Advanced Excel Assignment

Question 1 : Explain the difference between Absolute, Relative, and Mixed Cell Referencing in Excel with examples.

Answer :

1. Relative Cell Referencing

Definition:
 Relative cell references change automatically when a formula is copied to another cell.
 This is the default type of referencing in Excel.

Syntax:
 A1 (no dollar signs)

Example:
 If cell C1 contains the formula:

       =A1 + B1

and you copy this formula from C1 to C2, it becomes:

       =A2 + B2

Explanation:
 Excel adjusts the row and column references based on the new location of the formula.

Usage:
   ● When you want formulas to automatically adjust for each row or column.
   ● Common in calculations like totals, averages, etc.

2. Absolute Cell Referencing

Definition:
 Absolute cell references remain fixed even when the formula is copied to another cell.

Syntax:
 A1 (dollar sign before both column and row)

Example:
 If cell C1 contains:

       =A1 * B1

and you copy the formula down to C2, it becomes:

       =A2 * B1
Explanation:

- A1 changes to A2 (relative).
- B1 stays the same (absolute).

Usage:

- When referring to a constant value (e.g., tax rate, fixed percentage).
- Useful in financial and statistical calculations.

3. Mixed Cell Referencing

Definition:
 Mixed referencing locks either the row or the column, but not both.

Syntax:

- $A1 → Column fixed, row changes.
- A$1 → Row fixed, column changes.

Example 1 (Column fixed):
 Formula in C1:

    =$A1 * B1

When copied to D2, it becomes:

    =$A2 * C2

Example 2 (Row fixed):
 Formula in C1:

    =A$1 * B1

When copied to D2, it becomes:

    =B$1 * C2

Usage:

- Common in tables, matrices, and multiplication grids.
- Useful when working with headers or fixed rows/columns.

Conclusion

Understanding the difference between Relative, Absolute, and Mixed cell referencing is essential for creating accurate and efficient Excel formulas. Choosing the correct reference type helps avoid errors and makes formulas reusable and reliable.

Question 2 : What is a Macro in Excel? How does it help in automation?

Answer :

A Macro is a stored sequence of commands that Excel can run automatically. These commands can include actions such as:

- Formatting cells.

- Entering formulas.

- Sorting and filtering data.

- Creating reports.

- Performing calculations.

Macros can be created in two ways:

1. Recording a Macro – Excel records user actions and converts them into VBA code.

2. Writing VBA Code – Advanced users write custom code for greater control.

Automation means performing tasks automatically without manual intervention. Macros help in automation in the following ways:

1. Saves Time

Macros perform repetitive tasks instantly, reducing the time required for manual work.

Example:
Instead of formatting a report daily, a macro can apply all formatting in seconds.

2. Reduces Errors

Manual data entry can lead to mistakes. Macros execute tasks the same way every time, ensuring accuracy and consistency.

3. Increases Productivity

With automation, users can focus on analysis and decision-making rather than repetitive operations.

4. Performs Complex Tasks Easily

Macros can combine multiple steps into one command.

Example:
A single macro can:

- Import data.

- Clean it.

- Apply formulas.

- Generate a summary report.

5. Customizable and Reusable

Macros can be reused across different workbooks and customized to meet specific requirements.

Example of Macro Usage

A macro can be used to:

- Automatically calculate totals.
- Format rows and columns.
- Generate monthly sales reports.
- Clean raw data (remove blanks, duplicates).

Conclusion

A Macro in Excel is a powerful automation tool that records or programs repetitive tasks using VBA. By automating routine operations, macros save time, reduce errors, and significantly improve efficiency, making Excel a powerful tool for data handling and analysis.

Question 3 : What are Text Functions in Excel? Mention any five with examples.

Answer :

Text functions allow users to:

- Combine text from multiple cells.
- Extract specific characters.
- Change text case.
- Remove unwanted spaces.
- Format text in a required way.

They are widely used in data cleaning and report preparation.

Five Text Functions with Examples

1. LEFT():

Purpose:
Extracts a specified number of characters from the left side of a text string.

Syntax:

```
LEFT(text, number_of_characters)
```

Example:
If cell **A1** contains Excel2024:

```
=LEFT(A1,5)
```

Output: Excel

2. RIGHT():

Purpose:
Extracts characters from the right side of a text string.

Syntax:

RIGHT(text, number_of_characters)

Example:
If **A1** contains Invoice789:

=RIGHT(A1,3)

Output: 789

3. MID():

Purpose:
Extracts characters from the middle of a text string.

