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1. What is Power BI?

Power BI is a business analytics tool by Microsoft that helps visualize data, create interactive dashboards, and share insights for informed decision-making.

2. Key Features of Power BI:

- **Data Connectivity:** Connect to multiple data sources (Excel, SQL Server, cloud services).
 - **Data Modeling:** Build relationships and create calculated columns/measures.
 - **Visualization:** Create graphs, charts, and maps for visual insights.
 - **Reports and Dashboards:** Build interactive reports and share dashboards.
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3. Components of Power BI:

- **Power BI Desktop:** Application for creating reports and data models.
 - **Power BI Service:** Cloud-based service for sharing and collaboration.
 - **Power BI Mobile:** App to view dashboards and reports on mobile devices.
 - **Power BI Gateway:** Connects on-premise data sources with Power BI Service.
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4. Difference Between Power BI Desktop and Power BI Service:

Feature	Power BI Desktop	Power BI Service
Platform	Installed application	Cloud-based web service
Usage	Data modeling, report creation	Report sharing, dashboards publishing
Data Refresh	Manual	Automated scheduled refresh
Collaboration	Local	Collaboration, sharing with others

5. What is Power BI Visuals?

Power BI Visuals are graphical representations of data (charts, graphs, maps, tables) to help users better understand insights.

6. Difference between Power BI and Tableau:

Feature	Power BI	Tableau
Integration	Better integration with Microsoft tools	Flexible with multiple data sources
Learning Curve	Easier for beginners	Steeper learning curve
Pricing	Cheaper	Higher cost

Feature	Power BI	Tableau
Custom Visuals	Custom visuals available	Rich visualization options

7. Power Query Concepts:

- **Power Query:** Tool to extract, transform, and load (ETL) data.
 - **Power Pivot:** For building complex data models.
 - **Power View:** Interactive visual presentation layer.
 - **Power Map:** Geographical data visualization.
 - **Power Q&A:** Allows natural language query input.
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8. Difference between Power Query and Power Pivot:

Feature	Power Query	Power Pivot
Functionality	Data extraction & transformation	Data modeling & analysis
Data Storage	No internal storage	Stores data in Data Model
Main Use	Preparing data	Creating relationships, measures

9. Types of Schema:

- **Star Schema:** Central fact table connected to dimension tables.
 - **Snowflake Schema:** Dimension tables are normalized into multiple related tables.
 - **Flat Schema:** Single large table combining all data without normalization.
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10. Relationship Types:

- **One-to-Many:** A single record in one table links to many in another (most common).
 - **One-to-One:** One record maps to exactly one record in another table.
 - **Many-to-One:** Multiple records link to a single record in another table.
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11. Views in Power BI Desktop:

- **Report View:** Create reports.
 - **Table/Data View:** See data in tables.
 - **Model View:** Manage relationships.
 - **DAX Query View:** Write DAX formulas.
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12. Power BI Desktop Windows Tabs:

1. Home
 2. Insert
 3. File
 4. Modeling
 5. View
 6. Optimize
 7. Help
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13. Panes in Power BI Desktop Window:

- Navigation Pane
 - Filter Pane
 - Visualization Pane
 - Field/Data Pane
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14. Calculated Measure vs Calculated Column vs Calculated Table:

Feature	Calculated Measure	Calculated Column	Calculated Table
Definition	Dynamic calculation in reports	Column calculated row by row	Table created by DAX expressions
Example	$\text{SUM}(\text{Sales}[\text{Amount}])$	$\text{Sales}[\text{Profit}] = \text{Sales}[\text{Revenue}] - \text{Sales}[\text{Cost}]$	$\text{FILTER}(\text{Sales}, \text{Sales}[\text{Amount}] > 1000)$
Use Case	Aggregations in reports	Extra data column in table	Data model structure

15. Power Query Editor Panes:

- Left Pane: Query List
- Center Pane: Data Preview
- Right Pane: Query Settings

Merge Query vs Append Query:

- **Merge Query:** Combines two queries based on matching columns (like SQL JOIN).
 - **Append Query:** Combines rows of two tables (like UNION ALL).
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16. Types of Visuals (Graphs) in Power BI:

- Bar Chart
- Line Chart

- Pie Chart
 - Map
 - Table
 - Card
 - Gauge
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17. Table / Matrix / Card / Slicer:

- **Table:** Simple tabular data display.
 - **Matrix:** Like pivot table (rows & columns).
 - **Card:** Displays single summary value.
 - **Slicer:** Filter visuals interactively.
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18. KPI / RLS / 1NF / 2NF / 3NF:

- **KPI:** Key Performance Indicator, a measurable value showing performance.
 - **RLS:** Row-Level Security – restricts data visibility by user role.
 - **1NF (First Normal Form):** No repeating groups; atomic values.
 - **2NF (Second Normal Form):** 1NF + no partial dependencies.
 - **3NF (Third Normal Form):** 2NF + no transitive dependencies.
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19. What is DAX?

- DAX (Data Analysis Expressions) is a formula language in Power BI for calculations and data analysis.

DAX Types:

- Calculated Column
- Calculated Measure

Use of DAX in Power BI:

- Perform dynamic calculations and aggregations in reports.
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1. Calculated Measure

- **Definition:**
A **calculated measure** is a dynamic calculation that performs aggregations (such as sum, average, min, max) on your data and is computed on the fly during report generation.
- **Example:**

Total Sales = SUM(Sales[SalesAmount])

- **Use Case:**
To show total sales, average sales, or any other aggregate on a dashboard.

2. Calculated Column

- **Definition:**
A **calculated column** is a new column added to a table where each row's value is computed when the data model is loaded or refreshed. It stores the calculated result in the data model.
- **Example:**

Profit = Sales[SalesAmount] - Sales[Cost]

- **Use Case:**
When you need to add extra information to each row of the table (e.g., profit per transaction).

3. Calculated Table

- **Definition:**
A **calculated table** is a new table created by DAX expressions, usually as a filtered or transformed version of existing tables.
- **Example:**

HighSales = FILTER(Sales, Sales[SalesAmount] > 10000)

- **Use Case:**
To create a new table with only specific rows or columns, for advanced analysis.

4. Types of Filters in Power BI

Filter Type	Description
Visual-level Filter	Filters applied to a specific visual (graph or table). Only affects that visual.
Page-level Filter	Filters applied to the entire report page. All visuals on that page are affected.
Report-level Filter	Filters applied to the whole report across all pages.
Drill-through Filter	Allows users to right-click a data point and “drill through” to see detailed data on another page.
Slicer Filter	Interactive visual control that allows users to filter report content dynamically using dropdowns or buttons.
