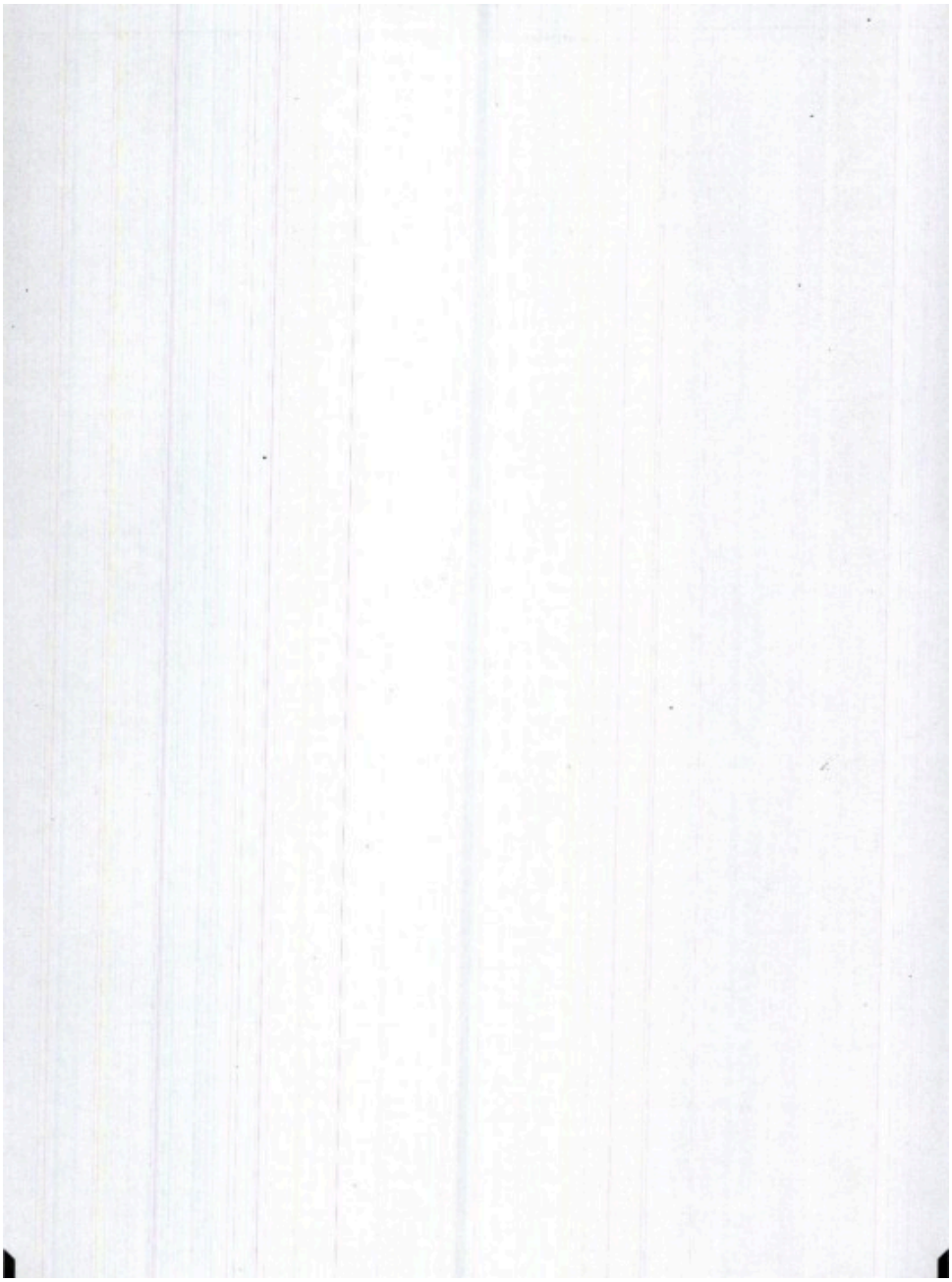






(Section B)

Q. No. 2 Part (I)

Key aspects of Usability:

Efficiency: The system design of model must be efficient means easy to use and understand.

Satisfactory:

In system design the model must be satisfactory and trust worthy to use.

Effective:

The system design must be effective have some purpose and make use for user benefit and effective to use.

.....