Syntax:

MID(text, start_position, number_of_characters)

Example:
If **A1** contains EMP12345:

=MID(A1,4,5)

Output: 12345

4. CONCATENATE() / CONCAT():

Purpose:
Joins two or more text strings together.

Syntax:

CONCAT(text1, text2, ...)

Example:
If A1 contains Aysha and B1 contains Sheik:

=CONCAT(A1," ",B1)

Output: Aysha Sheik

5. UPPER()

<u>Purpose:</u>
Converts text to uppercase letters.

<u>Syntax:</u>

```
UPPER(text)
```

<u>Example</u>:
If A1 contains `excel functions`:

```
=UPPER(A1)
```

<u>Output:</u> `EXCEL FUNCTIONS`

<u>Conclusion</u>

Text functions in Excel are essential for handling and cleaning textual data. Functions like LEFT, RIGHT, MID, CONCAT, and UPPER help extract, combine, and format text efficiently, making data more organized and analysis-ready.

Question 4 : What is the use of Scenario Manager in decision making?

Answer :

Scenario Manager allows you to:

- Create and save multiple sets of input values (called scenarios).
- Switch between scenarios easily.
- Compare results without changing the original data.

Each scenario represents a possible situation or decision.

Scenario Manager is a What-If Analysis tool in Microsoft Excel that helps users analyze different possible outcomes by changing input values in a worksheet. It is mainly used for decision making, forecasting, and planning.

<u>Use of Scenario Manager in Decision Making</u>

<u>1. Compare Different Outcomes:</u>

Scenario Manager helps compare results under different assumptions.

<u>Example</u>:
A company can analyze best case, worst case, and most likely case profits by changing:

- Sales volume
- Cost

- Price

2. **Helps in Forecasting and Planning:**

It helps managers plan for future uncertainties.

Example:
 Forecasting revenue based on different growth rates.

3. **Risk Analysis:**

By testing multiple scenarios, decision-makers can understand risks and choose safer options.

Example:
 Analyzing how profit changes if raw material cost increases.

4. **Saves Time and Avoids Errors:**

Once scenarios are created, Excel automatically changes values, avoiding manual recalculations and mistakes.

5. **Supports Data-Driven Decisions:**

Scenario summaries provide clear comparison tables that support logical and informed decisions.

Example of Scenario Manager

A business creates three scenarios:

- Best Case – High sales, low cost
- Worst Case – Low sales, high cost
- Normal Case – Average sales and cost

Excel shows how profit changes in each case, helping management choose the best strategy.

Conclusion:

Scenario Manager is a powerful decision-making tool in Excel that allows users to evaluate multiple possibilities, compare outcomes, reduce risk, and make informed business decisions based on data rather than assumptions.

Question 5 : Define the purpose of VLOOKUP and HLOOKUP. How are they different from XLOOKUP? Which among XLOOKUP and INDEX-MATCH is best while usage?

Answer :

Purpose of VLOOKUP:

VLOOKUP (Vertical Lookup) is used to search for a value in the first column of a table and return a corresponding value from another column in the same row.

```
VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])
```

Purpose:

- To retrieve related data vertically.
- Commonly used in reports, marksheets, salary sheets, etc.

Example:
 Find salary of employee ID 101 from a table.

Purpose of HLOOKUP:

HLOOKUP (Horizontal Lookup) searches for a value in the first row of a table and returns a corresponding value from another row in the same column.

Syntax:

```
HLOOKUP(lookup_value, table_array, row_index_num, [range_lookup])
```

Purpose:

- To retrieve data arranged horizontally.
- Used when data is stored in rows instead of columns.

Limitations of VLOOKUP and HLOOKUP:

- Can only look right (VLOOKUP) or down (HLOOKUP).
- Breaks if columns/rows are inserted or deleted.
- Requires fixed column or row index number.
- Cannot easily perform left lookups.

How XLOOKUP Is Different:

XLOOKUP is a modern and advanced lookup function that replaces VLOOKUP and HLOOKUP.

Syntax:

```
XLOOKUP(lookup_value, lookup_array, return_array)
```

Advantages of XLOOKUP:

- Works both vertically and horizontally.
- Supports left, right, up, and down lookups.
- Does not require column or row numbers.
- Automatically adjusts to table changes.
- Can return multiple results.
- Easier to read and write.

Example:

```
=XLOOKUP(A2, A2:A10, C2:C10)
```

XLOOKUP vs INDEX-MATCH: Which Is Better?

