IQRA NATIONAL UNIVERSITY

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* Data Communication and Networks *

Q1 ?.

Ans ?. Q- One way to describe this system might to be describe the series of actions you take (or other take for you) when you fly on an airline. You purchase your ticket, check your bags go to the gate and eventually get seated onto the plane. The plane takes off and is routed to its destination ~~After your~~ flight plan and. You de-plane at the gate and clim your bags. if the trip was bad you complain about the flight to the ticket (getting nothing for your efforts) This scenario is shown in figure.

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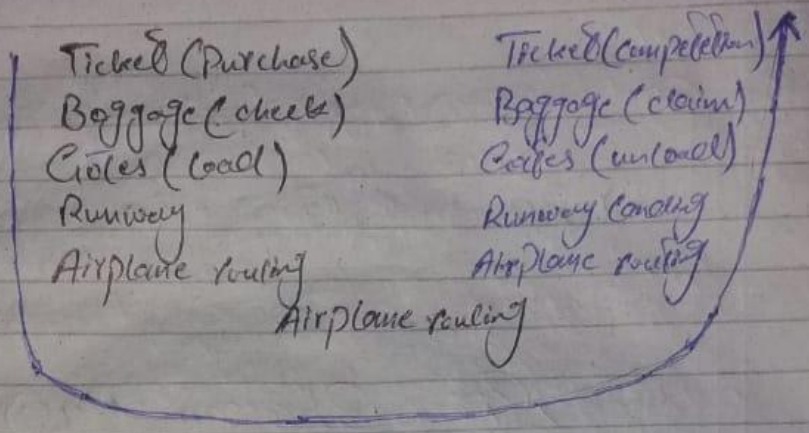

Already we can see some analogies here with computer networking. You are being shipped from source to destination by the airline, a packet is shipped from source host to destination host to internet in a horizontal manner the above figure can be shown as;

Ticket (Purchase)	Ticket completion	Ticket
Baggage (check)	Baggage (claim)	Baggage
Gates (load)	Gates (unload)	Gate
Runway	Runway landing	Takeoff / landing
Airplane routing	Airplan routing Airplane routing	Airplane routing

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Q2/5

Ans/5

Advantages /5

1) By combining these layers the functionality is performed by a single layer and overhead is reduced.

2) It reflect the real-life separation of application from the Top-downward section of the OSI model.

3) Higher Bandwidth as number of layers is reduced.

Disadvantages of /5

1) There will be security issues as the network security and Application security will open at a single point which may expose our network open to our network.

2) More function need to be performed by single layer.

3) Can make reasoning about the architecture of network system less effective.

(4)

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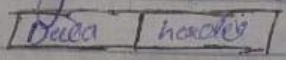
Q3 / 5

Ans 5:

Computer A:

Content of segment at Transport layer



Content of packet at Network layer

A	D	Data	Header

Content of frame at Data Link layer

4240	A	D	m	n	Data	M_2	T_2

Computer D:

Content of segment at Transport layer

Data	Header

Content of packet at Network layer

A	D	Data	Header

Content of frame at Data Link layer

8082	A	D	m	n	Data	M_2	T_2

(5)

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Q4/5

Ans 3

(a)

$SNR(dB) = 10 * \log_{10}(SNR)$

$SNR = 10^{(SNR(dB)/10)}$

$SNR = 10^{(30/10)}$

$SNR = 10^3 = 1000$

As we know that

$Capacity = bandwidth * \log_2(1+SNR)$

$= 15kHz * \log_2(1+1000)$

$= 15kHz * \log_2(1001)$

$Capacity = 15kHz * 9.97$

$Capacity = 149.55 kbps$

(b)

$SNR(dB) = 10 * \log_{10}(SNR)$

$SNR = 10^{(2/10)}$

$SNR = 10^{0.2} = 1.6$

As we know that

$Capacity = bandwidth * \log_2(1+SNR)$

$Capacity = 100kHz * \log_2(1+1.6)$

$Capacity = 100kHz * \log_2(2.6)$

$= 100kHz * 1.38$

$Capacity = 138 kbps$

(c)

$SNR(dB) = 10 * \log_{10}(SNR)$

$SNR = 10^{(10/10)}$

$SNR = 10^1 = 10$

$Capacity = 0.5 MHz * \log_2(1+10)$

$= 0.5MHz * \log_2(11)$

$= 0.5 MHz * 3.46$

$Capacity = 1.73 Mbps$

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Q5 / 3

Ans / 3:

using Nyquist equation

$$C = 2 * B * \log_2 M.$$

We have $C = 4800$ bps

$\log_2 M = 8$, Because a signal element encodes a 4-bit words

Therefore, $C = 4800 = 2B, = 8.$

$$16B = 4800$$

and we have $B = 300$ Hz.

Q6 / 3

Ans / 3:

Here number of bit = 8 bit, and bit duration = 8 ns

Bit rate = 8 bit / 8 ns

Bit rate = 1 bit / ns

Bit rate = $1 * 10^9$ bit/sec)

Bit rate = 1 Gbps

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Q7 / 5

Ans / 5

capacity = bandwidth * $\log_2(1+SNR)$

capacity = 40 Mbps and bandwidth = 6 MHz

putting in above equation

40 Mbps = 6 MHz * $\log_2(1+SNR)$

$40 * 10^6$ bps = $6 * 10^6$ Hz * $\log_2(1+SNR)$

$\log_2(1+SNR) = 40/6$

$\log_2(1+SNR) = 6.67$

$1+SNR = 2^{6.67}$

$1+SNR = 102$

$SNR = 102-1$

SNR = 101

Q8 / 5

Ans / 5

Frequencies = 20 to 40 KHz

bandwidth = 40KHz - 20KHz

Bandwidth = 20 KHz

Amplitude = 10 V for the lowest and the highest signals

30 V for the 30 KHz

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