Power BI Assignment

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

- Power BI is a business intelligence tool designed for data visualization and analysis, allowing users to create interactive dashboards and reports from large dataset while Excel is a spreadsheet program primarily used for data organization, basic calculations, and simpler data visualization with limitations on large datasets and advance analytics making Power BI better suited for complex data analysis and sharing insights across an organization compared to excel.

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

- Data modeling in Power BI is the process of structuring and organizing data to create relationships between tables, optimize performance, and enable efficient analysis. It involves defining relationships using primary and foreign keys, choosing between star and snowflake schema designs, and leveraging DAX (Data Analysis Expressions)for advanced calculations. Power BI allows users to clean and transform data using Power Query, create hierarchies for drill-down analysis, and apply Row-Level Security to control data access. A well-designed data model ensures accurate insights, improves query performance, and supports scalability for dynamic reporting.

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

- Power BI offers several types of connections depending on data size, performance needs, and real-time requirements. Import Mode loads data into memory for fast performance but requires scheduled refreshes. DirectQuery Mode connects directly to the data source, ensuring real-time updates but relying on source performance Live Connection works similarly to DirectQuery but is specific to SQL Server Analysis Services, Azure Analysis Services, and Power BI Datasets. Composite Mode combines Import and DirectQuery for flexibility, allowing optimized performance. Dataflows enable cloud-based ETL processing in Azure Data Lake, making data reusable across multiple across multiple reports. Lastly, Dataverse Connection integrates with Microsoft Dataverse, commonly used in Power Apps and Dynamics 365,supporting both Import and Direct Query.

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

- To transform data in Power BI, you can use the Power Query Editor or DAX formulas. You can also use the Power Query M language for more advanced transformations.

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

- DAX (Data Analysis Expressions) is a formula language in Power BI used for creating custom calculations, measures, and aggregations It enhances data modeling by enabling advanced computations, filtering, and relationships between tables. DAX is essential for performance optimization , time-based analysis and applying conditional logic in reports. By using functions like SUMX, FILTER, and IF, it allows for dynamic and interactive data insights ,making Power Bi reports more powerful and flexible.

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

- In Power BI, calculated columns are created at the row level, stored in the model, and used for want to link by selecting the corresponding columns in each table that share common values (like a customer ID in both a customer and sales table) to create a relationship between them.

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

- To manage relationships between tables in Power BI, navigate to the "Modeling" tab, select "Manage Relationships", then choose the tables you want to link by selecting the corresponding columns in each table that share common values (like a customer ID in both a customer and sales table) to create a relationship between them.

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

- The Power BI gateway connects on-premises data sources to the Power BI cloud service. It acts as a bridge between the two, allowing users to access and analyze data from their local network.

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

- To schedule a data refresh in Power BI Service, you can do the following:

1.Go to the web portal

2.Right-click on the Power BI report

3.Select Manage

4.Select the Scheduled refresh tab

5.Select Edit next to the refresh plan you want to manage

6.Enter a description and set a schedule for the data refresh

7.Select Apply

You can also schedule a refresh by going to the workspace and selecting a semantic model from the workspace content list. Then, on the semantic model details page, select Refresh and then Schedule refresh.

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

- Row-Level Security (RLS) in Power BI limits the data rows that users can see in a report. This helps to control what users can see based on their login account.

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

- Power BI Desktop is a free, downloadable application installed on your local computer where you create and design reports and dashboards by connecting to data sources, transforming data, and adding visualizations, while Power BI Service is a cloud-based platform where you publish those reports and dashboards to share and collaborate with others, essentially acting as the online viewing and sharing hub for your Power BI content in short, Power BI Desktop is for building reports, and Power BI Service is for sharing them.

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

- DirectQuery in Power BI is a connection mode that allows Power BI to retrieve data directly from the source in real-time without importing it into the Power BI model. Unlike Import Mode, which stores data in memory, DirectQuery keeps data at the source and queries it when needed, ensuring that reports always reflect the latest data.

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

- A Power BI template is a pre-designed report layout that includes visuals, data model schema,and queries,essentially providing a starting point for creating a new report in Power BI without having to build everything from scratch,thus saving time and ensuring consistency across reportswithin an organization by providing a standardized structure

for data visualization and analysis users simply need to connect their own data to the template to generate customized reports.

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

- Incremental Data Refresh in Power BI optimizes performance by loading only new or changed data instead of refreshing the entire dataset This reduces refresh time and improves efficiency, especially for large datasets.

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

- In Power BI, Power Query acts as the primary data preparation and transformation tool,allowing users to connect to various data sources,clean, reshape, and combine data from multiple sources before loading it into Power BI for analysis, essentially performing the"Extract, Transform, and Load (ETL)" process within the platform.

16) Explain the difference between calculated columns and calculated tables in Power BI.

- In Power BI, a calculated column adds a new column to an existing table by applying a formula to each row of that table, while a calculated table creates a completely new table based on calculations or filters applied to existing tables in the data models essentially generating a derived table from existing data; both use DAX expressions to define their calculations, but calculated columns are added to a specific table, whereas calculated tables are separate entities within the model.

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

- Creating custom visuals in Power BI allows users to design unique and interactive visualizations beyond the built-in options This can be done using Power BI Developer Tools (Visual SDK) and coding in TypeScript and JavaScript with the D3.js library.

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

- To optimize performance in Power BI, key best practices include: structuring your data model using a star schema, minimizing unnecessary columns and rows, utilizing measures instead of calculated columns,leveraging query folding, using DirectQuery for large datasets,limiting the number of visuals on a page, and monitoring performance with the Power BI Performance Analyzer to identify bottlenecks and areas of improvment.

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

- To integrate Power BI with other Microsoft products like Azure and Office 365, you can directly connect to data sources within these platforms using the "Get Data" feature in Power BI Desktop, allowing you to pull data from Azure services like SQL Databases, Blob Storage, and Analysis Services, as well as Office 365 data like SharePoint lists, Dynamics 365 records, and Excel files, enabling you to create comprehensive reports and dashboards by combining data from various Microsoft products within a single interface; you can also embed Power BI reports within other Office 365 applications like SharePoint and Teams for seamless access to data insights within the relevant context.

20) Explain the concept of aggregations in Power BI.

- Aggregations in Power BI can improve query performance over large Direct Query semantic models. By using aggregations, you cache data at the aggregated level in-memory. Aggregations in Power BI can be manually configured in the data model, as described in this article.

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

- To handle error handling and data quality in Power BI, you can utilize features like data validation within Power Query, create custom validation rules using DAX expressions, identify and flag potential errors during data import, generate exception reports to highlight problematic data rows, and implement data governance practices to ensure data consistency and accuracy across your data sources.

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

- Power BI Embedded allows developers to integrate interactive Power BI reports, dashboards, and tiles directly into their own applications or websites, essentially providing data visualization capabilities within a custom-built platform without having to create the visuals from scratch; you would use it when you want to embed data analytics functionality within a third-party application, giving users access to insights directly within the application they are already using.