Chhatrapati Shahu Ji Maharaj
University, Kanpur

Answer Script Details
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Roll No. 23071002365
Total Mark 49/75.00

Exam BCA-V_ODD_EXAM_NOV_2025
Subject BCA5003 - COMPUTER NETWORK

Question wise Mark Summary

Q.No	Mark	Q.No	Mark	Q.No	Mark	Q.No	Mark
1A	3/5	8	0/15				
1B	3/5	9	10/15				
1C	3/5						
1D	4/5						
1E	4/5						
1F	4/5						
1G	3/5						
1H	3/5						
1I	3/5						
2	0/15						
3A	3/5						
3B	3/5						
3C	3/5						
4	0/15						
5	0/15						
6	0/15						
7	0/15						

Chhatrapati Shahu Ji Maharaj University
Kanpur, Uttar Pradesh

PART-II

Date of Exam: 18-11-25 Shift: Evening Room No.: 118
Paper Code: BCA5003 Subject: Computer Network Year/Sem: V
Name of Candidate: Khyati Trivedi
Roll No.: 2 3 0 7 1 0 0 2 3 6 5

Signature of Candidate | Signature of Invigilator | COE Facsimile

MARKS OBTAINED

Q.	1	2	3	4	5	6	7	8	9	10
(a)										
(b)										
(c)										
(d)										
(e)										
(f)										
(g)										
(h)										
(i)										
(j)										
Total										

Total Marks in Figures | Max. Marks
Total Marks in Words

BCA5003
Paper Code

Signature of Evaluator

Course: Bachelor of Computer Application
Session: 2025-2026 Year/Semester: V
Subject: Computer Network

Paper Code: B C A 5 0 0 3
Exam Date: 1 8 1 1 2 0 2 5
Name of Candidate: KHYATI TRIVEDI
Father's Name: SHAILENDRA KUMAR TRIVEDI

महाविद्यालय का कोड College Code: K N 1 6 2

परीक्षा केन्द्र का कोड Exam Centre Code: K N 1 6 2

परीक्षा का प्रकार Type of Exam: संस्थागत Regular ● | भूतपूर्व छात्र Ex. Student ○ | व्यक्तिगत Private ○ | बैक पेपर परीक्षा Back paper Exam ○

ANSWER BOOKLET NO.
12015853

BCA5003
Paper Code

नामांकन संख्या Enrollment Number: C S J M A 2 3 0 0 0 1 2 9 5 1 7

परीक्षार्थी अनुक्रमांक संख्या Candidate's Roll Number: 2 3 0 7 1 0 0 2 3 6 5

पेपर कोड Paper Code: B 5 0 0 3

Signature of Candidate

Signature of Invigilator

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नोट: 1. परीक्षार्थी को निर्देशित किया जाता है कि आवरण पत्र के पृष्ठ भाग पर अंकित सभी निर्देशों को सावधानी पूर्वक पढ़ें।
2. ... 3. ...

INSTRUCTIONS TO THE CANDIDATE FOR FILLING PART-I

1. Read the instructions carefully given on the answer script and admit card.
2. Write Date of Exam, Shift, Paper Code & Name of Subject Correctly.
3. Write Name & Roll No. Correctly.
4. Write Semester & Branch Correctly.

INSTRUCTIONS TO THE CANDIDATE FOR FILLING PART-III

1. Use blue or black ball point pen for writing alphabets & numerals in ☐ Boxes.
2. Carefully study the example before you start marking.
3. As shown in the example below blacken the circles completely.

