

WB Board Class 12 Computer Science Question Paper with Solutions(Memory Based)

Time Allowed :3 Hour	Maximum Marks :60	Total Questions :24
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General Instructions

Read the following instructions very carefully and strictly follow them:

- Answers to this Paper must be written on the paper provided separately.
- You will not be allowed to write during the first 15 minutes
- This time is to be spent in reading the question paper.
- The time given at the head of this Paper is the time allowed for writing the answers,
- The paper has four Sections.
- Section A is compulsory - All questions in Section A must be answered.
- You must attempt one question from each of the Sections B, C and D and one other question from any Section of your choice.

1. What are the differences between LAN, MAN, and WAN in terms of geographical area?

Correct Answer: LAN covers a small area, MAN covers a city, and WAN covers very large/global areas.

Solution: Concept: Computer networks are classified based on the geographical area they cover. The three main types are:

- LAN — Local Area Network
- MAN — Metropolitan Area Network
- WAN — Wide Area Network

Step 1: Local Area Network (LAN).

- Covers a **small geographical area**.
- Examples: home, school, office building.
- Usually privately owned and high-speed.

Step 2: Metropolitan Area Network (MAN).

- Covers a **larger area than LAN**, typically a city or town.

- Connects multiple LANs together.
- Example: city-wide cable network.

Step 3: Wide Area Network (WAN).

- Covers a **very large geographical area**.
- May span countries or continents.
- Example: The Internet.

Step 4: Comparison in terms of area.

$$\text{LAN} < \text{MAN} < \text{WAN}$$

This means LAN has the smallest coverage, while WAN has the largest.

Conclusion:

- LAN: Small/local area (building or campus)
- MAN: Medium area (city)
- WAN: Very large/global area (countries or world)

Quick Tip

Remember: **L-M-W** → Local, Metropolitan, Wide — increasing order of geographical coverage.

2. Explain the three modes of communication: Simplex, Half Duplex, and Full Duplex.

Correct Answer: The three communication modes differ based on the direction of data flow: one-way (Simplex), two-way but not simultaneous (Half Duplex), and two-way simultaneous (Full Duplex).

Solution: Concept: Communication modes describe how data flows between two devices in a network. They are classified based on direction and simultaneity of data transmission.

Step 1: Simplex Mode.

- Data flows in **only one direction**.
- One device sends, the other only receives.
- No feedback or reverse communication.
- Examples: Keyboard to computer, radio broadcasting.

Step 2: Half Duplex Mode.

- Data flows in **both directions**, but **not at the same time**.
- Devices take turns sending data.
- Communication is two-way but alternating.
- Example: Walkie-talkies.

Step 3: Full Duplex Mode.

- Data flows in **both directions simultaneously**.
- Both devices can send and receive at the same time.
- Faster and more efficient communication.
- Examples: Telephone calls, video calls.

Step 4: Comparison.

Simplex → One-way communication

Half Duplex → Two-way, but one at a time

Full Duplex → Two-way simultaneous communication

Conclusion:

The three modes differ based on direction and timing of data flow, with Full Duplex being the most efficient.

Quick Tip

Remember: **S-H-F** → Simplex (1-way), Half Duplex (2-way alternate), Full Duplex (2-way simultaneous).

3. What is the difference between Client-Server and Peer-to-Peer network architectures?

Correct Answer: Client-Server uses a central server to manage resources, while Peer-to-Peer allows all devices to share resources directly without a central server.

Solution: Concept: Network architecture defines how devices communicate and share resources in a network. Two common architectures are:

- Client-Server Architecture
- Peer-to-Peer Architecture

Step 1: Client-Server Architecture.

- A **central server** manages data, services, and security.
- Clients request resources from the server.
- Server controls access and processing.
- Examples: Web servers, email servers, banking systems.

Step 2: Peer-to-Peer (P2P) Architecture.

- No central server; all computers are **equal peers**.
- Each device can act as both client and server.
- Resources are shared directly between devices.
- Examples: File sharing networks, small home networks.

Step 3: Key Differences.

- **Control:** Centralized in Client-Server, decentralized in P2P.
- **Security:** Higher in Client-Server due to central control.
- **Cost:** Higher in Client-Server (server required), lower in P2P.
- **Scalability:** Client-Server handles large networks better.

Step 4: Summary.