Q. No. 2 Part (II)

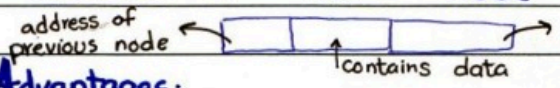
Stack	Queue
• Stack uses LIFO (Last-In, First Out principle.	Queue uses FIFO first-In, first Out principle
• Main feature of stack are push, pop, top, etc.	Main feature of Queue are Enqueue, Dequeue, etc
• Stack use for data to find latest operation.	Queue work for line-by-line operation.
• Example:	Example
1) - Stack of plates	1) - Print function (printer print pages on FIFO principle).
2) - Pile of books	2) Queue in shopping malls at counter.
3) - Undo any operation in MS word.	3) Carriage transfer at airport.

(Section B)

Q. No. 2 Part (iii)

Linked List:

In Linked list data is linked with each other using nodes and can be accessble through index system. One node's end point is connected with starting point of next node. Last node contains address of next node.



Advantages:

- Easy to find any value./Easy to access any value.
- Efficient and simple to implement.
- Dynamic, contains different datatypes.

Example: Train Carriage.

Q. No. 2 Part (iv)

Learnability in HCI:

Learnability in HCI (Human-Computer Interaction) means how easy and efficient to use any application or model for the first time. User can Learn how to use the model without any complexity.

Learnability is very important because when learnability is missing in any model user find frustration, complexity and wastage of time and he will not use the model or app agin.

Example: Having **Tutorials and walkthrough guides** can help in enhancing Learnability.

(Section B)

Q. No. 2 Part (v)

Symmetric Cryptography	Asymmetric Cryptography
1) In Symmetric cryptography (def) public (data and key) and private key is transfered through one safe channel.	1) In Asymmetric cryptography public and private key (data and key) is transfered through separate safe channels.
2) It contains less (Security) security.	2) It contains more security.
3) It has less complexity (Complexity) and efficient.	3) It has more complexity and less efficient than symmetric crytography.
4) Key should be transfered through very safe and secure channel.	4) Not necessary to be shared with very safe path.
5) Uses same key for encryption and decryption.	5) Uses seperate key for encrytion and decryption of data.

Q. No. 2 Part (vi)

DATA NORMALIZATION :

Data Normalization is a process of removing redaduncy, repeatition and converting Large data bases into simple and easy to understand form. After 3rd data normalization if you want to change a data on one place it won't affect on your whole data base.

ID	Name
101, 102	Mahom Hamid

Forms of data normalization 1 NF :

- No repeatition of data, contains atomic value in each cell.

1NF

ID	Name
101	Mahom
102	Hamid

2 NF :

- Contains Composite Key.
- Remove "Partial Dependencies"

ID	Name	Skill no	Skill name
102	Sana	2	Craft

ID	Name
102	Sana

Skill no	Skill name
2	Craft

(Section B)

Q. No. 2 Part (vii)

Test-train split :

Test-train split is used in model building to train the model on data and then test model on any new data.

Training data: The model is trained on specific data. for example fo identifying animals images model we give thousand of **input** images to train model. Model identify similar features like long ear, color, legs etc.

Testing data in model building : The model is test by giving some new images or data it the model will identify on past experience or similarity from refrence image. like providing horse image ; the model will identify by its tail, height etc.

Key Concept : The ratio must be divide wisely most of the time training data is 70% and test data is 20%.

Q. No. 2 Part (viii)

Accessibility is Ignored in system design :

When accessibility is ignored old age, disabled people (with eye (blind) issue, hearing impairment, motor impairment or non educated people cannot access to the system which is the large defect in any model.

Accessibility in system helps enhance by adding closed caption, subtitles, alt text, on screen keyboard, etc.

When accessibility is ignored less community engagement and less traffic will gather on system. **Example:** An ATM machine is not accessible to blind or hearing impaired person which reduces its accessibility.

(Section B)

Q. No. 2 Part (ix)

Advantage of array:

1) Array Data structure allows to access any value quickly using index system.
2) Easy, simple and efficient to use.
3) Array data structure have less size.

TYPES:

1-Dimentional Array: One dimentional array have single (row or column) one at a time.