Correct method	Incorrect method
① ● ③ ④	✓ ✗ ● ⊘

4. Make no Stray marks on this sheet.
5. **DO NOT WRITE OR MARK ON THE BAR CODE.**

परीक्षार्थी के लिए निर्देश

1. प्रवेश पत्र एवं उत्तर पुस्तिका पर दिये गये निर्देशों को ध्यान से पढ़ें।
2. कवर पृष्ठ के दूसरी तरफ कुछ न लिखें।
3. उत्तर पुस्तिका के पृष्ठों पर दोनों तरफ लिखें।
4. प्रश्न पत्र पर अपने अनुक्रमांक के अतिरिक्त कुछ न लिखें।
5. प्रश्न पत्र कोड एवं प्रश्न पत्र कोड सावधानी पूर्वक लिखें।
6. अपनी स्थिति स्पष्ट लिखें।
7. उत्तर पुस्तिका के पृष्ठों की संख्या देखें। अगर उत्तर पुस्तिका में पृष्ठ (1–24) से कम है या फटे हुए है, तो परीक्षा शुरू होने के पूर्व दूसरी उत्तर पुस्तिका ले लें।
8. प्रश्नपत्र को देख, यदि प्रश्नपत्र के विषय कोड, विषय का नाम तथा प्रश्न में कोई त्रुटि है तो उसके परीक्षा शुरू होने के 30 मिनट के अन्दर कक्ष निरीक्षक को तत्काल सूचित करें, उसके बाद विश्वविद्यालय द्वारा कोई कार्यवाही नहीं की जायेगी।
9. प्रश्नों के उत्तर लिखने के लिये पैंसिल का प्रयोग न करें।
10. B कोपी या अतिरिक्त शीट नहीं दिया जायेगा।

IN ORDER TO AVOID UFM (UNFAIR MEANS) :

1. The Roll No. and Answer Book no. found elsewhere or any other symbol found in the answer book will be treated as unfair means.
2. Any tempering of Bar Code and Booklet no shall be treated as Unfair Means.
3. Do Not bring the materials like slip of paper/mobile/digital diaries/ study material/ revision notes in examination hall. Possession of the mobiles/ digital diaries/ electronic watch and any other electronic gadget except memory less scientific calculator shall be considered as UFM case.
4. Do not keep or paste currency note in answer script it shall be consider as UFM.

INSTRUCTIONS TO THE CANDIDATE

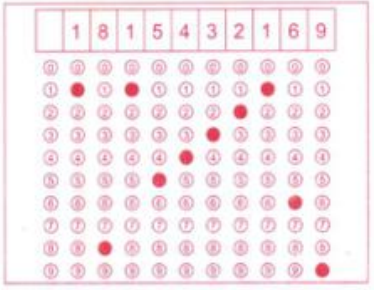
1. Read the instructions carefully given on the Question Paper Admit Card & Answer Script.
2. Do not write anything on back side of the cover page.
3. Write on both sides of pages of answer book.
4. Do not write anything on question paper except Roll Number.
5. Write Paper Code & Question Paper Id carefully.
6. CHECK the number of pages (1-32) or any other kind of damage in your answer script, if found than change the answer script immediately before the commencement of examination.
7. CHECK the Question Paper for any kind of discrepancy e.g. Subject Code, Subject Name and Question of the Question Paper during first THIRTY MINUTES of the commencement of the exam, so that it can be corrected in TIME. After that no corrections shall be entertained by the university.
8. Do not use pencil for answering the question.
9. Write status correctly e.g. those appearing in carry over papers should fill in status as Carry Over. Those appearing as Ex Students should fill in status as ex.
10. No supplementary answer book & graph paper will be provided.

अनुचित साधन से बचने हेतु:

1. उत्तर पुस्तिका के निर्देशित स्थान को छोड़कर अनुक्रमांक एवं उत्तरपुस्तिका का क्रमांक कहीं और न लिखे तथा कोई भी चिन्ह न बनायें क्योंकि यह अनुचित साधन प्रयोग की परिधि में आता है।
2. उत्तर पुस्तिका के बारकोड अथवा उत्तर पुस्तिका संख्या पर छेड़ करने पर अनुचित साधन प्रयोग माना जायेगा।
3. परीक्षा कक्ष में निम्न वस्तुएं साथ न लायें, जैसे लिखे हुए कागज के टुकड़े, मोबाईल, डिजिटल डायरी, कोपी, पुस्तक एवं सभी वस्तुए जो अनुचित साधन के अन्तर्गत आती है। केवल संबंधित प्रश्नपत्र में ही मेमोरी लैस साइंटिफिक केल्कुलेटर ले जाने की अनुमन्यता होगी।
4. उत्तर पुस्तिकाओं में रूपये न रखें न ही उत्तर पुस्तिका में चिपकायें। ऐसा करना अनुचित साधन प्रयोग की परिधि में आता है।

INSTRUCTIONS TO THE CANDIDATE FOR FILLING PART-IV

1. Use blue or black ball point pen for writing alphabets & numberals in ☐ Boxes.
2. Use blue or black ball point pen for filling the circles.



