**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.

**21) How do you handle error handling and data quality in Power BI?**

* Use **Power Query** for data profiling, cleansing, and transformation.
* Implement conditional error handling logic in DAX or Power Query.
* Monitor refresh errors in Power BI Service logs and fix underlying issues.

**22) What is the purpose of Power BI Embedded and when would you use it?**

Power BI Embedded allows developers to integrate Power BI reports and dashboards into custom applications using APIs. It’s used to deliver analytics to external users or within business applications without requiring a Power BI license for each user.