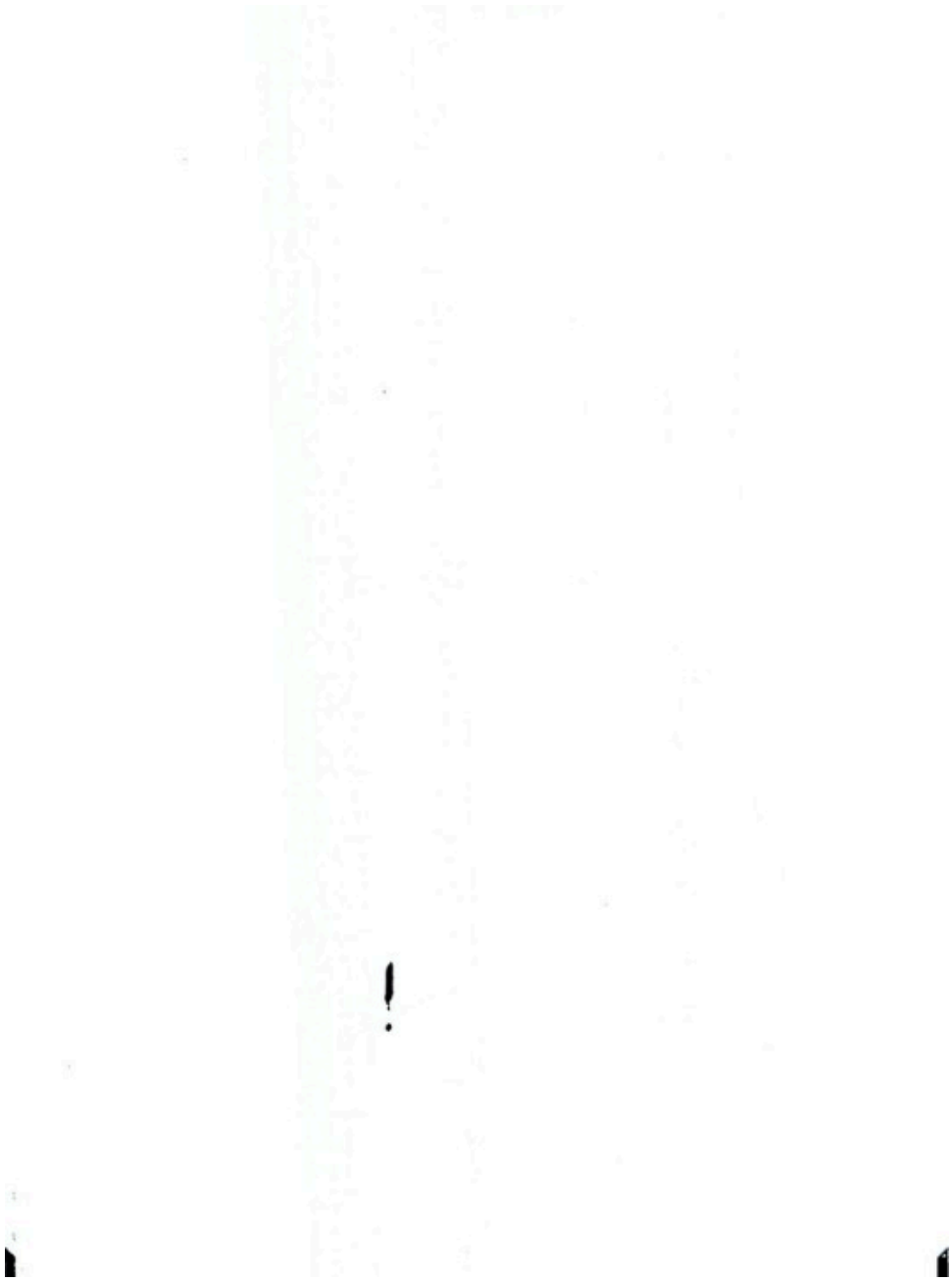
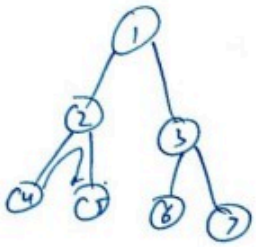






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(Section B)

Q. No. 2 Part (i)

KEY ASPECTS OF USABILITY:- key aspects of usability are:

1) **Effectivness:** The degree to which user can use system to solve problems.