Note - If your Roll No. is of 10 digits. Please leave first three columns.

Section - A

Answer - a)

(Communication)

- Communication is a process in which the information from one source or resource from one source is transferred to a destination with the help of a medium.
- Communication process has the following 5 components-

1) Source / Sender
It is the place or device that is sending to receive some information or resource.

2) Destination
It is the place where the information / resource is sent. It is the end of the communication process.

3) Data
Data stands for the resource or information that is to be shared over a network.

4) Medium
Refers to the physical path through which

Information is shared.

4. Protocols-
Set of rules & regulations that help & govern the process of communication
eg- HTTP, FTP
[Hypertext Transfer Protocol] [File Transfer Protocol].

Characteristics of communication.

1. Delivery:
Message is sent to the correct destination.

2. Timeliness:
The information is sent in a specific time neither late nor early.

3. Jitter:
Refers to the change in the message sent & recieved.

4. Accuracy.
Most accurate message should be recieved & transferred in communication.

Answer - b.

Advantages of Optical Fibre Cables.

1. Using Optical Fibre cable we can send & transmit large amount of data with over a network because fibre Optic cable uses the concept of light to and reflection for transferring data from one place to another.

2. Optical Fibre Cables are a very fast transmission media because light travels fastest in all the mediums therefore the large amount of data can be shared in a very less time.

3. Optical fibre cable are also used in ~~circuit switching~~ transmission of analog signals therefore it can be used for the process of Switching where large data has to be transferred in less time like in message switching.

4. Optical Fibre Cables increase the efficiency of the transmission medium because it can transfer whole lot of data in a very less amount of time which increased the performance of the transmission medium & process both simultaneously.

5). Optical Fiber Cables are less prone to any noise or data inconsistency because they are covered with a PVC or Teflon covering so the process of reflection & transmission of Data becomes quite efficient.

Answer-(c).

(Bridges)

1. Bridges are used in the Data Link layer in order to connect two ~~or more~~ network segments that are working on same protocol.

2. Bridges are used for congestion control in some cases because a bridge has the capability to divide its congestion segment which distributes the traffic & hence gives congestion control.

3. Bridges do work on MAC addressing therefore it is useful to filter the traffic through MAC addresses and helps in proper & smooth distribution of traffic throughout the network.

4. Bridges help in taking data / information in frames & transfer it to another segment in real time. Therefore two network segments in same protocol can communicate through Bridges.

5. Bridges are also a smart device therefore they do not broadcast the data completely but route for delivery at MAC Addresses.

6. Bridges are efficient in broadband channels sometimes also.

Answer - d.

(Piggybacking)

- Piggybacking is a mechanism used in sliding windows arq/ack mechanism of ~~flow control on~~ the Data - Link Layer.
- In this mechanism, whenever a acknowledgement has to be sent from the destination to source it is assigned in a frame that is going back to source & new frame for acknowledgment is not made & sent.

Paper Code

06

- The mechanism of Piggybacking reduces overhead of new frame creation for every single data that it receives.
- Piggybacking saves the memory as no new frame for each acknowledgement is to be made so it makes the process of framing very memory-efficient.
- Piggybacking also helps in making the framing & transmission fast because the response frame holds the acknowledgement & the sender will not have to wait for the acknowledgement which could be a overhead.
- Piggybacking helps in the end-to-end delivery of the frames in less time memory & overhead.

