**Module 5: Creating Dashboard with Visualization Tool – Assignment Answers**

1. **What is Power BI and how does it differ from Excel?**  
   Power BI is a business analytics tool by Microsoft that allows users to visualize and share insights from their data. Unlike Excel, which is primarily spreadsheet-based, Power BI offers powerful data visualization, real-time dashboards, and better data modeling capabilities. Excel is ideal for ad-hoc reporting, while Power BI is more suited for interactive dashboards and enterprise-level data analysis.
2. **Explain the concept of data modeling in Power BI.**  
   Data modeling in Power BI involves creating relationships between different data tables, defining calculated columns and measures, and optimizing the data structure to enable effective analysis. It is the foundation of Power BI reports, allowing users to perform meaningful analysis through well-structured data.
3. **What are the different types of connections available in Power BI?**  
   Power BI supports several data connection types:

* Import (loads data into Power BI)
* DirectQuery (connects to the source in real-time)
* Live Connection (used with Analysis Services)
* Composite Models (combination of Import and DirectQuery)

1. **How do you handle data transformation in Power BI?**  
   Data transformation in Power BI is handled using Power Query Editor. Users can clean, reshape, and transform data by applying steps such as filtering, renaming columns, merging tables, removing duplicates, and changing data types.
2. **What is DAX (Data Analysis Expressions) and why is it important in Power BI?**  
   DAX is a formula language used in Power BI for creating custom calculations in measures and calculated columns. It is essential for performing advanced data analysis and business logic.
3. **Explain the difference between calculated columns and measures in Power BI.**

* Calculated Columns are evaluated row-by-row and added to tables as new columns.
* Measures are evaluated based on the context (filters) of visuals and are used for aggregations like SUM, AVERAGE, etc.

1. **How do you handle relationships between tables in Power BI?**  
   Relationships are created in the model view by connecting common fields (keys) between tables. Users can define relationship direction and cardinality to control how data flows and aggregates across related tables.
2. **What is the purpose of a Power BI Gateway?**  
   A Power BI Gateway acts as a bridge between on-premises data sources and the Power BI Service, allowing secure data refresh and real-time data access from local servers.
3. **How can you schedule data refresh in Power BI Service?**  
   In Power BI Service, users can schedule data refresh under dataset settings. They can set refresh frequency, time, and enable failure notifications to ensure updated dashboards.
4. **Explain the concept of row-level security in Power BI.**  
   Row-level security (RLS) restricts data access for specific users. It is implemented by defining roles and DAX filters in Power BI Desktop and assigning users to those roles in Power BI Service.
5. **What is Power BI Desktop and how does it differ from Power BI Service?**  
   Power BI Desktop is a Windows application used for report development and data modeling. Power BI Service is a cloud platform for sharing, publishing, and collaborating on reports. Desktop is for creation; Service is for distribution and access.
6. **Explain the concept of Direct Query in Power BI.**  
   Direct Query connects Power BI directly to the data source without importing the data. Queries are sent to the source in real-time, ensuring up-to-date results but may impact performance.
7. **What are Power BI templates and how are they useful?**  
   Power BI templates (.pbit) are pre-built report templates without data. They are useful for reusing report structures, visuals, and calculations across different datasets or clients.
8. **How do you handle incremental data refresh in Power BI?**  
   Incremental refresh loads only new or changed data during refresh instead of the entire dataset. It improves performance and is configured using parameters and data filters in Power BI Desktop.
9. **What is the role of Power Query in Power BI?**  
   Power Query is used for data ingestion and transformation. It helps users import, clean, and shape data before it is loaded into the Power BI model.
10. **Explain the difference between calculated columns and calculated tables in Power BI.**

* Calculated Columns add a new column with row-level calculations.
* Calculated Tables are entire new tables created using DAX expressions, used for custom grouping, filtering, or complex data scenarios.

1. **How do you create custom visuals in Power BI?**  
   Custom visuals can be created using tools like Microsoft’s Developer Tools and TypeScript. Alternatively, users can import custom visuals from AppSource or develop them using Power BI Visuals SDK.
2. **What are the best practices for optimizing performance in Power BI?**

* Reduce data size with filters and summarized data
* Use star schema modeling
* Limit calculated columns
* Use DAX efficiently
* Enable query folding in Power Query
* Schedule data refresh during off-peak hours

1. **How can you integrate Power BI with other Microsoft products like Azure and Office 365?**  
   Power BI integrates with:

* Azure (e.g., Azure SQL, Azure Synapse) for real-time data access
* Office 365 (Excel, SharePoint, Teams) for seamless data sharing and collaboration

1. **Explain the concept of aggregations in Power BI.**  
   Aggregations are summarized views of data that improve performance by reducing the amount of data queried. Power BI can automatically use aggregation tables when available.
2. **How do you handle error handling and data quality in Power BI?**

* Use Power Query to detect and fix errors
* Replace or remove null values
* Apply data type checks
* Use data profiling tools to monitor column quality, distribution, and completeness

1. **What is the purpose of Power BI Embedded and when would you use it?**  
   Power BI Embedded allows developers to integrate Power BI reports into custom applications. It’s useful when you want to provide data insights within apps without users needing a Power BI account.