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Program 4th Semester.

Section B.

-: Question 1 :-

-: Part 1 :-

-: ANSWER :-

-: Layer: 1 :-

-: Physical :-

At the bottom of our OSI bean dip we have the Physical representation of the System. This can include everything from the cable type, radio frequency (as in an 802.11g wireless system), as well as the layout of pins, voltages and ~~another~~ other physical ~~occurs,~~ requirements. When a networking problem occurs, many networking pros go right to the physical layer to check that all of the cables are properly connected and that the power plug hasn't been pulled from the router, switch or computer.

-: Data Link :-

The data link layer provides node-to-node data transfer (between two directlly nodes), and also handles error correction from the physical layer. Two sublayers exist here as well - the Media Access Control (MAC) layer & the Logical Link Control (LLC) Layer. In the networking world, most switches operate at Layer.

-: Transport :-

The transport Layer deals with the cordination of the data transfer between end system and hosts. How much data to send, at what rate, where it goes, etc. The best known example of the Transport layer is the Transport Layer is the transmission control Protocol (TCP), which is build on top of the internet Protocol ~~(TCP)~~ (IP), commonly known as TCP/IP. TCP and

Page : 3:

UDP port number work at layer. while IP addresses work at layer, the network layer.

-: Presentation:-

The Presentation represents the area that is independent of data representation at the application layer, in general, it represents preparation or translation of application format to network format, or from network ~~fo~~ formatting to application format. In other words, the layer "presents" data for the application or the network. A good example of this is encryption and decryption of data for secure transmission-this happens at layer.

:Question :1:

:Part B:

Argue the advantages and disadvantages of combining the session, presentation, and application layer in the OSI model into one single application application layer in the Inter model.

:ANSWER:-

:The Advantages:

(a) Single layer to study as all the functionalities is provided at this layer.

(B) Higher bandwidth as number of layer is reduced.

(C) It reflects the real-life separation of application from the TCP-downward sections of the OSI Model.

(2)

-: Disadvantages:-

(a). Can make reasoning about the architecture of network systems less effective.

(b). 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 thread.

(c). It makes troubleshooting hard as multiple errors may reside at a single.

Page (1)

:Q2:

:Part: A:

OSI Model.

Data	Layer
Data =	Application. Network - Process to Application
Data =	Presentation. Data representation & Encryption
Data =	Session. Interhost communication.
Segments =	Transport. End-to-End Connections and Reliability.
Packets =	Network. Path Determination and IP (logical addressing)
Frames =	Data Link. MAC and LLC (Physical addressing)
Bits =	Physical. Media, signal & Binary Transmission.

-: Session: -

When two devices, computers or servers need to "speak" with one another, a session ~~layer~~ ~~function~~ need to be created, and this is done at the session layer. Functions at this layer involve setup, coordination ~~for~~ and termination b/w the applications at each end of the session.

: Network :

Here at the Network layer is when you'll find most of the router functionality that most networking professionals care about and love. In its most basic sense, this layer is responsible for packet forwarding, including routing through different routers.

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(3)

-: Application:-

To further our bean clip analogy, the application layer is the one at the top - it's what most users see. In the OSI model, this is the layer that is the "closest to the end user". Applications that work at layer are the ones that users interact with directly.

:Question:- 2:

-:Part B:-

Answer:-

If the value of a signal changes over a very short span of time, Its frequency is high. If it changes over a long span of time, it's frequency is low. What if a signal does not change at all? What if it maintains a constant voltage level the entire time it is active? In such a case, it's frequency is zero. Conceptually this idea is a simple one. If a signal does not change at all, it never completes a cycle, so it's frequency is 0Hz. But what if a signal changes instantaneously? What if it jumps from one to another in no time? Then its frequency is infinite, In other words, when the signal changes instantaneously its period is zero.

Since frequency is the inverse of period. Then in this case, the frequency is 1/0, is infinity

Phase:-

The term phase describes the position of the wave form relative to time zero. If we think of the wave as something that can be shifted backward or forward along the time axis, phase describes the amount of that shift. It indicates the status of the first cycle.

Phase describes the position of the wave form related to time zero.

Phase is measured in degrees or radians (2π rad = 360). A phase shift of 360 corresponds to a shift of a complete period; a phase sift of 180 degress corresponds to a shift half a period. A Phase shift of 90 corresponds to a shift of quarter of a period.

:Question: 3:

:Part A:

Four Connections (10 kbps, 100kbps, 1Mbps and 10 Mbps) are multiplexed together. A unit is 1 byte or 8 bits. Find (a) the duration of 1 bit before multiplexing (b) the transmission rate of the link (c) the duration of a time slot & (d) the duration of a frame.

:ANSWER:-

(a) The duration of 1 bit before Multiplexing.

The duration of 1 bit as for 10 kbps as follow

$$\frac{\text{unit bit}}{\text{individual connection}} = \text{Multiplexing}$$

So,

$$= 1/10\,\text{kbps}$$

$= \frac{1}{10{,}000\ bps}$ $= 0.0001\ s$ (OR)

$= 1\ ms$ Ans.

The duration of 1 bit for connection 100 kbps as:

$= \frac{1\ bit}{100\ kbps}$

$= \frac{1\ bit}{100{,}000\ bps}$

$= 0.00001\ s$ Ans.

The duration of 1 bit for connection 1 Mbps as:

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

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

$= \frac{1}{10^6\ bps} = 10^{-6}\ s = 1\ \mu s$ Ans.