Example [1], [4 6]

Two-Dimention Array: In two dimentional array tables - can be create. Also known as Metrix array. E-g $\begin{bmatrix} 0 & 1 & 2 \\ 2 & 3 & 1 \end{bmatrix}$, $\begin{bmatrix} 1 & 0 & 3 \\ 6 & 2 & 4 \end{bmatrix}$

Q. No. 2 Part (x)

Identity theft

Identify theft is stealing someone's personal information like personal ID card number, name, address, contact number, etc. Identify theft can be happen through online or by accidently exchange of personal data or aiming at stealing manually.

Harmful Effect: Identity theft is very harmful because the theft try to become someones else whose identity he/she has stealed and **blackmail** to victims family and loved onze. Also through personal data he/she can access to **bank details** and can steal money.

(Section B)

Q. No. 2 Part (xi)

Substitutional Cipher:

In cryptography substitutional cipher is encrypted data by using other letters or words specified for each word or letter present in data which has to be encrypted. **Example.**

plain text:	h	e	l	l	o
cipher text:	c↓	f↓	m↓	m↓	↓n

Q. No. 2 Part (xii)

Deep Learning

Deep learning learns through past experience, patterns, predictions but as deep learning takes large data in input therefore it has high accuracy.

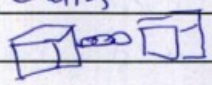
Deep Learning in Robotics:

Deep learning works in robotics by using sensors. For movement of hands, legs, head sensors are used. Deep learning is human brain like efficient it is trained by millions of keywords, and condition. however in robotics itself deeplearning keep the feature of advancement, memory, result on past experience, etc.

(Section B)

Q. No. 2 Part (xiii) **Blockchain:**

Blockchains work by connecting Ledger. It contains transparent data. Each block is connected with each other data can be access through any server. Block chain have high security.



Application:

Banking: Block chain is used in banking. Every customer transaction data is stored and accessible through any bank. Where data is secure and safe and in transparent form.

Q. No. 2 Part (xiv) **Controlling Air Pollution:**

IOT can control air pollution in following way;

1) IOT check humidity, temperature, wind direction etc and sends data to weather forecast It tells reason where to media warned people
2) Cameras check ~~for~~ and detect automobile which producing extra smoke.
3) Smokers are detected through cameras and sensors on alarm and bell.

(Section C)

Q. No. 3 (Page 1)

Human Computer Interaction (HCI)

HCI is interaction between user and computer or digital devices. The goal of HCI is to improve user accessibility, enhance efficiency and reduce error.

Common Problem Occured in HCI:

1) Complexity
2) Learnability
3) Error prevention
4) Feedback
5) Accessibility Issues.

Complexity:

Complexity is how difficult or complex to use any model or application. Adding too many features on homepage increase complexity which cause frustration and difficulty for user to use the model.

Sometimes fonts or format are too complex to understand using wrong font size and font style is the main fault in CSS.

(Section C)

Q. No. 3 (Page 2)

How to resolve:

Complexity in model is resolved by keeping the model simple. Try to keep only main features on home page. Make categories if you are making any website. Use clear and easy to read font size. Keep text simple and clear. Keep By keeping the interface simple and efficient complexity of model can be decrease.

Example:

Initially Paypal ~~we~~ has very complex design which make difficulty for user. But gradually paypal change its interface now it just contains billing payment receiving and sending menus on home page.

Accessibility:

Accessibility is how efficient and easy for use to all age group people also includes disable people.

Accessibility

(Section C)

Q. No. 3 (Page 3)

Error Prevention:

Most of time ~~who~~ some websites and app shows error which are unknown and even they don't display or tell what type of error occurs. Sometimes screen go black or sometime error 505 message comp. This is not the defect of user it is the fault of programmer who have not specified error or add any notification, message or prevension note.

Error must be prevent from websites apps, softwares, etc as it makes difficulty and complexity for user to use mode).

How to resolve:

Programmers should add message like Restart your app, pc etc, Check your server or internet connection etc.

Example:

Microsoft Office ~~q~~ st display notification to close, save or exist ~~pre~~ document) when user click on end program button.

Window display notification before installing or uninstalling any app ~~of~~ or software.