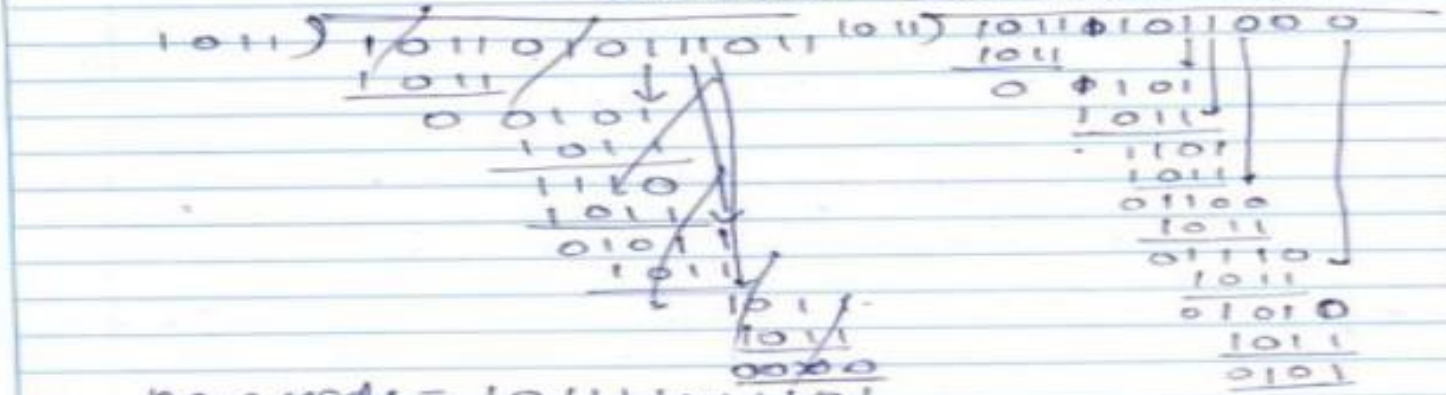
Answer - c.

CRC
(Stands for Cyclic Redundancy Control)

- It is a technique which is used by the data-link layer for the process of error-detection.
- This method can identify if there is error from both bit error data or burst error data.
- It works on the process of (n+r) bits where. n = data bits
  r = redundant bits.
  The redundant bits are = highest degree of the polynomial that is assigned with the message that is sent.
- When the degree polynomial code is XORed with the new (n+r) bit code it gives a coded message to reciever.
- The reciever follows the same process with the coded message & if the redundant bit are all 0 [i.e 000...] then data is error free otherwise data has errors.

eg. Message 1011 ♦ 1011
polynomial x^3+x+1
redundant bit = degree of highest pol = 3.
new (n+r) bits 1011010111000
the pol bits = 1011.

$= x^3\times1 + x^2\times0 + x\times1 + x^0\times1 = 1011$



new code = 1011111011101

At receiver end 1011) 1011111011101
which will give all 000 at end
so data will not have any error.

Answer - f.

Network Components

- Network components refers to various devices/[illegible] are used in the process of networking.
- A data is transfered from one source to destination using components of networks.

Paper Code

09

Sender — Network components — Reciever

- Network components help to share the data & maintain its integrity from various sources.
- When a data is sent it is a burst traffic but it is handled by the network components & seamless & smooth transmission of data is done.

Advantages of network components

1. Various network components like amplifiers & Repeaters increase the bandwidth or help in increasing the network segments.
2. Network components like modem help in converting digital signal to analog & vice versa for a favourable delivery of data.
3. Network components like routers are used to transfer the data optimally without broadcasting & congestion.

