PAGE NO.:
DATE: / /

C.N

* Network Topology :-
  1. Bus Topology (LAN)
  2. Star Topology → hub / switch.
  3. Mesh topology :- all nodes are connected to eachother
  4. Ring Topology :- Each node connected to two other node.

* Transmission media are facilities used to interconnect computers, wire, cable

* OSI Model :- Open System Interconnection model. 7 layers.

7. Application
6. Presentation → work on data
5. Session
4. Transport → Segments
3. Network → Packets
2. Data Link → Frames
1. Physical → Bits

1. Physical layer :- - Physical connects between device
   - Conv info in bits

2. Data link layer :- - It forms frames from packet & send it to physical layer, & receives packets from Network layer
   - Error detection bit used by it.

- Data layer control flow control of data by using buffer. (used when fast transmitter and slow receive)
- Error control is done by adding trailer at end of frame. Duplicate of frame are also done. prevented.
- Access control is also managed by data link layer.

* Network layer:- • Delives packets from source to destination.
- Divider outgoing ~~packets~~ message into packet.
- And incoming packets to message is converted by it.
- Translate logical add to physical add.
- Router, gateway

* Transport Layer:- Accept data from above layer and split it into smaller unit and pass to Network layer.
- Ensure data received is proper

* Session Layer:- - allow user to establish session
- Synch. & manage the conversation between two diff. appl.
- Dialog control → allow communication in full duplex or half duplex
- Token management:- Prevent two parties from attempting same critical op at same time

Presentation
two comm.
- send data in
- Encryption at
receiver
- Data
*

DATE : / /

Presentation layer:- - take care of syntax and semantic of information exchanged between two comm. system
- send data in such form that is useful and understand.
- Encryption at transmitter and Decryption at receiver.
- Data compression to reduce bandwidth

☆ Applicam layer:- - Manipulate of data in various way eg:- Email, Transfer file, etc

☆ TCP / IP Model :- Transmission control Protocol / Internet Protocol - use a layer communicam Protocol

OSI Model | TCP/IP Model

Applicam, Presentation, Session → Applicam layer
Transport → Transport layer
Network → Internet layer
Data link, Physical → Network Access layer

① Applicam layer :- Include high level protocols like DNS, HTTP, etc

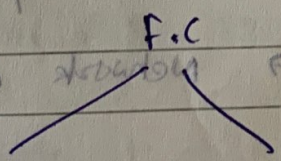
② Transport layer :- Permit device communicam on source and destinam.
- level of service & status of connecm used
- TCP, UDP
  ↳ User datagram Protocol

DATE : /

③ Internet layer - pack data into datapackets as IP datagram.
- contain both destination & source address.
- Decide the route.
- Protocol are IP, ~~ARP~~ ARP, etc

④ Network Access Layer:
- Data is physically sent over network
- Protocol - Ethernet, Token Ring, etc

★ Flow Control:
Sender sends packet at high speed, and receiver receive at slow speed. And buffer is also full, at that receiver discard the new incoming frame. So, sender should get message from receiver that don't send more data this called as flow control. There should be synch. between them.



Stop & wait
↓
Stop & wait ARQ

Sliding window Protocol

Go Back N ARQ

Repeated ARQ

DATE : / /

1. STOP and wait ARQ - Sender sends 1 frame at a time and then waits for ack. from receiver. Then only it sends another frame

