

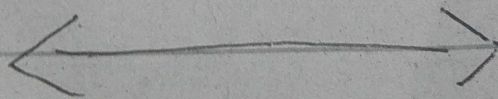
NAME: AWAIS MALIK  
ID: 14741

(1)

Q1

Answer:-

The model uses layers to help give a visual description of what is going on with a particular networking system. This can help network managers narrow down problems as well as computer programmers (when developing an application, which other layers does it need to work with?). Tech vendors selling new products will often refer to the OSI model to help customers understand which layer their products work with or whether it works "across the stack".





(2)

Q No. 1 (b)

Answer:-

Advantages:-

- 1) Single layer to study all the functionalities is provided at this layer.
- 2) Higher bandwidth as number of layers is reduces.
- 3) it reflects the real life separation of application from the Top-downward Sections

Disadvantages:-

- 1) Can make reasoning about architecture of network systems less effective
- 2) 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 threat.
- 3) it makes troubleshooting hard as multiple errors may reside at a single layer.



Q2 (a)

4/

e) Answer

There are 7 layers in OSI model

1) Physical layer:

The physical layer is the 1st layer of OSI model and conveys the bit stream of electrical impulse, radio signals, light signals via the network at the mechanical or electrical levels.

2) Data link layer:

The data link layer is the 2nd layer in the OSI model at this layer the data packets are both encoded and decoded into bits. This layer is divided into two sublayers first is media access control (MAC) and logical link control (LLC).

3) Network layer

It provides routing and switching technologies create logical path called as virtual circuit transmitting the data from one node



4)

Transport layer :-

The transport layer is the fourth layer in OSI model and is responsible for end to end communication over a network-

5)

Session layer :-

It is the fifth layer in OSI model which control the connections between multiple computers - The session layer tracks the dialogs between computers which are also called sessions-

6)

Presentation layer :-

It is the sixth layer of OSI model. It is used to present data to the application layer in an accurate, well defined and standardized format-

7)

Application layer :-

It is the seventh layer in OSI model. It consist of protocols that focus on process-to-process communication across an IP network and provides a firm communication interface and end user service-



(5)

Q No 2 (b)

Answer: A sine wave is comprehensively defined by its amplitude, frequency, and phase. We have been showing a sine wave by using what is called a time domain plot. The time domain plot shows changes in signal amplitude with respect to time. Phase is not explicitly shown on a time domain plot. To show the relationship between amplitude and frequency, we use a frequency-domain plot.



(6)

Q3 (a)

Answer:-

(a) The duration of 1 bit before multiplexing:

Sol = The duration of 1 bit is for  
10 kbps

Unit bit = multiplexing  
individual connection

$$\begin{aligned} \text{So } &= \frac{1}{10 \text{ kbps}} \\ &= \frac{1}{10,000 \text{ bps}} \\ &= 0.0001 \text{ s} = 1 \text{ ms} \end{aligned}$$

The duration of 1 bit for  
Connection 100 kbps:

$$\begin{aligned} &= \frac{1 \text{ bit}}{100 \text{ kbps}} \\ &= \frac{1 \text{ bit}}{100,000 \text{ bps}} \\ &= 0.00001 \text{ s} \text{ Ans.} \end{aligned}$$



The duration of 1 bit for  
Connection 1 Mbps :-

$$= \frac{1 \text{ bit}}{1 \text{ Mbps}}$$

$$= \frac{1}{1 \times 10^6 \text{ bps}}$$

$$= \frac{1}{10^6 \text{ bps}} = 10^{-6} \text{ s}$$

$$= 1 \mu\text{s} \quad \text{Ans}$$

b) The transmission rate of link :-  
The rate of the link is 4-time.  
The rate of connection is 4 kbps.

c) The duration of time slot :-  
The duration of each time slot  
is one fourth of the duration of  
each bit before multiplexing or  
 $\frac{1}{4} \text{ ms}$  or  $250 \mu\text{s}$ . Note that  
we can also calculate this from  
the data rate of the link  
4 kbps. The bit duration is  
the inverse of the data rate  
or  $\frac{1}{4} \text{ kbps}$  or  $250 \mu\text{s}$ .