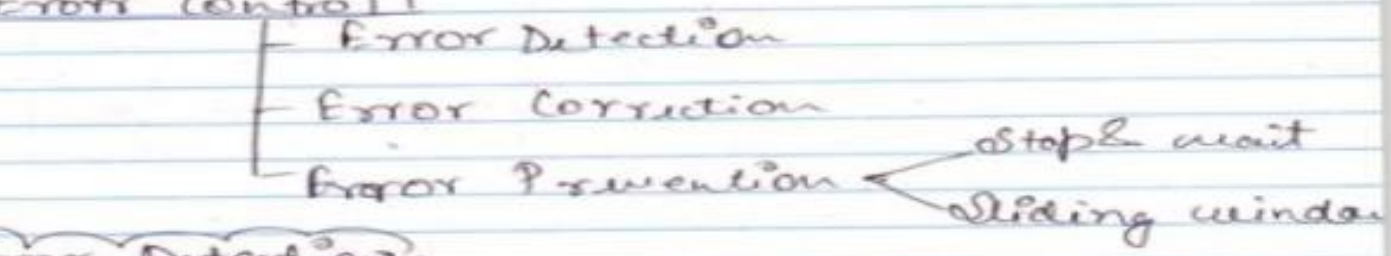
Examples of Network Components

1. Hub: basic device that connects LANs & broadcasts
2. Switch: Learned device with congestion control
3. Router: optimal delivery of data
4. Repeater: increase ~~Data~~ network segment
5. Bridge: connect multiple LAN segments.

Answer-9

Error Control

- Error control is one of the the key responsibility of the data-link layer.
- It is the procedure of error detection correction & prevention. So it is able to manage all the activities using some mechanisms & protocols.



(1). **Error Detection**

For detecting errors there are multiple methods used that are able to identify if the data recieved is pursue has error.

1). Parity Bit
2). Multidimensional Bit Error control
3) Checksum
4). CRC (Cyclic Redundancy control)

(2). Error Correction.

- Now if error is found it can be corrected using two mechanism :-

(1). Forward Correction :—

we can do forward correction by using the Hamming code methods.

ii) Backward Correction.
which simply means retransmission of data.

(3). Error Prevention
It does not lets the error occur with following precautions.

(1). Stop and wait
wait till the acknowledgment of last message is received & if error is found then resend the data of the only last packet that ~~you~~ is stored.

(2) Sliding windows.
It has two type:-
i). Go-back n.
Resend all packets from the error acknowledgement
ii) Selective reject
ReSend only the corrupted Packet.

Answer - b.

Protocol

- A Protocol can be defined as the set of rules & regulations that govern the process of networking.

- When ever a information is transfered from one node to another then all the data is broken into packets shared over network & acknowledgment is made all happens because of Protocols.

Some most important Protocols & their uses are -

(1) HTTP/HTTPs.
- [Hypertext Transfer Protocol]
- This Protocol is used in web-technologies for sharing of requests & responses.
- HTTPs is the secure version of HTTP.

(2) TCP
- It stands for Transmission Control Protocol.
- It is a connection-oriented protocol which enables a safe & acknowledge Based delivery of data.
- Used in - File transfers.

(3) UDP.
- Stands for User Datagram Protocol.
- Which is connection-less protocol.
- Used in video calls, gaming etc.

(4) FTP
- File Tranfer Protocol.

- used for media downloading & uploading over a network.

(5). SMTP

- Simple Mail Tranfer Protocol.
- These are used for networking & transmission of e-mails over network.
- All protocols work at a layer particularly & help in seamless & smooth transmission.

Answer - f.
Application layer.

(1). (Remote Login)

- The foremost of service of application layer is that it can allows us for remote login which means a authenticated user can login from anywhere to its application without any overhead.

(2). (Layer of Interface b/w user & Application)

- Since application layer is the interface b/w the user & Application on two connecting applications. It forwards the data directly from the application to user as it is the first layer to interact with user.

(3) Resource access

The Application layer offers access to various ~~soft~~ resources like Printers, CPU's etc with proper authentication & authorization in a secured manner.

(4) E-mail / Message Access

Since it is the interface b/w the user & the application we can access our E-mail or various other messages or informations from various sources with the help of the application layer.

(5) Authentication & Authorization

In order to access a application or a resource remotely we need to first authorize ourself & then we can have access to it so this task is done by Application layer.

