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

**Ans.** **Power BI** is a data visualization and analytics tool for creating interactive report and dashboards, handling large datasets efficiently.

**Excel** is a spreadsheet tool for data analysis and calculations, better suited for smaller-scale tasks.

1. **Explain the concept of data modeling in Power BI.**

**Ans.** Data modeling in Power BI involves structuring and organizing data from different sources by creating relationships between tables. This enables efficient data analysis and reporting by defining how data is connected, allowing users to build more meaningful insights and calculations across multiple datasets.

1. **What are the different types of connections available in Power BI?**

**Ans.** Power BI offers two main types of connections:

1. Import: Data is imported into Power BI and stored in memory, allowing for fast performance and offline access.
2. DirectQuery: Power BI queries the data source in real-time without storing the data, useful for large datasets that need frequent updates.
3. **How do you handle data transformation in Power BI?**

**Ans.** In Power BI, data transformation is handled using **Power Query**, a tool that allows users to clean, reshape, and manipulate data by applying steps like filtering, merging, splitting, and adding calculated columns, all before loading the data into the model for analysis.

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

**Ans.** **DAX (Data Analysis Expressions)** is a formula language used in Power BI for creating custom calculations and aggregations on data. It’s important because it allows users to perform complex data analysis and create advanced metrics and insights beyond basic reporting capabilities.

**6) Can you explain the difference between calculated columns and measures in Power BI?**

**Ans.** In Power BI:

* Calculated Columns: Static columns created using DAX, stored in the data model.
* Measures: Dynamic calculations using DAX, recalculated based on report context.

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

Ans. In Power BI, relationships between tables are created by linking key columns, with options for one-to-one, one-to-many, or many-to-many connections, and adjustable cross-filtering directions for data flow control.

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

**Ans.** A Power BI Gateway is used to securely connect on-premises data sources to Power BI services in the cloud. It allows for data refreshes and real-time access to data while maintaining data security and compliance.

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

**Ans.** In Power BI Service, you can schedule data refresh by navigating to the dataset settings, enabling the **Scheduled refresh** option, and specifying the refresh frequency (daily or weekly) and time. You can also set up notifications for refresh failures.

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

**Ans.** Row-level security (RLS) in Power BI restricts data access for specific users based on defined rules. It ensures that users only see data relevant to them by applying filters on the data model, allowing organizations to maintain data privacy and compliance while sharing reports.

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

**Ans.** Power BI Desktop is a desktop application used for data modeling, report creation, and data transformation, allowing users to build reports offline.

Power BI Service, on the other hand, is a cloud-based platform for sharing, collaborating, and viewing reports and dashboards online. While Power BI Desktop is focused on development, Power BI Service emphasizes distribution and collaboration.

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

**Ans.** Direct Query in Power BI is a method of connecting to a data source without importing data into Power BI itself. Instead of loading data into Power BI's in-memory model, Direct Query retrieves data directly from the source when a report is run. This ensures the report always reflects the most current data, but it may result in slower performance due to reliance on the underlying database for queries. Direct Query is ideal for large datasets and when real-time data is required.

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

**Ans.** Power BI templates (.pbit files) are pre-built report files that contain the structure of a Power BI report, including visualizations, layouts, and calculations, but without the actual data. They are useful because they allow users to create reusable report designs, standardize reporting across teams, and share reports with others who can connect to their own data sources while preserving the report’s design and logic. This speed up the report creation process and ensures consistency.

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

**Ans.** Incremental data refresh in Power BI updates only new or changed data, rather than the entire dataset. You set it up by defining parameters (like date ranges), configuring refresh policies in Power BI Desktop, and publishing to Power BI Service. It improves refresh speed and efficiency, especially for large datasets.

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

**Ans.** Power Query in Power BI is used to connect, clean, and transform data before analysis. It helps prepare and shape data from multiple sources, ensuring it's ready for reporting and visualization.

**16) Explain the difference between calculated columns and**

**calculated tables in Power BI.**

**Ans.** **Calculated columns** perform row-level calculations within an existing table, while **calculated tables** create new tables from table-level operations using DAX in Power BI.

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

**Ans.** To create custom visuals in Power BI:

1. Use Developer Tools: Install Power BI Developer tools.
2. Develop the Visual: Write the visual using JavaScript/TypeScript.
3. Package the Visual: Bundle it into a. pbiviz file.
4. Import the Visual: Use Power BI Desktop to import the. pbiviz file.
5. Use the Visual: Add the custom visual to your reports.

**18) What are the best practices for optimizing performance in Power BI?**

**Ans.** Best practices for optimizing performance in Power BI include:

1. Use Direct Query for large datasets.
2. Limit Data Volume by importing only necessary data.
3. Optimize Data Models with star schemas and minimal relationships.
4. Implement Aggregations for pre-calculated summaries.
5. Manage Data Types for better storage efficiency.
6. Reduce Visual Complexity by limiting visuals and high-cardinality fields.
7. Leverage Query Folding to push processing to the data source.
8. Schedule Refreshes Wisely during off-peak hours.

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

**Ans.** You can integrate Power BI with other Microsoft products as follows:

1. Azure: Connect to Azure SQL Database, Azure Data Lake, and Azure Analysis Services for data access and storage.
2. Office 365: Import data from Excel, embed reports in SharePoint, and share insights in Microsoft Teams.
3. Power Platform: Use Power Automate for workflows based on Power BI alerts and embed reports in Power Apps.

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

**Ans.** Aggregations in Power BI are pre-calculated summaries that enhance performance by allowing faster queries on large datasets. They reduce data processing by summarizing information (like totals or averages) into smaller tables. This enables quick access to insights while keeping detailed data available when necessary.

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

**Ans.** To handle error handling and data quality in Power BI:

1. Data Profiling: Use Power Query to identify anomalies and assess data quality.
2. Data Cleansing: Transform data by removing duplicates and correcting types in Power Query.
3. Error Handling Functions: Use DAX functions like IFERROR() to manage calculation errors.
4. Validation Rules: Implement checks during data loading to ensure quality standards.
5. Conditional Formatting: Highlight data quality issues visually in reports.
6. Monitoring Dashboards: Create dashboards to track data quality metrics and address issues.

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

**Ans.** Power BI Embedded allows developers to integrate Power BI reports and dashboards into custom applications, enhancing user experience with analytics directly within the app. You would use it for:

1. Custom Applications: To add interactive analytics features.
2. White-Label Solutions: To deliver branded reports without exposing Power BI interfaces.
3. Business Applications: To enhance existing apps with BI capabilities.