INDEX-MATCH:

Uses two functions together:

- `INDEX()` returns value.
- `MATCH()` finds position.

Advantages:

- More flexible than VLOOKUP/HLOOKUP.
- Supports left lookup.
- Faster in large datasets.
- Works in older Excel versions.

Disadvantages:

- Syntax is complex.
- Harder for beginners to understand.

XLOOKUP:

Advantages:

- Simple and readable syntax.
- Highly flexible.
- Replaces multiple lookup functions.
- Best for modern Excel users.

Disadvantages:

- Not available in very old Excel versions

Which Is Best While Usage?

- XLOOKUP is best for:
    - New Excel versions.
    - Simplicity and flexibility.
    - Most business and analyst use cases.

- INDEX-MATCH is best for:
    - Older Excel compatibility.
    - Very large datasets.
    - Advanced users needing high performance.

Conclusion:

- VLOOKUP & HLOOKUP are basic lookup functions with limitations.
- XLOOKUP is the most powerful and user-friendly modern lookup function.
- Between XLOOKUP and INDEX-MATCH, XLOOKUP is generally the best choice, while INDEX-MATCH remains valuable for compatibility and performance needs.

Question 6 : Create a dataset of 8 employees with joining dates. Use the dummy dataset to calculate their experience in years and months.

Answer :

Objective:

To calculate employee experience in years and months based on their joining date using Microsoft Excel.

Dummy Dataset:

Employee ID	Employee Name	Joining Date
E001	Aisha Khan	15-06-2018
E002	Rahul Verma	10-01-2020
E003	Neha Sharma	25-03-2017
E004	Arjun Patel	01-12-2019
E005	Priya Mehta	20-08-2016
E006	Rohan Das	05-05-2021
E007	Sneha Iyer	14-02-2015
E008	Aman Singh	30-09-2018

Logic Used:

- The current date is taken using the TODAY() function.
- Experience is calculated by finding the difference between Joining Date and Today's Date.
- DATEDIF() function is used:
- "Y" to calculate completed years.
- "YM" to calculate remaining months after years.

Formulas Used in Excel:

Assuming:

- Joining Date is in C2.

Experience (Years):

```
=DATEDIF(C2, TODAY(), "Y")
```

Experience (Months):

```
=DATEDIF(C2, TODAY(), "YM")
```

Final Output: The practical solution for this question is provided in the Excel file under the sheet **Q6_Employee_Experience**.

Conclusion:

Using the DATEDIF() and TODAY() functions, employee experience can be accurately calculated in years and months. This method is useful for HR analysis and employee tenure tracking.

Question 7 : You are provided with a dataset containing details of 100 road accidents. Design a Road Accident Analysis Dashboard using Pivot Tables and Slicers in Excel.

Answer :

Solution Approach – Road Accident Analysis Dashboard

Objective:
 The objective is to analyze road accident data and present key insights using Pivot Tables and Slicers in Excel.

Approach and Logic:

1. The dataset was reviewed to understand the nature of each column.
2. Accident ID was used to calculate the total number of accidents, while casualties were used to measure accident impact.
3. Pivot tables were created to analyze accidents by city, severity, vehicle type, accident type, and cause.
4. Charts were generated from pivot tables to visualize accident patterns clearly.
5. Slicers were added for important categorical fields to allow interactive filtering of the dashboard.

Reasoning:
 This approach helps identify high-risk cities, major accident causes, severity levels, and vehicle involvement, making the dashboard useful for analysis and decision-making.

Conclusion:
 The Road Accident Analysis Dashboard provides a clear, interactive summary of accident trends using Excel pivot tables and slicers.

Question 8 : Create a table of 10 products with stock levels. Use Macros to highlight:

● Low stock (less than 10 units) in red.

● Overstock (more than 50 units) in green.

 Answer :

<u>**Solution Approach - Stock Level-Macro**</u>

<u>**Objective:**</u>
The objective is to monitor product stock levels and visually identify low stock and overstock situations using Excel Macros.

<u>**Logic Used:**</u>

- A table of 10 products was created with stock quantities.
- A VBA macro was written to loop through the Stock Level column.
- If stock is less than 10 units, the cell is highlighted in red.
- If stock is greater than 50 units, the cell is highlighted in green.
- Normal stock levels are left unchanged.

<u>**Reasoning:**</u>
Using macros automates stock monitoring and helps users quickly identify products that require restocking or inventory reduction.