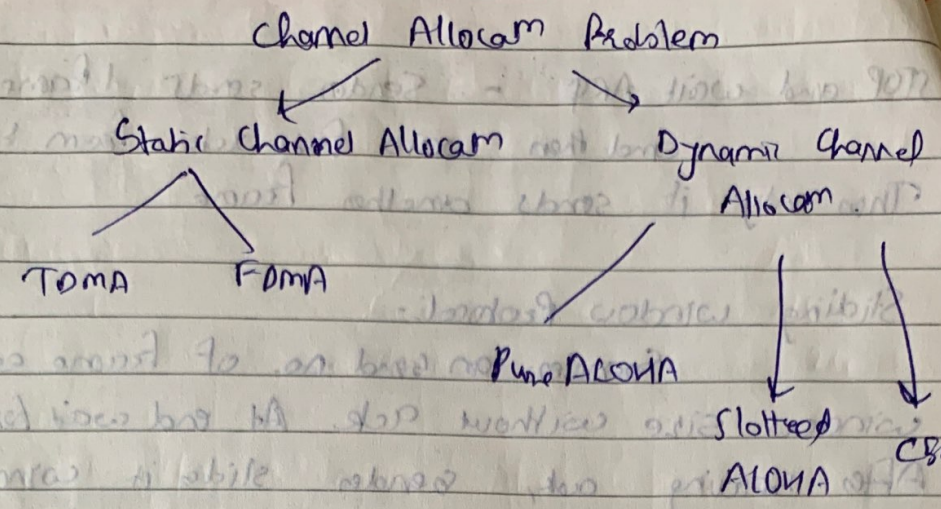
2. Sliding window Protocol:-
   Sender can send no. of frame equal to window size without ack. At end wait for ack.
   - After receiving ack, sender slides it window from right to left.
   - No. of position it will slide depend on ack. no.

☆ Communication Mode:-
   1. Simplex:- only sender can send
   2. Half Duplex:- Sender can send & receiver can ~~receive~~ send but not simultaneously.
   3. Full Duplex:- Sender & receiver can send, receive simultaneously.
   - Sliding window → Full duplex

☆ Error Type :- 1. Frame Damaged
   2. Frame Lost
   3. Ack. lost

☆ - MAC :- Medium Access Control Layer

1. Decide who will send data (St. . This is called channel allocation problem.



① TDMA :- Time division multiple access.
- Allocates diff^n time slot to each user on a given freq.
- Divide each channel into 3 time slot.

② FDMA :- Frequency Division Multiple access.
- Separate channel via freq.
- There is anyone conservam q one user at a time per radio channel

③ Pure ALOHA :- ⓐ Station can send at any time.
- IF collision occurs -
  - detect collosm
  - wait random amount of time
  - again send data

④ Slotted ALOHA :- - Time divided in discrete intervals
- Station can send data at beginning of time interval.

⑤ CSMA :- Carrier Sense Multiple access → Multiple device or one.
- first sense channel before sending data.

Scanned with CamScanner

DATE : / /

1- Persistent :→ Continously listen channel, as soon as channel free, send data.

Non-Persistent → Wait random amount of time, again sense channel to send data.

- CSMA-CD → Collision Detector.
  - If collision detected, then will send data again

- CSMA-CA → Collision Avoidance
  - Used in wireless network.

☆ Logical Addressing

① IPV4 → 32 bit address → unique.

No. of address it can have :→ 2^{32}

ex:- 128.11.3.31

↓ ↓ → → →

10000000 00001011 00000011 00011111

- IPV4 has only 4 parts.
- No number in ip can be more than 255.
- IP should be complete binary or decimal.
- There must be no leading zero. ex(045).
- There are 5 classes

	Binary Notation First Byte	Dotted decimal Notation First Byte
Class A	0	0-127
B	10	128-191
C	110	192-223
D	1110	224-239
E	1111	240-255

DATE :

* Subnet Mask: 32 bit no. used to differentiate network component of IP add. by dividing into a network add. and host add.

ClassA	255.0.0.0	/8
B	255.255.0.0	/16
C	255.255.255.0	/24.