Client-Server → Centralized management

Peer-to-Peer → Decentralized sharing

Conclusion:

Client-Server architecture relies on a central server for control and management, whereas Peer-to-Peer architecture allows direct communication and resource sharing among all nodes.

Quick Tip

Remember: **Client-Server = Central control, P2P = Equal nodes sharing resources directly.**

4. Explain the different types of network topologies: Bus, Star, Ring, and Tree.

Correct Answer: Network topologies describe how devices are arranged and connected. The main types include Bus, Star, Ring, and Tree topologies.

Solution: Concept: A network topology refers to the physical or logical arrangement of devices in a network. Different topologies affect performance, reliability, and scalability.

Step 1: Bus Topology.

- All devices are connected to a **single central cable** (backbone).
- Data travels in both directions along the bus.
- Simple and low cost.
- Disadvantage: Failure of backbone stops entire network.

Step 2: Star Topology.

- All devices connect to a **central hub or switch**.
- Most widely used topology today.
- Easy to install and manage.
- Failure of one device does not affect others, but hub failure stops network.

Step 3: Ring Topology.

- Devices are connected in a **circular loop**.
- Data travels in one direction around the ring.
- Equal access for all nodes.
- Disadvantage: A break in the ring can disrupt the network.

Step 4: Tree Topology.

- Combination of **Star and Bus** topologies.
- Organized in a hierarchical structure (root and branches).
- Suitable for large networks like organizations.
- Failure of a branch affects only that section.

Step 5: Comparison.

Bus → Single backbone cable

Star → Central hub connection

Ring → Circular loop

Tree → Hierarchical structure

Conclusion:

Each topology has its own advantages and limitations. Star topology is most common today, while Tree topology is preferred for large hierarchical networks.

Quick Tip

Remember shapes: Bus = Line, Star = Hub spokes, Ring = Circle, Tree = Hierarchy.

5. Write the HTML code to create a table with 3 rows and 2 columns.

Correct Answer: Use the <table>, <tr>, and <td> tags to create rows and columns.

Solution: Concept: In HTML:

- <table> defines the table.
- <tr> defines a table row.
- <td> defines a table cell (column).

To create a table with 3 rows and 2 columns:

- Use 3 <tr> tags.
- Each row contains 2 <td> tags.

Step 1: Start the table structure.

Use the opening and closing <table> tag.

Step 2: Create rows using <tr>.

Each row represents horizontal entries.

Step 3: Add columns using <td>.

Two <td> elements inside each row give 2 columns.

Step 4: Complete HTML code.

```
<!DOCTYPE html>
<html>
<head>
  <title>3x2 Table</title>
</head>
<body>

<table border="1">
  <tr>
    <td>Row1 Col1</td>
    <td>Row1 Col2</td>
  </tr>
  <tr>
    <td>Row2 Col1</td>
    <td>Row2 Col2</td>
  </tr>
  <tr>
    <td>Row3 Col1</td>
    <td>Row3 Col2</td>
  </tr>
</table>

</body>
</html>
```

Conclusion:

The table contains 3 rows and 2 columns created using `<tr>` and `<td>` tags inside a `<table>` element.

Quick Tip

Rows = `<tr>`, Columns = number of `<td>` inside each row.

6. How do you use the `` tag to insert an image into a webpage?

Correct Answer: The `` tag is used with attributes like `src`, `alt`, `width`, and `height` to insert an image into a webpage.

Solution: Concept: The `` tag in HTML is used to display images on a webpage. It is an **empty tag**, meaning it does not require a closing tag.

Important attributes:

- `src` — Specifies the image path or URL.
- `alt` — Alternative text (shown if image fails to load).
- `width` and `height` — Control image size.

Step 1: Basic syntax of the `` tag.

```

```

Step 2: Add the image source.

The `src` attribute defines the location of the image:

- Local image: `src="photo.jpg"`
- Online image: `src="https://example.com/photo.jpg"`

Step 3: Add alternative text.

The `alt` attribute improves accessibility and SEO:

```
alt="A beautiful sunset"
```

Step 4: Set width and height (optional).

```

```

Step 5: Complete example.

```
<!DOCTYPE html>
<html>
<head>
  <title>Image Example</title>
</head>
```

```
<body>

<h2>My Image</h2>


</body>
</html>
```

Conclusion:

The `` tag inserts images using the `src` attribute, while `alt`, `width`, and `height` enhance usability and display.