(6) Transfer Packets (Data) to Presentation layer

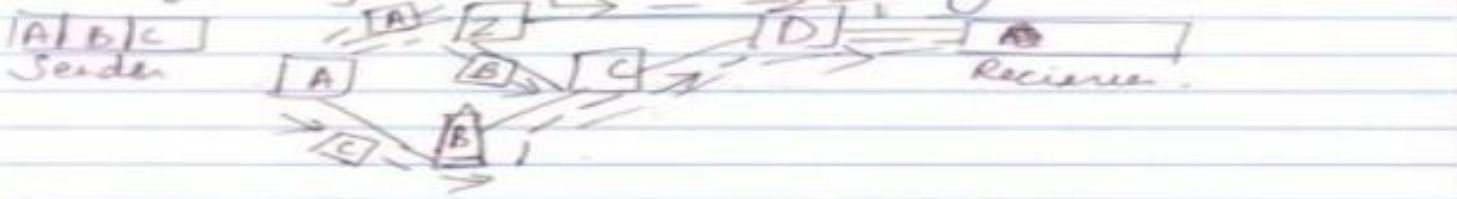
The Application layer directly interacts with the Presentation layer so for sending data it sends

it to Presentation Layer & for receiving data it takes information from Presentation layer.

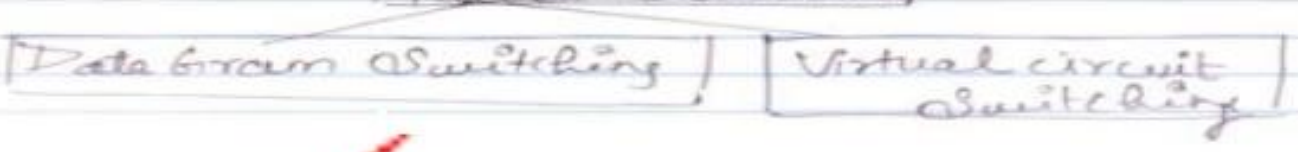
Section-B

3. **Packet Switching**

- Packet Switching is a switching technique in which the data that is to be transferred is broken into packets & then transferred over the network.
- Now these packets can be routed both statically or dynamically according to the type of packet Switching used.

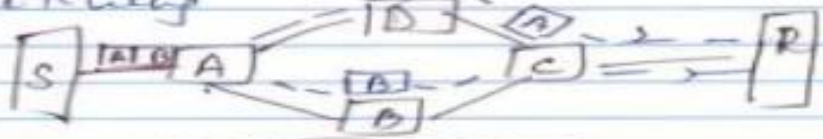


- Packet Switching is of two types —



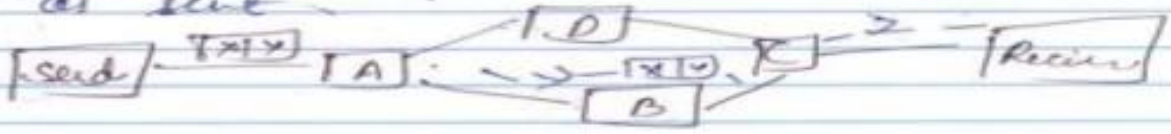
① Data Gram Switching

- It is a connection-less switching algorithm.
- Here different data packets travel through different paths and get compiled & combined at the reciever end.
- The data is not in order in Data Gram Switching



② Virtual Circuit Switching

- It is a connection-oriented switching algorithm
- Here handshaking is done before transmission & all the data is sent in the same path.
- All the data transferred here is in same order as sent.



Advantages of Packet Switching

① Here data is forwarded in form of packets which are smaller so it is fast switching.

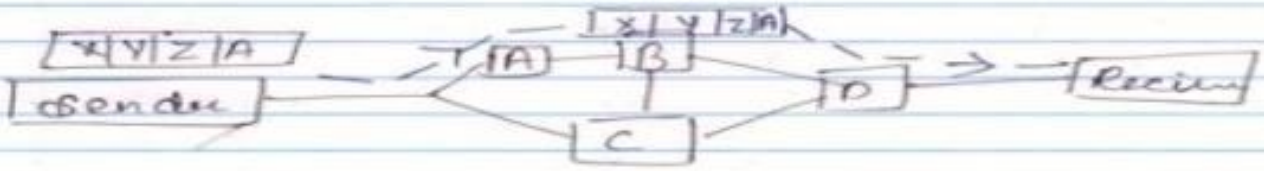
④ It can transfer large amount of data in less time.

Disadvantages:

① Sometimes the data might not be in order then is an overhead because of source & destination address assigned with packets.

b) Message Switching

- Message switching is the process in which the complete data is treated as a single unit or frame & transferred over the network.
- Here the data is always received in the order it was sent.
- This switching follows the concept of store and forward. which means that the message is sent node by node & then forwarded to next node.
- There is no dedicated path for communication the middle nodes decide the path of transmission of the message from one place to another.