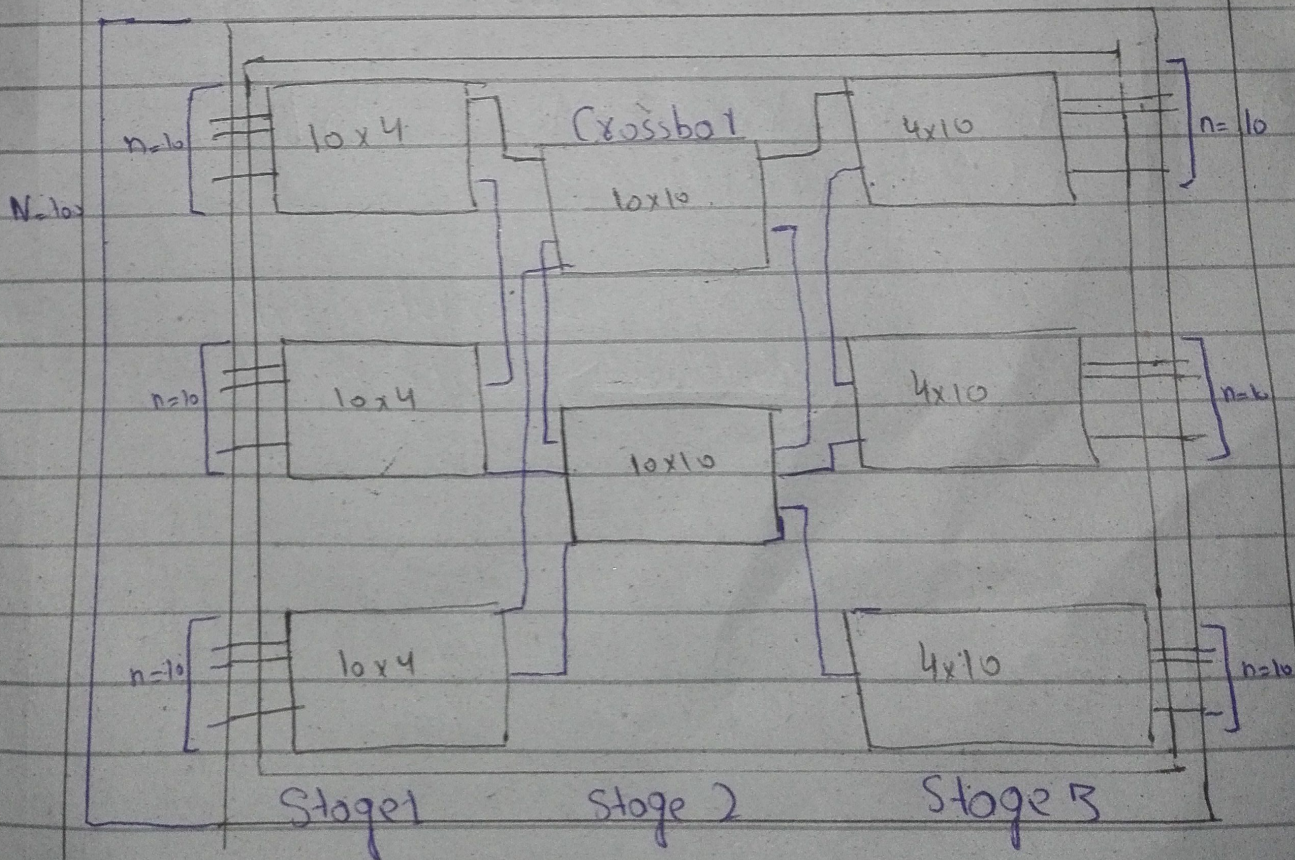


d) The duration of a frame:  
The duration of frame is always same as the duration of unit before multiplexing. we can also calculate this in another way. Each frame in this case has 4 time slots so the duration of frame is 4-times 250  $\mu$ s or 1ms

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Q3 (b)

a) Draw Configuration diagram -





(9)

b)

$$\begin{aligned} \text{The total number of crosspoints} \\ &= 10(10 \times 4) + 4(10 \times 10) + 10(4 \times 10) \\ &= 1200 \end{aligned}$$

c)

only four simultaneous connections are possible for each crossbar at the first stage this means that the total number of simultaneous connections is  $4 \times 10 = 40$ .

d)

if we use one crossbar ( $100 \times 100$ ) all inputs lines can have a connection at the same time which means 100 simultaneous connections.

e)

The blocking factor is  $40/100$  or 40 percent.