2) **Efficiency:** The speed and minimal effort with which tasks can be accomplished.

3) **Satisfaction:** The customers sense of comfort and positive experience while interacting with system.

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Q. No. 2 Part (ii)

SECURITY PROTOCOLS: Security protocols refers to set of rules and regulations implemented to protect system from unauthorized access. These protocols are important because they protect our data From hackers or other people who can misuse our data. Also these protocols save our data from being altered or changed by someone.

Example: If security protocols were not implement someone can gain access to our banking & financial details and we might lose our money or personal information. Also someone can use our photos for harmful purposes.

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Q. No. 2 Part (iii)

Linked List: Linked list is a datastructure used to store data. It consist of boxes called elements to store data and these elements are connected by concept of pointers.

Advantages of Linked List:

→ It can store multiple data types.
→ Insertion and deletion of data is easily done.
→ Also it is mutable means it's size can be changed anytime according to our requirements.

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Q. No. 2 Part (iv)

P-Values in hypothesis testing: It tells whether result is due to chance or not.

In hypothesis testing p-values are used to accept or reject Null hypothesis. (H_0).
Null hypothesis states that there is no cause and effect relation between variables and any observed difference are due to random chance.

→ if P-value is high (i.e 0.5) we accept null hypothesis.
→ if P-value is low (i.e 0.005) we reject null hypothesis and accept alternative hypothesis which states there is cause & effect relation between variables.

(Section B)

Q. No. 2 Part (v)

Symmetric Cryptography	Asymmetric Cryptography
→ In symmetric cryptography one key is used for encryption & decryption.	→ In Asymmetric cryptography pair of keys is used for encryption and decryption.
→ Safe key distribution is challenge in symmetric cryptography.	→ key distribution is not a challenge as two keys are used.
→ Ideal for sharing large data volumes.	→ Typically used for sharing small data volumes.
→ It is computationally fast than Asymmetric encryption.	→ It is computationally slow as compared to symmetric cryptography.

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Q. No. 2 Part (vi)

Data Normalization: It is the process of removing redundancies or inconsistencies in data to make access and alteration of data easy and fast.

1NF (First normal form): In 1-NF tables have atomic values along with repeating or multivalued cells are removed.

2NF (Second normal form): In 2-NF we remove partial dependencies.

3NF (Third Normal form): 3NF remove Transitive dependencies in which every non-key attribute depend upon other non-key attribute is eliminated.

(Section B)

Q. No. 2 Part (vii)

TEST-TRAIN SPLIT: Test-train split is the process of division of ~~data~~ which is going to be used for model building into two portions, One for training and other for Testing.
Usually tes-train split of 70-30 or 65-35 is used for building a model but it can vary from model to model.
If this ratio is not chosen thoughtfully it can cause Overfitting or Underfitting affecting the model building in machine learning.

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Q. No. 2 Part (viii)

Enqueue: Enqueue is used to add an element at the end of queue.

Dequeue: Dequeue is used to remove an element from start of queue.

Front: Front is used to return first element without removing it.

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Q. No. 2 Part (ix)

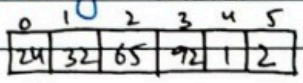
Advantage of Array:

→ It doesn't require additional data called metadata to store information.

→ In array, contiguous memory locations are used to store data so accessing of data is fast.

-: Types of Array :-

One-dimensional array: In this data is stored in the form of list and can be accessed by knowing index.



Two-Dimentional array: In this data is stored in array in the form of matrix & can be accessed by knowing x & y indexes (x, y)



Q. No. 2 Part (x)

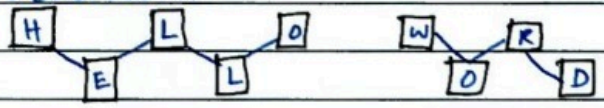
A/B Testing: A/B testing also know as 'Split Testing' in which two versions of software product are used to test which one performs better. It improves website usability by assigning randomly one version to some audience and other to other audience. Then compare the results obtained means which version got good feedback or in which version user was easily using it and in which version user feels more satisfied and after calculating the result integrate ~~that~~ the better version for everyone.

(Section B)

Q. No. 2 Part (xi)

Transposition Cipher: In transposition cipher data is encrypted by re-arranging the position of characters in plaintext without changing characters themselves. Mean plaintext and ciphertext consist of same letters just their position is replaced / changed by a specific method.