Advantages.

1). There is no overhead of destination in multiple packets because single message is transferred to single location together.

2). All the message sent is always in order & the same.

Disadvantages.

1). It is a slow process because single message may be very big to be transported.

2). If the error is occurred we can loose all the data at a single node only which is unsafe.

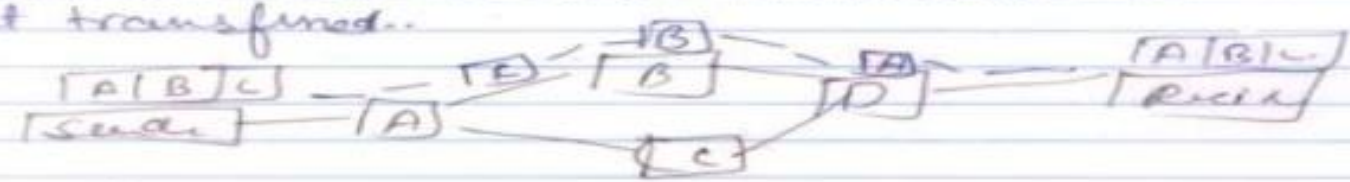
- The concept of Message Switching is used in the E-mails.

c) Circuit Switching

- Circuit Switching is a process in which a message is transferred over a pre defined circuit.
- Here the process of handshaking is performed & the circuit Switching has following steps —

1. Circuit creation
2. Transmission of Data
3. Circuit Termination.

- The circuit tend to exist till all data is not transfered..



Advantages.

- It is a connection - Oriented process which means that there is a safe transmission with acknowledgment

Disadvantage.

- Because of handshaking there is high overhead of acknowledgement therefore it is a

slower technique of switching.

- Data may / maynot be in order.

Section-C

9. (Congestion Control algorithms)

For the process of congestion control we have multiple algorithms & multiple ways —.

(1). **Traffic Shaping Algorithms.**

This algorithm convert the bursty traffic into a set of smooth & definitely moving / flowing traffic.

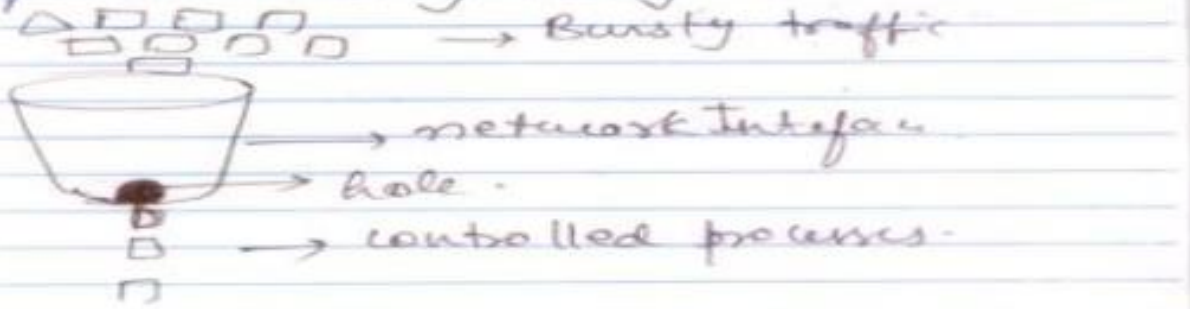
There are two Traffic Shaping Algorithm.