(Section C)

Q. No. 4 (Page 1)

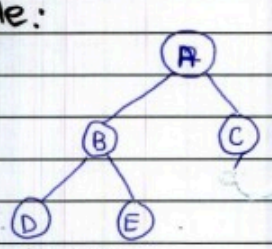
PRE-ORDER

In Pre-Order the operation is first transfer to node the left node and then to right note. Pre-order makes accessible to find any data in graph -

Working:

Node → Left node → right node

Example:



(NLR)

A → B → D → E → C

The operation is first transfered to node(A) then left node (B) ~~then~~ which become node as it is parent child of node. (B) as node and (D) Left node (E) righ node and in last to C.

(Section C)

Q. No. 4 (Page 2) LRN.

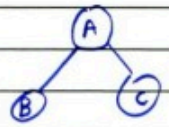
Post - Order Traversal :

In post order traversal node ~~is~~ comes in end. Operation first transfer to Left node then to right node and then to node.

Working

Left node → Right node → Node

Example:

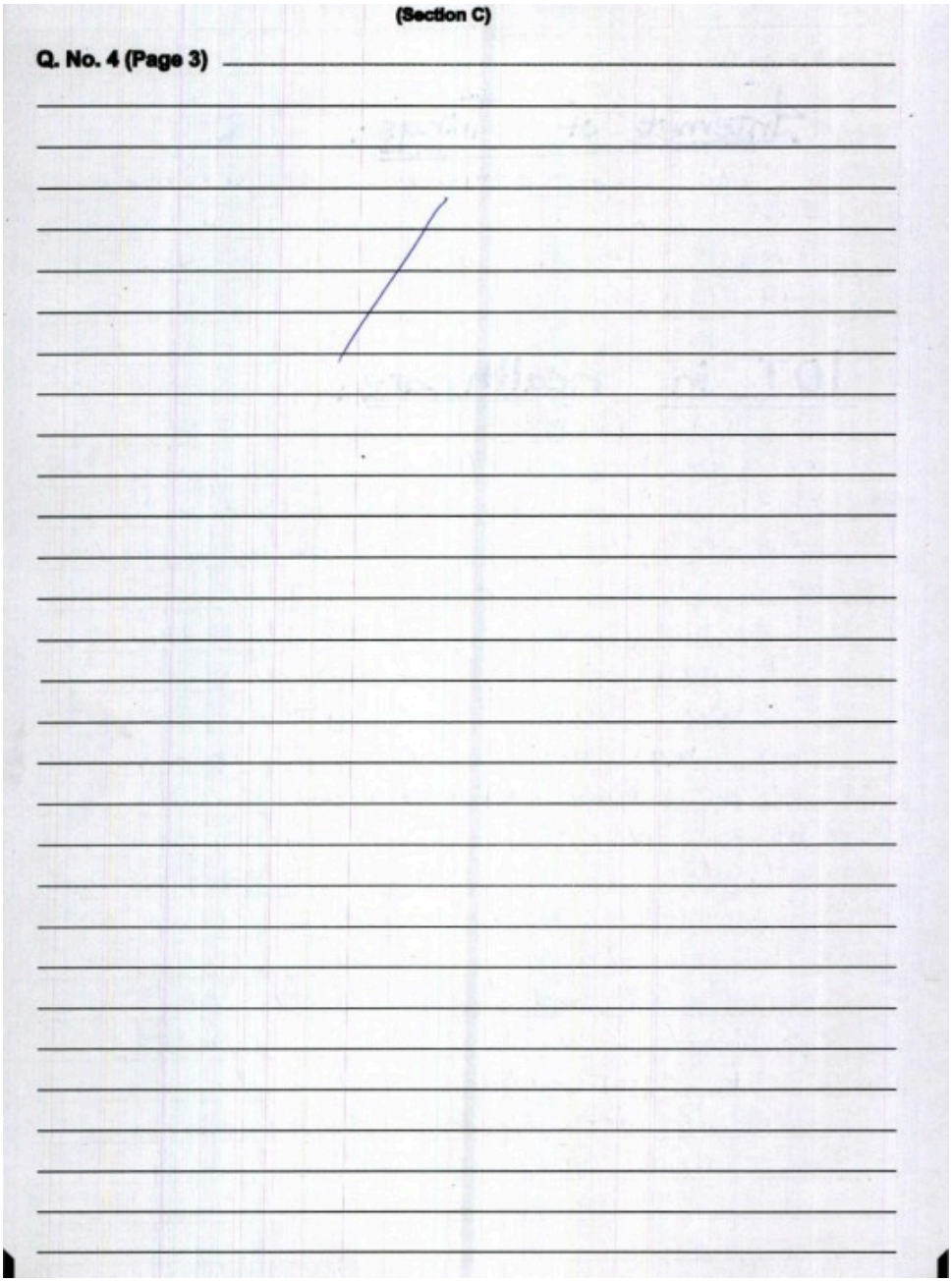


B → A → C.