Example: As, If we apply transposition cipher to hello word.



It becomes HLOEL WROD.

Q. No. 2 Part (xii)

Digital tools in Research: Digital tools can be used to engage diverse audience because we have digital tools for multiple type of audience. For Text heavy reports tools like Microsoft word, Google docs, prezi can be used. For visual representation tools like excel, google ~~sheets~~ slides and Latex can be used. Visual tools i.e powerpoint, google sheets & tableau can be used to create table, charts & graphs inorder to find patterns and trends in data.

Example: We divide research into ~~three~~ two parts one for people who like text, other for people who likes visual and in the end give overview by tables charts & graphs.

(Section B)

Q. No. 2 Part (xiii)

-: Descriptive statistic Techniques:-

Mean: Mean in descriptive statistics refers to average of data.

Median: Median in descriptive statistics refers to middle value of data if it is in specific order.

Mode: Mode is the most frequent value in data.

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Q. No. 2 Part (xiv)

Accessibility Enhancement:- One method for improving human computer interaction is accessibility enhancements means that system or application should be designed in a way that it can be used by wide range of people including people with disabilities.

Example: Integrate, voice recognition system, ~~an~~ enhance colour theme and use specialized keyboards in your banking app so that it can be used by people with physical, visual and hearing impairements.

(Section C)

Q. No. 3 (Page 1)

Human-Computer Interaction: Human computer interaction refers to how humans interact with computer and digital applications inorder to solve their daily life tasks.

-: Common problems in HCI :-

Two common problems in HCI include

→ Interface issues.

→ Accessibility challanges.

Interface Issues / Complex Interfaces: Complex interfaces are one of the most common problem in human computer interaction. Complex interfaces are those that overwhelm users with too much information, too many options or overly complicated layouts. When user face this problem it is more likely that they would not be able to complete their tasks and will soon leave and shift to other application with simple interface.

Example: Consider a mobile banking app when we open it's homepage, it has too much options i.e help, transaction history, credit, debit, search etc this is an example of complex interface as it provides too much unneccessary information. It can be simpled if it shows only option for transaction and research.

(Section C)

Q. No. 3 (Page 2)

Accessibility Challenges: Accessibility plays very important role in human computer interaction. Accessibility in context of HCI refers to that the system should be designed in a way that it can be used by wide range of people including people with dissabilities. Difficulty occurs when system is not designed by keeping accessibility in mind. By this problem a large number of users can't use the system for solving their daily life problems. There are various types of accessibility issues i.e physical disabilities, hearing impairments, eye sight issues when these disabilities aren't kept in mind while developing ~~stem~~ system. These people get it's sideeffects.

Example: For example, a website in which dull colours theme is used, ~~it can~~ people with visual problems can feel difficulty in using these devices. Also, there are no closed caption/transcripts so people who are deaf can't hear what is going on in website. Also, it doesn't operates on voice so people with motor abilities can't use it. Inorder to overcome integrate these in website and improve its accessibility.

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Q. No. 3 (Page 3)

(Section C)

Q. No. 4 (Page 1)

TREE TRAVERSAL:- Tree traversal is the method of visiting tree in specific order to get our desired information.

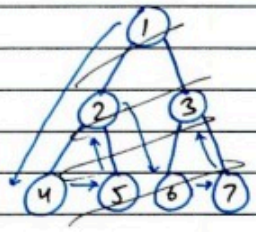
-: Types of TREE TRAVERSAL :-

→ In-order traversal.
→ Pre-order traversal.
→ Post-order traversal.

PRE-ORDER TRAVERSAL: In this traversal we visit root node first, then traverse left subtree and then right subtree.
So pre-order traversal is.
→ Visit Root node.
→ Traverse left subtree.
→ Traverse right subtree.

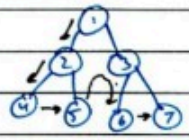
Example: Consider a tree given below pre-order traversal can be given by.

1 4 5 2 6 7 3 is the pre-order traversal for given tree.



OR

1 2 4 5 3 6 7 is the traversal f pre-order traversal for given tree.



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Q. No. 4 (Page 2)

POST-ORDER TRAVERSAL: In this traversal, we first traverse left subtree, then right subtree and in the end visit root node.