<u>**Conclusion:**</u>
The macro successfully highlights low and excess stock levels, improving inventory control and decision-making.

Question 9 : You are given a dataset : Create a drop-down list of product names in a separate cell using Data Validation, and write a formula in the adjacent cell so that when a product is selected from the drop-down, its corresponding price is automatically displayed.

Answer :

<u>**Objective:**</u>

To create a drop-down list of product names and automatically display the corresponding unit price when a product is selected.

<u>**Solution Approach:**</u>

1. The given dataset was entered into Microsoft Excel with appropriate column headings.
2. A separate cell was selected to create a drop-down list of product names using Data Validation.
3. The Product Name column from the dataset was used as the source for the drop-down list.
4. In the adjacent cell, the VLOOKUP function was applied to fetch the unit price corresponding to the selected product.
5. The formula uses an exact match to ensure accurate price retrieval.

<u>**Formula Used:**</u>
  =VLOOKUP(O2,F2:H50,3,FALSE)

<u>**Explanation of Formula:**</u>

- **O2** – Selected product from the drop-down list.
- **F2:H50** – Lookup table containing product details.
- **3** – Column number of Unit Price in the lookup table.

- **FALSE** – Ensures exact match.

Result

When a product name is selected from the drop-down list, the corresponding unit price is automatically displayed in the adjacent cell.

Conclusion

This approach improves data accuracy and efficiency by using Data Validation and lookup functions to retrieve product prices dynamically.

Question 10 : Case Scenario :-
You are a data analyst working for a retail firm. You've received a sales dataset that includes customer transactions from various regions and product categories. Your job is to analyze this data, clean inconsistencies, extract insights, and build visual reports.
Task :
1. Apply data validation in the Units Sold column to ensure only values between 1 and 20 are allowed.
2. Highlight rows where Profit > ₹5000.
3. Highlight any phone number that is not exactly 10 digits.
4. Find the Revenue generated by each product and also label according to revenue generated as "High", "Medium", "Low".
5. Find the profit percentage up to two decimal places.
6. Show Total Revenue and Total Profit by Region.
7. Show Average Units Sold per Product Category.

Answer:

Case Scenario: Sales Data Analysis

Objective

To clean, validate, analyze, and summarize the given retail sales dataset using Excel features such as Data Validation, Conditional Formatting, formulas, and Pivot Tables.

Approach for Each Task

Task 1: Apply Data Validation on Units Sold (1 to 20)

- The *Units Sold* column was validated to prevent incorrect data entry.

Steps

1. Select the Units Sold column.
2. Go to Data → Data Validation.

3. Set:
    - Allow: Whole number
    - Minimum: 1
    - Maximum: 20
- This ensures only valid unit quantities are entered.

Task 2: Highlight Rows where Profit > ₹5000

- Conditional Formatting was applied to identify high-profit transactions.

Steps

1. Select the entire dataset.
2. Go to Home → Conditional Formatting → New Rule.
3. Use formula:

    ```
    =$J2>5000
    ```

4. Apply a light green fill.

Rows with profit greater than ₹5000 are highlighted.

Task 3: Highlight Phone Numbers Not Exactly 10 Digits

- Phone numbers were checked using text length logic.

Formula Used:

```
=LEN(E2)<>10
```

Steps

1. Select the Phone Number column.
2. Apply Conditional Formatting using the above formula.
3. Highlight with red fill.

Invalid phone numbers are easily identified.

Task 4: Calculate Revenue and Label Revenue Category

Revenue Formula:

```
=H2*I2
```

(Price × Units Sold)

Revenue Label Logic:

```
=IF(L2>=20000,"High",IF(L2>=8000,"Medium","Low"))
```

Revenue is classified into High / Medium / Low.

Task 5: Calculate Profit Percentage (2 Decimal Places)

Formula Used:

```
=ROUND((J2/L2)*100,2)
```

Profit percentage is displayed up to two decimal places.

Task 6: Total Revenue and Total Profit by Region

- A Pivot Table was used for summarization.

Pivot Table Setup:

- Rows: Region
- Values:
    - Sum of Revenue
    - Sum of Profit

Shows region-wise financial performance.

Task 7: Average Units Sold per Product Category

- A Pivot Table was used to calculate averages.

Pivot Table Setup:

- Rows: Product Category
- Values:
    - Average of Units Sold

Identifies product demand trends.

Final Review:

The dataset was reviewed to ensure all validations, calculations, and formatting were applied correctly before final submission.