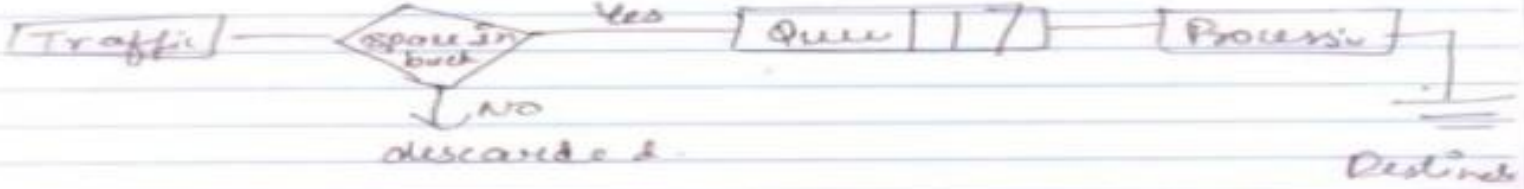
(1). Leaky Bucket Algorithm
(2) Token Bucket Algorithm

1) (Leaky Bucket Algorithm)

- We consider that whenever a bursty traffic approaches the network interface it acts like a bucket that has a hole at its bottom & acts like a leaky Bucket.

- The burst traffic is now converted to a regulated flow of data that is controlled & does not lead to congestion.
- Diagram Implementation of Leaky Bucket.

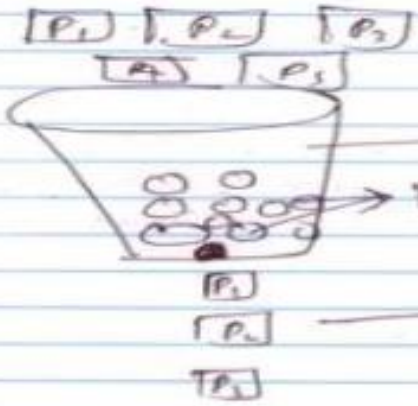


- 

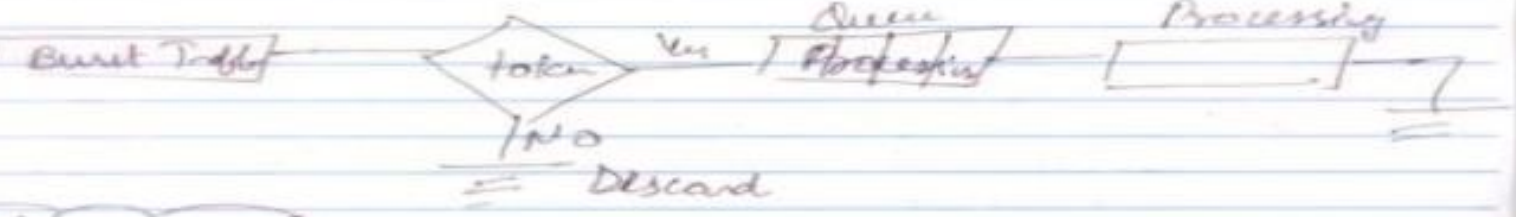
- Leaky bucket has a disadvantage that if there is no memory in the bucket then all the coming packets will be discarded.
- Advantages
  1. The congestion is controlled.
  2. The flow of the traffic is now controlled
  3. no scope of deadlock for a controlled process.

(2) Token Bucket Algorithm

- A Token Bucket Algorithm can be viewed as a bucket with tockens.
- Here a process is only allowed in the Queue if there are tokens in the network Interface otherwise the processes will be discarded.



- Now here the Interface card produces tokens at a constant rate.
- If the no. of outstanding process > the tokens in bucket they will have to wait or they will be discarded.



Advantages:

- It can be used in web browsing when sometimes burst request can come & we can serve them in real time.
- Used over leaky bucket because some problems require burst solutions only so it can be helpful when we have to give burst solutions upto no. of tokens = processes allowed.

(3) ~~Reg~~ Entry Regulated Algorithm

(4) Hold and wait Algorithm

- In this algo we hold the data of the all last ~~se~~ packets & send next packet only when last one reached successfully.
- This controls congestion because packets are only forwarded when last one is transferred successfully.

⑧ Sliding window Algorithm:

- Here we store the values of the last frame & send the next frame according to acknowledgement of the receiver.
- If the recv sents NACK means data isn't sent properly so we send it again using —

a) Selective Reject : only last frame sent.
b) Go-back-n : all the frames succeding the last frame.

- It helps reduce congestion because the new frames are sent only when last one have arrived & there is no scope of traffic.

Advantage:

- These algo help in reducing the scope of traffic & congestion by forwarding the data packets in a regulated manner.