So, steps for traversal are:

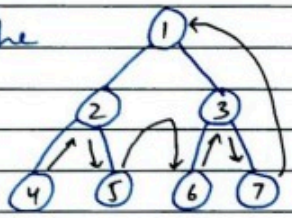
→ Traverse left subtree.

→ Traverse right subtree.

→ Visit root node.

Example: Consider the tree given below post-order traversal can be done by following above steps.

4 2 5 6 3 7 1 is the post-order traversal for give tree.



OR

Hypothesis formulation: is the process of making a rough educated guess about relationships between variable on the behalf of prior experience or knowledge.

Null hypothesis: (H_0) It states that there is no cause and effect relationship between variables and any observed differences

(Section C)

Q. No. 4 (Page 3)

are due to random chance. It is denoted by (H_0).

Alternative hypothesis: It states there is cause and effect relationship between variables It is denoted by (H_1).

Example: A research is conducted about hypothesis coffee improves cognitive function ~~about~~ of students.

According to null hypothesis, coffee and cognitive function ~~are~~ ~~is~~ has no relation. ~~and~~ observed data is due to chance.

According to ~~alternative~~ hypothesis, coffee improves cognitive function and ~~they~~ their is relation between them.

After gathering data about research question we conclude coffee ~~has~~ improves cognitive function ~~in~~ student. So we accept Alternate hypothesis and reject null hypothesis.

(Section C)

Q. No. 5 (Page 1)

DDOS (Distributed Denial of service): DDoS is a cyber attack where multiple computers work together to flood a website or system with too much traffic making it slow or completely unavailable to network users. Means in this attacks the targeted system stops working or becomes extremely slow making it's users worry about their privacy and data. This attack can be harmful for individuals or organizations as they will not be able to perform task using system and their data is at risk too. They might loose their users because of this attack hence their reputation is at risk and also it can cause financial loses.

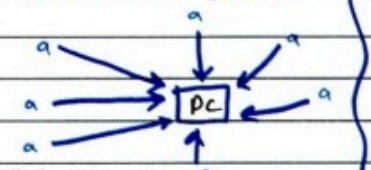
Ransomware: In Ransomware attack hacker encrypts user file and data and demand ransom (money) for decryption key. Ransom doesn't gurantee data access and user might lose access to critical data. It is very dangerous cyber attack because of this attacks. users data is not only hacked it is encrypted and

(Section C)

Q. No. 5 (Page 2)

for decryption we require decryption key. Even if we pay ransom may be hacker doesn't decrypt our data and demand more ransom or also can exploit / destroy our data never to return and we might lose our critical data.

a = attackers computers.



DDoS attack



Ransomware

(Section C)

Q. No. 5 (Page 3)

(Section C)

Q. No. 6 (Page 1)

TRAINING OF NEURAL NETWORK:- Neural network is trained by providing it dataset about which it is trained and it extracts features from data on its own. and provide us. output on the behalf of what it has learned.
It has 3 layers.
→ Input layer that recieves input.
→ Hidden layer that extract features & produce output
→ Output layer that displays output.

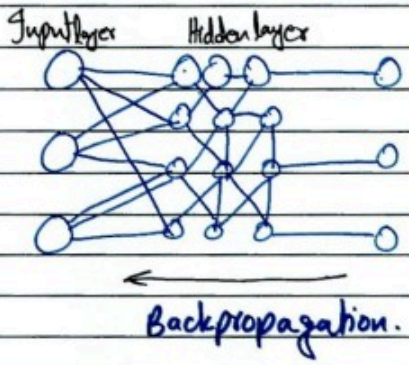
Feedforward Propagation: In feedforward propagation, information is fed in forward direction from input layer the information enters the neural network from input layer this layer transmit this input data to hidden layer. Activation function apply methamatical operations ~~with~~ it. weights associated with neuron if it goes over threshold neuron is activated else information is transfered to next layer and eventually to output layer that displays the final output.

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Q. No. 6 (Page 2)

Backpropagation: In backpropagation information is fed in backward direction from output layer to hidden and then to input layer. **loss function** apply operations to weights associated with each neuron and weight are adjusted to provide accurate value. and reduce gap between actual and produced output.

Feedforward Propagation



Backpropagation.

(Section C)

Q. No. 6 (Page 3)