(3)

The duration of 1 bit for connection 10Mbps as:

$$= \frac{1 \text{ bit}}{10 \text{Mbps}}$$

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

$$= \frac{1}{1 \times 10^7 \text{bps}}$$

$$= \boxed{1 \times 10^{-7} \cdot s}$$ OR

$$= \boxed{10 \times \mu \cdot s}$$ Ans.

(B) The transmission rate of link as:

* The rate of the link is 4-times.

* The rate of a connections or 4kbps.

(c) : The duration of a time slot as:

The duration of ~~a time~~ each time slot is one-fourth of the duration of each bit before multiplexing, or 1/4 ms or 250 μs. Note that we can also calculate this from the data rate of the link ~~4 Kbps~~ 4Kbps. The bit duration is the inverse of the data rate or 1/4Kbps or 250 μs.

: Question :3:

:Part B:

We need a three-stage space-division switch with total inputs of ~~500~~ 10,000.
We use 1000 crossbars at the first and third stages and 16 crossbars at the middle stage.

(A) Draw the configuration diagram.

(B) Calculate the total number of cross-points.

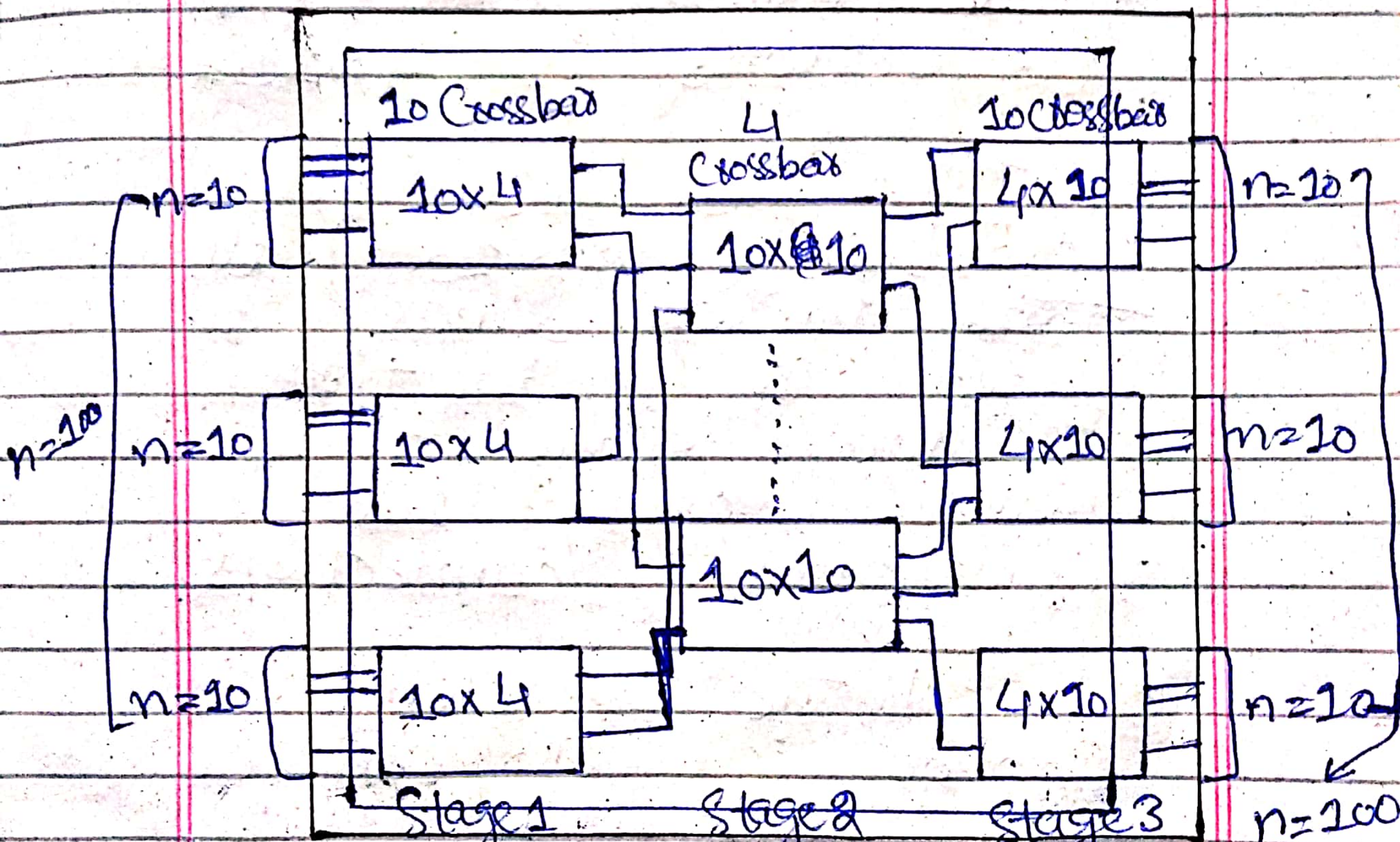
(C) Find the possible number of simultaneous connections.

(D) Find the possible number of simultaneous connections if we use one single crossbar (1000x1000).

(e) Find the blocking factor and the ratio of the number of connections in C, and in d.

:ANSWER:-

(A) Draw the configuration diagram:-



(B) The total number of crosspoints:

$= 10(10\times4) + 4(10\times10) + 10(4\times10)$

$= 1200$

(3)

(c) Only four simultaneous connections are possible for each crossbar at the first stage this means that the total number of simultances connections is 4x10=40.

(D) If we use one crossbar (1000x1000) all ~~points~~ inputs lines can have a connections at the same time, which means 100 simultaneous connections.

(E) The blocking factor is 40/100 or 40 percent. (OR) 40%.