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Program :

BS (SE-4)

Section :

(A)

Assis :

Data Communication & networks

Q1 (a):

Answer:

As we know that in a communication network we use the OSI model which consist on seven layer the network layer work as responsibility of end to end delivery and path selection and it is conceptual model between sender and receiver to send a data or communication with each other. out of seven layer the data link layer are used as a trailer

Trailer has information about the which bit is the starter or the ender and node to node delivery and flow and error control and transmit the bits data into data which are useful for user

> if there is no presentation, transport, data link and physical layer the communication b/w sender and receiver are not possible and also there is no proper way to understand the whole process.

> So the International Standard Organization are introduce the OSI model

> So the OSI model are the most important for communication are there is no way to develop the other model.

And how the OSI and ISO related to each other it is a model.



Q1 (b)

Answer:

The following is the advantages and disadvantages that combining the session application and the presentation layer in the OSI model.

Advantages:

- a) Single layer to study as all the functionalities is provided at this layer.
- b) It is an industry standard and open protocol with scalable architecture.
- c) Higher bandwidth as number of layer is reduced.
- d) It uses flow control, Error control and congestion control mechanisms.
- e) It reflect the real-life separation of application from the top-downward

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Sections of the OSI model.

- E) TCP protocol is connection oriented and uses sequence number which are unique to different packets.
- a) Routers read TCP packets and provide special treatment to them.
 - b) TCP provides relatively better throughput when used on modern or on LAN.

Disadvantages

- a) SI can make reasoning about the architecture of network system less effective.
- b) SI is difficult to setup and maintain compare to NetBEUI or IPX/SPX.
- c) SI make troubleshooting hard as multiple errors may reside at a single.
- d) Handoff overhead can be significant.
- e) TCP does not have any block boundaries programmer need to create their own.
- f) There will be security issues as the network security and application security will open a single point which may expose our network open.

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to our threat.



Q2 a)

Answer:

The Seven-layer of OSI/ISO model are given as

- Layer 7: Application Layer
- Layer 6: Presentation Layer
- Layer 5: Session Layer
- Layer 4: Transport Layer
- Layer 3: Network Layer
- Layer 2: Data Link Layer
- Layer 1: Physical Layer

Physical Layer:

The physical layer is the 1st layer of the OSI/ISO model and conveys the bit stream of electrical impulse, radio signals, light signals via the network at the mechanical or electrical levels. This layer also provide hardware means of sending and receiving the data on a way or a carrier thus includes the definition of cables cards and physical aspects.

2) Data link layer:

The data link layer is the 2nd layer of OSI/ISO model. At this layer the data packets are both encoded and decoded into bits. This layer is divided into two sub-layer first is media Access Control (MAC) layer and logical Link Control (LLC) layer.

3) Network layer:

The Network layer is the 3rd layer of the OSI/ISO model and this layer thus provides routing and switching technologies. Creates logical path called as virtual circuits for transmitting the data from one node to another node.

4) Transport layer:

The transport layer is the 4th layer of the OSI model that provides the transfer of data transparently b/w the end system or between the host systems.

5) Session layer:

Session layer provides means of establishing, maintaining and terminating a dialogue or a session between two end users.

This layer allow a process to add checkpoints which are considered as synchronization points into the data.

6) Presentation layer:

Presentation layer provide facilities to convert message data into a form that is meaningful to communicating application layer. It may perform on message data such transformation - as encoding, decoding, code conversion. Reduce the number of bits that need to be transmitted on the network.