Quick Tip

Always include the `alt` attribute — it helps accessibility and shows text if the image cannot load.

7. What are the steps to perform a Mail Merge in MS Word?

Correct Answer: Mail Merge involves creating a main document, selecting recipients, inserting merge fields, previewing, and completing the merge.

Solution: Concept: Mail Merge in MS Word is used to create multiple personalized documents (letters, labels, emails) using:

- A main document (template)
- A data source (list of recipients)

Step 1: Create the main document.

- Open MS Word.
- Type the common content (e.g., letter body).

Step 2: Start Mail Merge.

- Go to **Mailings** tab.
- Click **Start Mail Merge**.
- Choose type (Letters, Envelopes, Labels, Email).

Step 3: Select recipients.

- Click **Select Recipients**.
- Choose:
 - Type a new list, or

- Use existing list (Excel file), or
- Outlook contacts.

Step 4: Insert merge fields.

- Place cursor where personalization is needed.
- Click **Insert Merge Field**.
- Insert fields like Name, Address, etc.

Step 5: Preview the results.

- Click **Preview Results**.
- Check how each document looks for different recipients.

Step 6: Complete the Mail Merge.

- Click **Finish & Merge**.
- Choose:
 - Print documents
 - Edit individual documents
 - Send email messages

Conclusion:

Mail Merge allows automatic creation of multiple personalized documents by combining a template with a data source.

Quick Tip

Remember sequence: **Start** → **Select Recipients** → **Insert Fields** → **Preview** → **Finish**.

8. Explain the functions of SUM, AVERAGE, and COUNT in MS Excel.

Correct Answer: SUM adds numbers, AVERAGE calculates the mean, and COUNT counts numeric cells in a range.

Solution: Concept: MS Excel provides built-in functions to perform calculations easily. SUM, AVERAGE, and COUNT are basic and commonly used statistical functions.

Step 1: SUM Function.

- Used to **add numbers** in a range of cells.
- Syntax:

=SUM(range)

- Example:

=SUM(A1:A5)

Adds values from cell A1 to A5.

Step 2: **AVERAGE Function.**

- Calculates the **mean (average)** of numbers.
- Syntax:

=AVERAGE(range)

- Example:

=AVERAGE(B1:B10)

Returns the average of values in B1 to B10.

Step 3: **COUNT Function.**

- Counts the number of **cells containing numeric values**.
- Ignores text and empty cells.
- Syntax:

=COUNT(range)

- Example:

=COUNT(C1:C20)

Counts numeric entries only.

Step 4: **Comparison.**

- SUM → Adds numbers
- AVERAGE → Finds mean
- COUNT → Counts numeric cells

Conclusion:

These functions simplify calculations in Excel and are essential for data analysis and spreadsheets.

Quick Tip

Remember: SUM = Total, AVERAGE = Mean, COUNT = Number of numeric entries.

9. Describe the process of Disk Defragmentation and why it is important for computer performance.

Correct Answer: Disk defragmentation rearranges fragmented data on a disk so files are stored contiguously, improving access speed and overall system performance.

Solution: Concept: Over time, files on a hard disk become **fragmented**, meaning parts of a file are stored in different physical locations. Disk Defragmentation reorganizes this data to improve efficiency.

Step 1: What is Fragmentation?

- When files are saved, deleted, or modified, empty spaces appear on the disk.
- New files get split into pieces and stored in scattered locations.
- This is called **disk fragmentation**.

Step 2: What is Disk Defragmentation?

- A maintenance process that **rearranges scattered file fragments**.
- Combines pieces of the same file into a single continuous block.
- Also consolidates free space.

Step 3: How the process works.

- The system scans the disk for fragmented files.
- Moves data blocks closer together.
- Reorganizes files into contiguous storage locations.
- Updates file indexes accordingly.

Step 4: Importance for performance.

- Faster file access and loading time.
- Improved system responsiveness.
- Reduced wear on mechanical hard drives (HDDs).
- Better disk space utilization.

Step 5: When to use it.

- Useful mainly for **HDDs**.
- Not usually required for SSDs (handled differently).

Conclusion:

Disk defragmentation improves computer performance by organizing fragmented files into continuous blocks, enabling faster data access and smoother system operation.

Quick Tip

Defragmentation is essential for HDDs but generally unnecessary for SSDs due to their different storage technology.