i.e. /8 → mean first 8 bit are of network add. & next one of host add

∴ IPv4 address is x.y.z.t/n

address mask

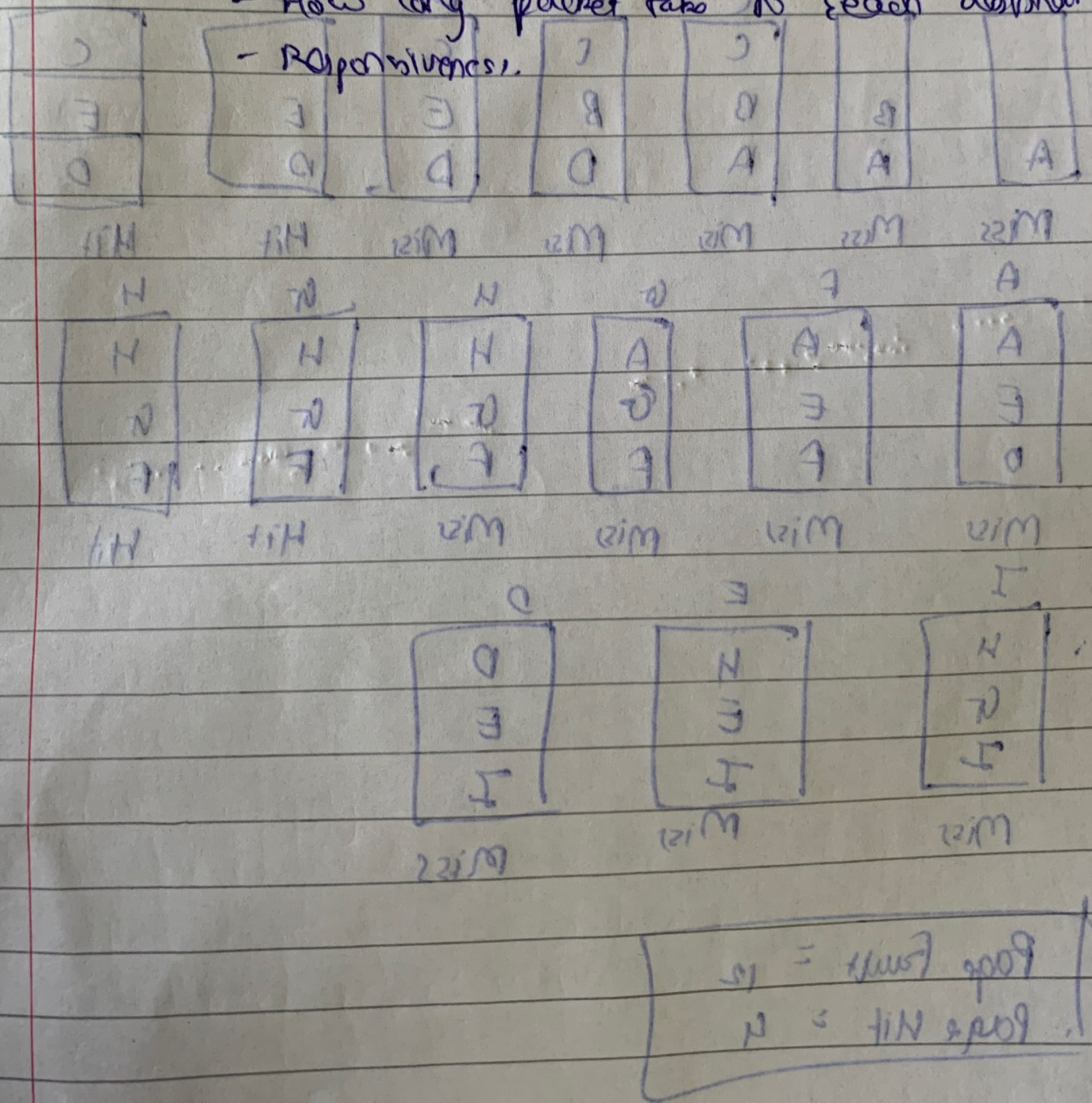
- If asked to find 1st address. → 11.351
  ex: 208.16.37.36./28.
  11111000 So, 32-28 = 4 make the right 4 bit = 0.
  Then make it back to decimal.
  ∴ we get → 208.16.37.32
  This is 1st add
- If asked to find last address then make 32-n rightmost bit = 1
- No. of add → 2^{32-n}
  ex: $2^{32-28} = 2^4 = 16$.

