COMPUTER ENGINEERING DEPARTMENT

SUBJECT: COMPUTER NETWORK

COURSE: T.E.   **Year: 2020-2021**   **Semester: V**

DEPT: Computer Engineering

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COMPUTER NETWORK ANSWER SHEET

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Exam   :   SEMESTER V

Subject :   COMPUTER NETWORK

Date   :   12/01/2021

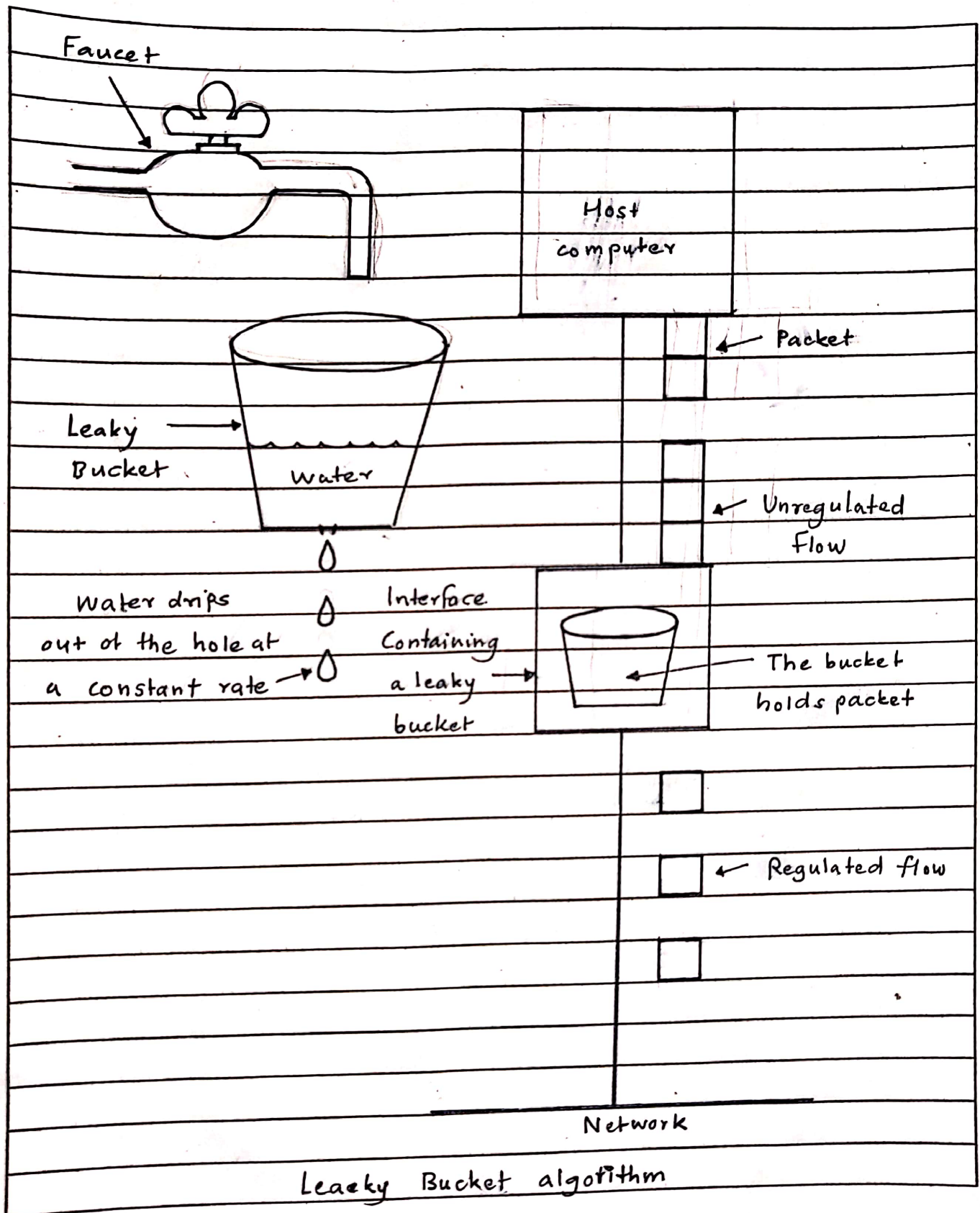**Day**   :   TUESDAY

Student Signature:

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Q. 3. A.

Traffic Shaping

Traffic shaping is defined as a mechanism to control the amount and rate of traffic sent to the network.

Leaky Bucket Algorithm.

- Leaky Bucket Algorithm is used to control congestion control in network traffic. As the name suggests its working is similar to a leaky bucket in real life.

- Principle of leaky bucket algorithm.

- Leaky bucket is a bucket with a hole at bottom. Flow of water from bucket is at a constant rate (data rate is constant) which is independent of water entering the bucket (incoming data). If bucket is full any additional water entering the bucket is thrown out (Packets are discarded).

- Same technique is applied to control congestion in network traffic. Every host in the network is having a buffer (equivalent to a bucket) with finite queue length. Packets which are put in the buffer is full are thrown out. The buffer may send some no. of packets per unit time onto the subnet. (helpful if the packet size is large)

Faucet

Host computer

Packet

Leaky Bucket

Water

Unregulated flow

Water drips out of the hole at a constant rate

Interface Containing a leaky bucket

The bucket holds packet

Regulated flow

Network

Leaky Bucket algorithm

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- Figure shows the implementation of leaky bucket algorithm. A FIFO (First In First Out) queue is used for holding the packets which is equivalent to the leaky bucket.