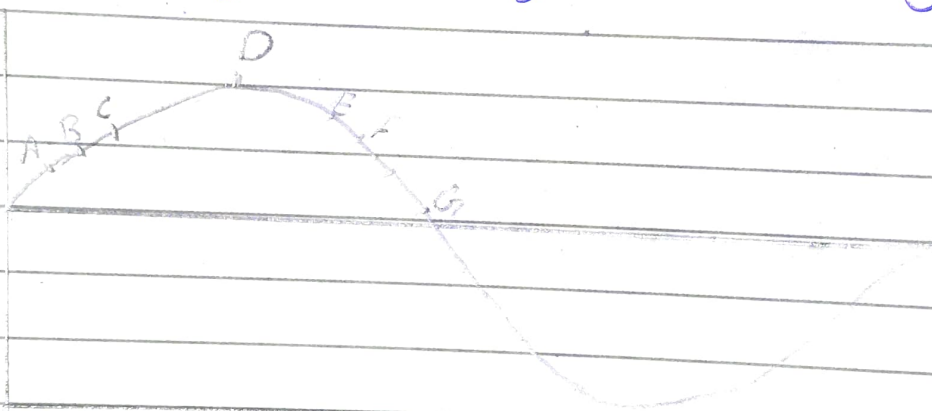
7) Application layer:

Application layer provide services that directly support end user of network. These application produce data which has to be transferred over the network. Application layer is also called Desktop layer.

Q2(b)

Answer:

Phase is a specific location in a sine wave. So in this sine wave we cannot plot phase of a sine wave in a time-phase plot as the wave is constantly changing.



As we can see that all the points are in different position thus we cannot explicitly plot the phase in time-phase plot.

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Q3 (A)

Ans:

a) A ~~unit~~ four connection is
 (10 kbps, 100 kbps, 1 mbps and 10 mbps)
 This mean that the bit duration

$$10 \text{ kbps} = 0.01 \text{ ms}$$

$$100 \text{ kbps} = 0.01 \text{ ms}$$

$$1 \text{ mbps} = 1 \text{ ms}$$

$$10 \text{ mbps} = 10 \text{ ms}$$

a) The duration of 1 bit before multiplexed
 is $\frac{1}{1000} = 0.001 \text{ ms}$ or 1 ms
 and each duration is

$$10 \text{ kbps} = 0.01 \text{ ms}$$

$$100 \text{ kbps} = 0.1 \text{ ms}$$

$$1 \text{ mbps} = 1 \text{ ms}$$

$$10 \text{ mbps} = 10 \text{ ms}$$

b) The transmission rate of the link is
 4 time of a connection or 4 kbps
 4 kbps

c) 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 μs .

d) The duration of a frame is always the
 same as the duration of a unit before
 multiplexing ⁽⁸⁾ or so the duration of time slot

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of the frame is 8 times

OR
for 10kbps channel

a) duration of 1 bit = $\frac{1}{10 \text{ kbps}}$ = 10 ms

for 100kbps of 1 bit = $\frac{1}{100 \text{ kbps}}$

$\frac{1}{100 \text{ kbps}}$ = 100 ms

for 1mbps channel

Duration of 1 bit = $\frac{1}{1 \text{ mbps}}$ = 1 μ s

for 10mbps channel

Duration of 1 bit = $\frac{1}{10 \text{ mbps}}$ = 10 μ s

b) Rate of link = 11.11 mbps

c) The duration of each slot is the inverse of data rate

= $\frac{1}{11.11 \text{ mbps}}$ = 0.09 μ s

d) Duration of frame is always same as the duration of unit before multiplexing

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Q3 b:

Answer:

a) Given data:

$N = 10,000$

$n = 1000$

$k = 16$

In the first stage we have N/n

$N/n = \frac{10,000}{1000} = 10$

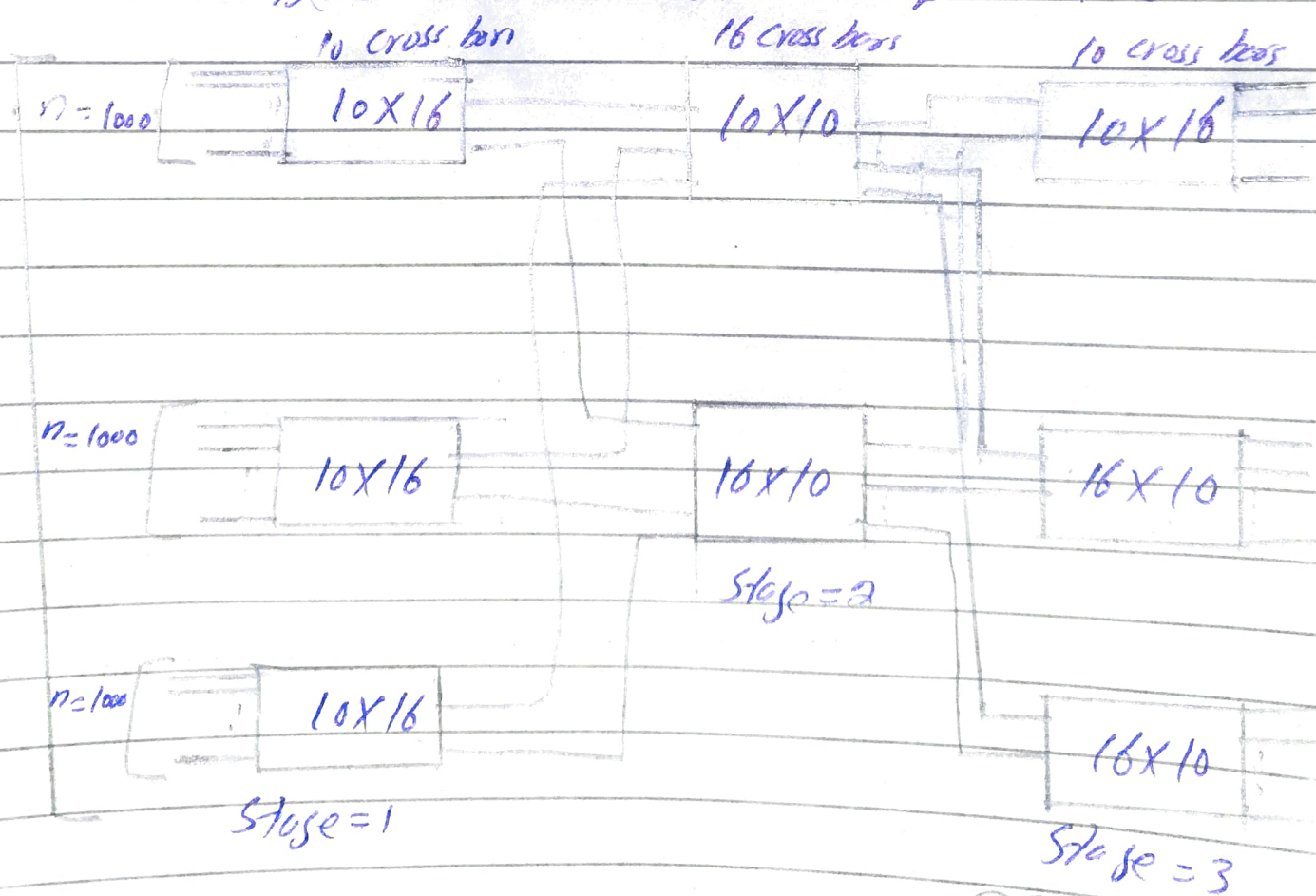
Cross bars each of size is 10×16

In the second stage we have

4 cross bars of size 10×10

In the third stage we have

10 cross bars each of size 16×10



b)

Total numbers of cross points

$$= 10(10 \times 16) + 16(10 \times 10) + 10(16 \times 10)$$

$$= 1600 + 1600 + 1600$$

$$= 4800$$

c) only 16 simultaneous connections are possible for each crossbar at the 1st stage this means that the total number of connections is $16 \times 10 = 160$

d) if we use a crossbar (1000x1000) all input lines can have a connection at the same time which means 1000 simultaneous connections

e) The blocking factor is $\frac{160}{1000} = 16\%$