**1) What is Power BI and how does it differ from Excel?**

Power BI is a business analytics tool by Microsoft for creating interactive visualizations and reports from data. Unlike Excel, which is spreadsheet-focused, Power BI specializes in data visualization, handling large datasets, and integrating multiple data sources for real-time insights.

**2) Explain the concept of data modeling in Power BI.**

Data modeling involves structuring data in Power BI using tables, relationships, and calculated fields. It allows users to create a unified view of data, enabling efficient querying and meaningful analysis.

**3) What are the different types of connections available in Power BI?**

* **Import Mode**: Data is imported and stored in Power BI for faster performance.
* **DirectQuery**: Queries data directly from the source, useful for real-time updates.
* **Live Connection**: Connects to live datasets in services like Analysis Services.
* **Composite Model**: Combines Import and DirectQuery modes.

**4) How do you handle data transformation in Power BI?**

Data transformation is managed using **Power Query**, which provides tools to clean, reshape, and prepare data through operations like filtering, merging, splitting columns, and creating calculated fields.

**5) What is DAX (Data Analysis Expressions) and why is it important in Power BI?**

DAX is a formula language in Power BI used for creating calculated columns, measures, and custom tables. It enhances data analysis capabilities by enabling complex calculations and aggregations.

**6) Difference between calculated columns and measures in Power BI**

* **Calculated Columns**: Add new data to a table based on row-level calculations.
* **Measures**: Perform aggregations or calculations dynamically based on user interactions, like filtering or slicing.

**7) How do you handle relationships between tables in Power BI?**

Relationships are managed in the **Model view**, where you define and configure relationships using keys (one-to-many, many-to-many). Relationship direction and cardinality are also set here.

**8) What is the purpose of a Power BI Gateway?**

A Power BI Gateway connects on-premises data sources to Power BI Service, enabling secure data transfer for reports and dashboards.

**9) How can you schedule data refresh in Power BI Service?**

Data refresh is scheduled through the **Settings** in Power BI Service, where you configure refresh frequency and credentials for connected datasets.

**10) Explain the concept of row-level security in Power BI.**

Row-level security (RLS) restricts data access at the row level based on user roles. It is configured in Power BI Desktop and applied in Power BI Service.

**11) What is Power BI Desktop and how does it differ from Power BI Service?**

* **Power BI Desktop**: A Windows application for creating reports and dashboards locally.
* **Power BI Service**: A cloud platform for sharing, publishing, and collaborating on Power BI content.

**12) Explain the concept of Direct Query in Power BI**

Direct Query allows Power BI to query data directly from the source without importing it. This is ideal for real-time data scenarios and handling large datasets.

**13) What are Power BI templates and how are they useful?**

Power BI templates (.PBIT files) store report layouts, visuals, and queries without data. They allow sharing report structures for reuse across different datasets.

**14) How do you handle incremental data refresh in Power BI?**

Incremental refresh is configured in Power BI Service using parameters to refresh only new or updated data, improving efficiency and performance for large datasets.

**15) What is the role of Power Query in Power BI?**

Power Query is a data preparation tool that allows users to extract, clean, and transform data before loading it into Power BI for analysis.

**16) Difference between calculated columns and calculated tables in Power BI**

* **Calculated Columns**: Add new data at the row level within an existing table.
* **Calculated Tables**: Create entirely new tables based on calculations, relationships, or aggregated data.

**17) How do you create custom visuals in Power BI?**

Custom visuals can be created using the **Power BI Developer tools** and TypeScript/JavaScript. They are packaged and imported into Power BI Desktop for use.

**18) Best practices for optimizing performance in Power BI**

* Use **Import Mode** for large datasets where possible.
* Optimize DAX formulas and avoid unnecessary calculated columns.
* Reduce model size by eliminating unused columns.
* Enable **incremental refresh** for large datasets.
* Optimize relationships and use a star schema.
* Avoid complex visuals with too many data points.

**19) How can you integrate Power BI with other Microsoft products like Azure and Office 365?**

* **Azure**: Connect to Azure SQL Database, Synapse Analytics, or Data Lake for advanced analytics. Use Azure Machine Learning for predictive insights.
* **Office 365**: Embed Power BI reports in Teams, SharePoint, or Excel for collaboration. Use Power Automate for workflows and integration.

**20) Explain the concept of aggregations in Power BI.**

Aggregations summarize detailed data to improve performance by reducing the query load. They are created using measures (e.g., sum, average) or pre-aggregated tables.