The operation of post-order traversal first goto (B) as left node then to righ node (C) and then in last to node A.

(Section C)

Q. No. 4 (Page 3)



(Section C)

Q. No. 5 (Page 1)

Internet of Things:

IoT are components or services that uses sensors, motors or machines using internet and help in daily life work.

IOT in healthcare:

IOT plays effective role in healthcare. Advanced surgery tools. AI embedded system which displays patients records, and store patients history. Transfer patient data to ~~their~~ hospital portal personally. Doctors can treat patient by real time live via through ~~zo~~ online platforms. Online doctors are easy to find. Online pharmacy people can get their medicine at their doorstep.

IOT enhanced beds of patient which tell patients BP, temperature and body level to doctors room, give alarms auto maticallly.

(Section C)

Q. No. 5 (Page 2)

IOT contain ambulance are also introducing nowadays through which patients treatment can be make quickly and can save patients life.
IOT bandg bondge. Pain relief sofas etc.
IOT is very helpful in the health care sector.

IOT in traffic Management System:

1) IOT controls traffic by checking balance and flow of vehicles on roads, highways.
2) IoT can also detect if a motorbiker or any vehicle take wrong way.
3) Drifting and one wheeling can be stopped as camera detect them and send notification to traffic management.
4) IOT can also detect number plates of car or vehicles so

(Section C)

Q. No. 5 (Page 3)

in case if vehicle misplaced traffic controller office can find rapidly.

5) Google maps are embedded with AI IOT to find alternative paths in case of road blocks.

6) Traffic Signals can be controlled automatically in case of road blockage of roads.

7) Traffic lights or roadway lights are charge through solar and can be on and off automatically.

(Section C)

Q. No. 6 (Page 1)

How Neural Network is trained:

Neural Network works like human brain. Sends and receives information through paths called neuron.

Have input layer, hidden layer and output layer.

Neural network uses its intelligence and divide the work balance, make predictions but those predictions have high accuracy.

Neural Networks take large data and process it in hidden layers and produced single or multiple outputs base on problem.

Example

To predict house rent neural network keep these below points in notice.

w_1 = area (sq feet)

w_2 = bedroom

w_3 = distance from city centre

w_4 = electricity, gas and water source

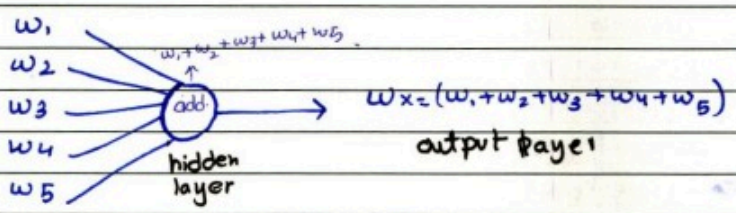
w_5 = condition (age of house)

Input layer takes these data.

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Q. No. 6 (Page 2)

hidden layer process it and output layer find one result.



Feed forward propagation:

In feed-forward propagation data is the process run step by step in forward process.

Input → Processing (hidden layer) → Output layer

Feed forward propagation runs on a time of processing. When neural network is working. It compare and check each input and possibility. Easy to run. Helps in finding error less chance of error enhance efficiency.

Example:

To recognize person's voice it takes data of audio process it under hidden

(Section C)

Q. No. 6 (Page 3)

layer by comparing voice of a person with his previous voice or in refrence voice check fluency and accent of person and in output it gives result that ~~w~~ is this voice is his or not.

Back Propagation:

In back propagation process undo its operation like:

output → processing → input

Backpropagation is used when output is come and backpropagation reverse this process again goto processing check hidden layer compare and ~~fin~~ then goto input to check that if the input data matched in processing. This enhance neural network efficiency and it is essential part of neural network.

Example:

In large data where there are thousands or million of values back propagation check if each value process correctly and then compare each value with input values to make output accurate.