**Module 5) Creating Dashboard with Visualization Tool**

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

Power BI is a tool that to create charts and dashboard very easily not like Excel where creating dashboard is hard and also Excel mainly use for using various function for data collection, data cleaning and many more, which is quite difficult in Power BI.

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

Data modeling in Power BI is the process of connecting multiple data sources, defining relationships between different data tables, and creating a cohesive data model that supports effective reporting and analysis.

**3) Types of Connections in Power BI**

Power BI supports various connection types, including Import, DirectQuery, Live Connection, and Composite Models, each serving different needs for data storage and real-time interaction. Import stores data within Power BI, DirectQuery queries live data from the source, Live Connection works with Analysis Services, and Composite Models combine multiple connection types.

**4) Handling Data Transformation in Power BI**

Data transformation in Power BI is performed using Power Query Editor, allowing users to clean, merge, filter, aggregate, and reshape data for better analysis. It provides a graphical interface for performing these transformations and creating custom columns using M language.

**5) DAX (Data Analysis Expressions) in Power BI**

DAX is a powerful formula language in Power BI used for creating custom calculations, measures, and calculated columns, enhancing the interactivity and analytical capabilities of reports. It enables advanced data manipulation, business logic implementation, and performance optimization.

**6) Calculated Columns vs. Measures in Power BI**

Calculated columns are static calculations stored in the data model and used for consistent data fields, while measures are dynamic calculations performed during query time, responding to filters and slicers. Measures provide real-time insights based on user interactions, whereas calculated columns are precomputed during data refresh.

**7) Handling Relationships between Tables in Power BI**

Managing relationships in Power BI involves defining correct cardinality, configuring cross-filter direction, and using active/inactive relationships to accurately model data interactions. Proper relationship management ensures accurate and efficient data analysis, reflecting the underlying business logic.

### 8) Purpose of a Power BI Gateway

A Power BI Gateway connects on-premises data sources to Power BI, enabling secure data transfer for real-time reporting and analysis.

### 9) Scheduling Data Refresh in Power BI Service

In Power BI Service, data refresh can be scheduled by setting up a refresh schedule under the dataset settings, specifying the frequency and time for automatic data updates.

### 10) Row-Level Security in Power BI

Row-level security (RLS) in Power BI restricts data access for specific users by defining roles and applying DAX filters to ensure users see only the data they are authorized to view.

### 11) Power BI Desktop vs. Power BI Service

Power BI Desktop is a local application for creating, developing, and testing reports and data models, while Power BI Service is an online platform for sharing, collaborating, and managing reports and dashboards in the cloud.

**12) Concept of Direct Query in Power BI**

Direct Query in Power BI allows users to connect directly to large databases and query data in real-time without importing it, ensuring live and up-to-date information for analysis.

**13) Power BI Templates**

Power BI templates .pbit files are pre-defined report files that contain the structure, visualizations, and data model definitions without the actual data, allowing users to create new reports with a consistent layout and logic.

**14) Handling Incremental Data Refresh in Power BI**

Incremental data refresh in Power BI is handled by configuring refresh policies in Power BI Desktop, allowing only new or changed data to be loaded during scheduled refreshes, which improves efficiency and reduces load times.

**15) Role of Power Query in Power BI**

Power Query in Power BI is used for data ingestion and transformation, enabling users to connect to various data sources, clean, shape, and prepare data for analysis through a user-friendly interface.

### 16) Difference Between Calculated Columns and Calculated Tables in Power BI

Calculated columns are new columns added to an existing table using DAX formulas, whereas calculated tables are entire new tables created from DAX expressions, often used to create subsets or summary tables from existing data.

### 17) Creating Custom Visuals in Power BI

Custom visuals in Power BI can be created using the Power BI Developer Tools, where you write code in JavaScript using libraries like D3.js, and then package and import them into Power BI for use in reports.

### 18) Best Practices for Optimizing Performance in Power BI

Optimize Power BI performance by reducing the dataset size, using proper data types, minimizing the number of visuals on a report page, using aggregations and summarized data, optimizing DAX queries, and leveraging Direct Query or Incremental Refresh when appropriate.

### 19) Integrating Power BI with Other Microsoft Products

Power BI integrates with Azure services for advanced analytics and storage, and with Office 365 products like SharePoint and Teams for sharing and collaboration capabilities.

### 20) Concept of Aggregations in Power BI

Aggregations in Power BI involve pre-calculating and storing summary data to optimize query performance, especially for large datasets, enabling faster report rendering by reducing the volume of data processed in real-time.

### 21) Handling Error Handling and Data Quality in Power BI

Handle errors and ensure data quality in Power BI by using Power Query to clean and transform data, implementing data validation checks, setting up error-handling steps to manage missing or inconsistent data, and using DAX functions to create conditional logic for data corrections.

### 22) Purpose of Power BI Embedded and When to Use It

Power BI Embedded is used to integrate Power BI reports and dashboards into custom applications, providing analytics and visualization capabilities to app users without needing a full Power BI license, ideal for developers wanting to add data insights to their software solutions.