0 A
01 B
011 C
0111 D
1111 E

PAGE NO :
DATE : / /

Routing Algo:-

1. Network Performance Measure:-
   - (a) Quantity of service (Throughput).
     - How much data transfer d time by it
   - (b) Quality of service (Avg. packet delay).
     - How long packet take to reach destination
     - Responsiveness.

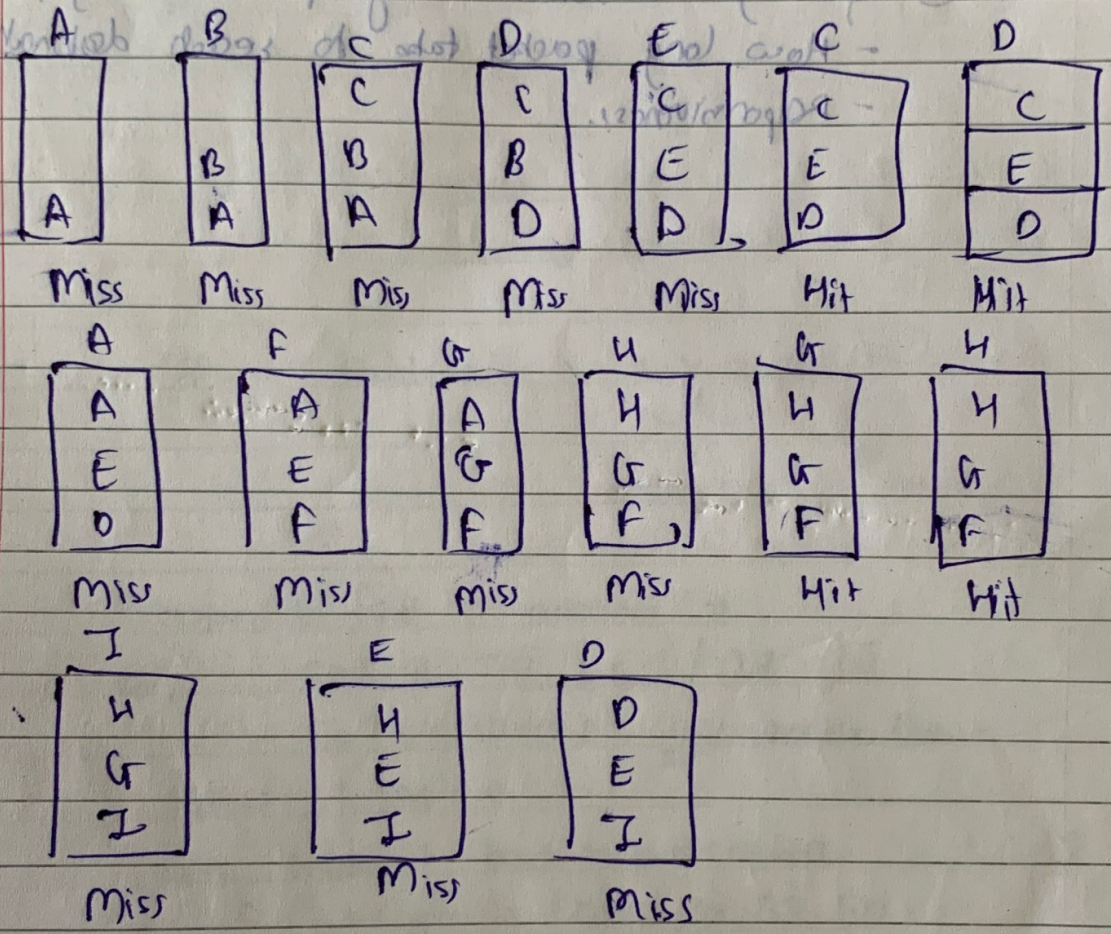


DATE : / /

Q3. (a)

FIFO : A, B, C, D, E, C, D, A, F, G, H, G, H, I, E, D.

frame size = 3



Page Fault = 12

Page Hit = 4