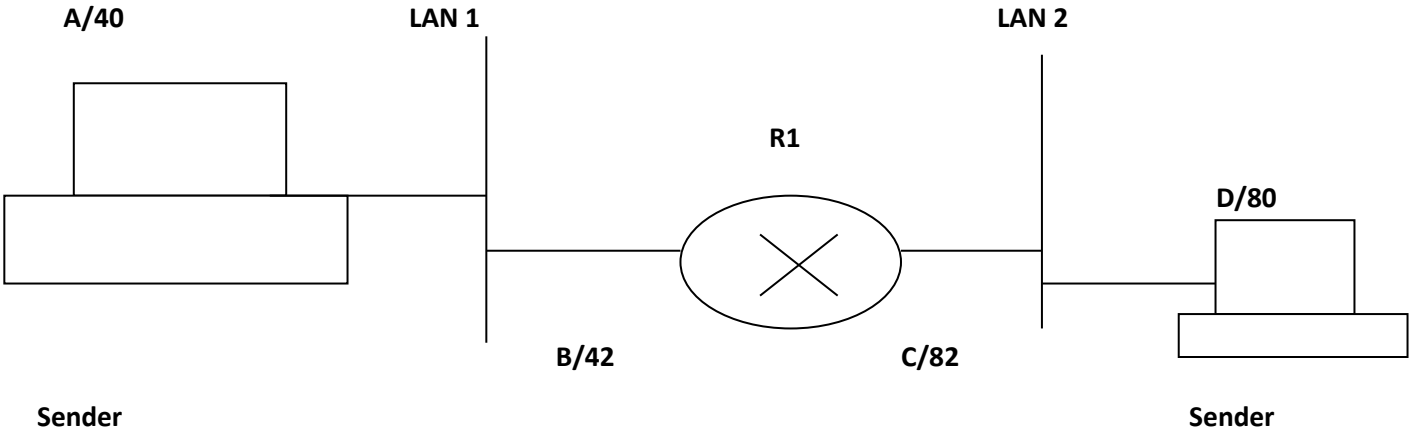
Question No 3

In figure below, assume that the communication is between a process running at computer A with port address ***m*** and a process running at computer D with port address n. show the contents of packets and frames at the network, data link, and transport layer of each hop.

Answer:



4220	***A***	***D***	***Mn Data***	***T2***
8082	***A***	***D***	***Mn Data***	***T2***

Q4: What is the theoretical capacity of a channel in each of the following cases:

a.Bandwidth: 15khz SNRdB=30

b.Bandwidth: 100 khz SNRdB=2

3.Bandwidth: 0.5MHz SNRdB=10

Answer:

a) Bandwidth 15khz SNRdB =30

$$C = B * \frac{SNRdB}{3}$$

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$$= 15khz * \frac{30}{3}$$

=15khz*10

=150kbps

b) C=B*SNRdB\3

= 100 khz*2/3

= 100khz0.666**

= 66.66 kbps

c) C= B * SNRdb /3

=0.5 MH3 * 10/3

=0.5MH3*3.33

=1.66 Mbps

Q5: A digitized system is operated at 4800bps. If a signal element encode an 8-bit word,what is the minimum required bandwidth of the channel?

Answer; Bandwidth $= \frac{\text{bit rate}}{\text{Num of bits}}$

=4800 bps

8

= 600hz.

Q6. What is the bit rate for the signal given below?

Ans. There are 4 bits in 8ns.

Bite Rate = 4/(8*10 power -9)

=0.5*10 power -9

=500 Mbps

Q7. A capacity of channel is given as 40Mbps,the bandwidth of the channel is 6MHz assuming white thermal noise, what signal-to-noise ration is required to achieve this capacity?

Ans. Data rate = Bandwidth log2(1+SNR)

Data rate/Bandwidth = SNR

40Mbps /6 MHZ =SNR

6.6 = SNR

Q8.A composite signal that is non periodic contains frequencyfrom 20 to 40 khz.The peak is 10v for the lowest and hisghest signal is 30 v.for the 30- khz signal …… frequency spectrum?