- The implementation can be under two different operating conditions. namely
  ① For packets of fixed size
  ② For packets of variable size.

Implementation of leaky bucket.
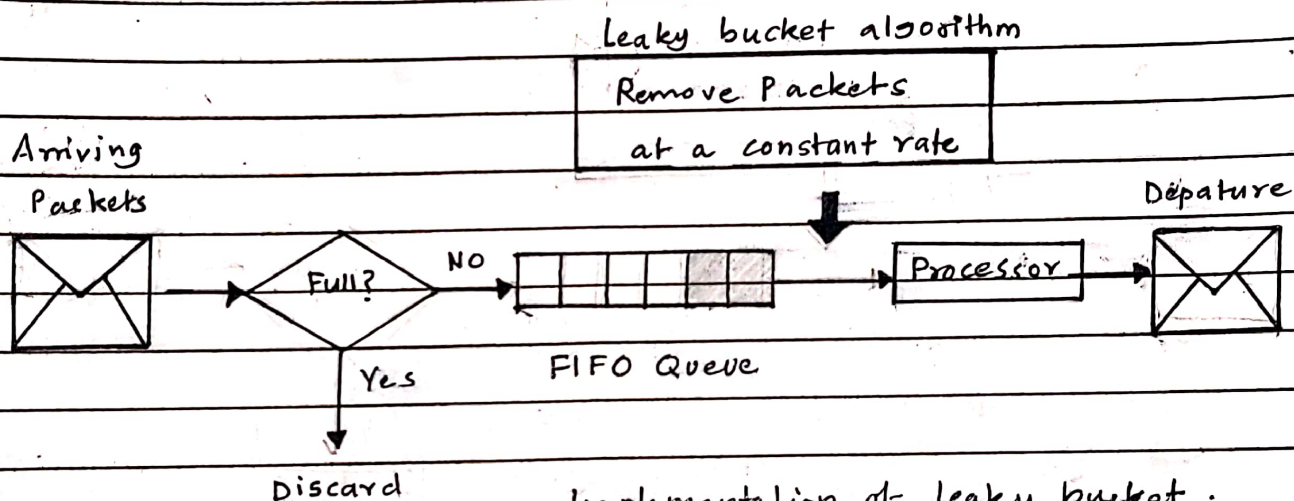
① Fixed size packets:
- If the arriving packets are of fixed size. then the process will allow the removal of a fixed number of packets from the queue corresponding to every tick of the clock.

② Packets of variable size:
- If the packets at the input of the process are of different size then the fixed output rate will not correspond to the no. of bits leaving the process

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Algorithm!

① Initialize a counter to a number 'n' at the tpk of the clock

② If n is greater than the packet size then send a packet and decrement the counter by the packet size.

③ Repeat step 2 until n becomes smaller than the packet size

④ Reset the counter and go back to step 1.

Q.3. B

CSMA Protocol

CSMA protocols stands for carrier sense multiple access protocol. CSMA is a network access method used on shared network topologies such as Ethernet to control access to the network. Devices attached to the network cable listen before transmitting. If the channel is in use, device wait before transmitting. Multiple Access indicates that many devices can connect to and share the same network. All devices have equal access to use the network when it is clear.

Types of CSMA Protocol

① Persistent CSMA

- In this method, stations that wants to transmit data continuously senses the channel to check whether the channel is idle or busy.

- If the channel is busy, the station waits until it becomes idle.

- When the station detects and idle channel, it immediately transmits the frame with probability one. Hence it is called 1-persistent CSMA.

- This method has the highest chance of collision because two or more stations may find channel to be idle at the same time and transmits their frame

②   Non - Persistent CsmA.

- In this scheme, if a station wants to transmit a frame and it finds that the channel is busy then it will wait for fixed interval of time

- After this time, it again checks the status because of the channel and if the channel is free it will transmit.

- A station that has a frame to send senses the channel.

- If the channel is idle, it sends immediately.

- If the channel is busy, it waits a random amount of time and then senses the channel again.

③   P - Persistent CsmA

- Used for slotted channel

- When a station becomes ready to send, it senses the channel

- In this method, after the station finds the line idle, it may or may not send

- If a station senses and idle channel it transmits with a probability P and refrains from sending by probability (1-P)

④   CsmA / CD

- Ethernet (IEEE 802-3) sends data using CsmA/CD. CsmA was an improvement over ALOHA as the Channel was sensed before transmission begins.

- Now a further improvided CsmA/CD has been brought about.

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Working :
- It two stations senses the channel to be idle they begin transmitting simultaneously and cause a collision.
- A collision is indicated by a high voltage
- Both the stations monitor the channel for a collision and stop transmitting ~~as soon as collision~~ as soon as error is detected.
- Now the stations wait for a random amount of time and check if channel is free.
- The process continues

How long will it take a station to realize that a collision has taken place?
- Let the time for a signal to propogate between the two farthest stations be T.
- Assume that at time to one station begins transmitting.
- Let's call the most distant station B.
- At time T - ε, which is an instant before the signal arrives at B, B itself senses an idle channel and begins transmitting.

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