1) What is Power BI and how does it differ from Excel?
   Power BI is a collection of software services, apps, and connectors that work together to turn your unrelated sources of data into coherent, visually immersive, and interactive insights.

   Power BI can handle large amounts of data from a wider range of sources, including cloud services like Azure SQL Database, Google Analytics, and Salesforce. Excel can only merge data from a limited number of sources, such as spreadsheets, CSV files, and extracted data from databases, Power BI is designed for real-time action and can provide access to data without importing it into the tool, Power BI dashboards, visuals, and reports can be embedded and viewed across different devices, Power BI is better suited for sophisticated data analytics and visualization tasks, such as handling complex datasets and creating interactive dashboards. Excel is better suited for personalized, small-scale analysis, and lightweight ad-hoc analysis.

2) Explain the concept of data modeling in Power BI.
   Data modeling in Power BI is the process of using Power BI to create data models that can be used to build relationships between tables, perform calculations, and create reports. Here are some things to consider about data modeling in Power BI

- Star schema: This is the preferred data modeling approach in Power BI because it offers the best performance and flexibility for analytics.
- Relationships: Power BI allows users to create relationships between tables, including one-to-many and many-to-many relationships.
- Calculated columns: Users can create calculated columns and tables to combine data elements and perform custom calculations.

3) What are the different types of connections available in Power BI?
   There are 5 types of Connection mode in power BI
   - Import Mode
   - DirectQuery Mode
   - Live Connection Mode
   - Composite Model
   - DirectLake

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

   Plan ahead

   Before transforming data, consider your analysis requirements to ensure that the transformations meet business needs.

   Maintain data quality

   Regularly review and update transformation steps to keep your reports accurate and maintain integrity.

   Optimize performance

Limit the number of steps by combining transformations where possible.

Use Power Query

Power Query is a tool that allows users to extract, transform, and load data from various sources. It offers a user-friendly interface for performing complex data transformations without coding.

Connect to a wide range of data sources

Power Query Editor supports connectivity to a wide range of data sources, including databases, spreadsheets, web services, and cloud-based platforms.

Make changes to your data

You can use Power Query Editor to make changes to your data, such as changing a data type, removing columns, or combining data from multiple sources.

Create a common data model
Power BI is known for its data integration abilities that allow a user to create a common data model after aggregating data from a range of sources.

5) What is DAX (Data Analysis Expressions) and why is it important in Power BI?
Data Analysis Expressions (DAX) is a library of functions and operators that can be combined to build calculation formula expressions
It manipulates and analyzes data from different sources, creates new calculated columns and measures, and performs complex calculations and analyses.

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

Calculated columns

These are static columns that are calculated once during data refresh and stored in the model. They are evaluated row by row and are not dependent on filters in the report. Calculated columns are useful for putting calculated values in slicers or as axes in chart visuals.

Measures
These are dynamic values that are computed at query time and exist as source code in the model. They are based on aggregations of data, such as summing, averaging, or counting. Measures are evaluated in the context of filtering and are useful for displaying calculation values that reflect user

selections. Measures can be applied to other tables and are useful for up-to-the-minute calculations

7) How do you handle relationships between tables in Power BI?
   On the Modeling tab, select Manage relationships > New. In the Create relationship dialog box, in the first table drop-down list, select a table. Select the column you want to use in the relationship. In the second table drop-down list, select the other table you want in the relationship

8) What is the purpose of a Power BI Gateway?
   The Power BI Gateway tool is a software application that helps users access the required data residing in an on-premises network. The tool acts as a gatekeeper for the source of data, and any requests made by users to access the data from a cloud or web-based application go through this gateway
   The gateway can be installed on one or more computers on a network. However, there are some restrictions, such as not being able to install the gateway on a domain controller

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

   Set up an on-premises gateway

   Publish your report and configure the data connection

   Go to the workspace and select a semantic model

   On the semantic model details page, select Refresh > Schedule refresh

   Set the toggle button to On

   Adjust the frequency, time, and other parameters of data update

   Click Apply

10) Explain the concept of row-level security in Power BI
    Row-level security (RLS) in Power BI lets you limit data access for specific users in a report or dataset. RLS allows different users to work with the same data, but see different information

11) What is the Power BI Desktop and how does it differ from Power BI Service?
    Power BI Desktop
    A free, locally-installed application for data analysis and report creation. It's primarily used for individual analysis and development. Some of its features include:
    - Connecting to data sources
    - Transforming data into a model

- Creating visuals, such as charts or graphs
- Creating reports

Power BI Service

A cloud-based platform for publishing, sharing, and collaborating on Power BI reports and dashboards. It's designed for collaboration and centralized management of BI content. Some of its features include:

- Viewing and interacting with reports
- Editing reports
- Creating visuals based on the existing data model
- Sharing and collaborating with co-workers

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

DirectQuery mode is different from Import mode, which copies data from the source into Power BI's memory.

This mode is useful for a number of reasons, including Real-time data, Security, Large data sets & Supports various types of databases

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

Power BI templates are pre-designed report layouts that can save time and ensure consistency when creating reports. They include all the components of a report, such as the data model schema, queries, visuals, charts, tables, and measures, but not the actual data

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

Set up incremental refresh for a dataflow

In the table view, select Incremental refresh, and then turn it on. You can also specify a filter field to use for incremental refresh.

Configure incremental refresh for a data source

Select a data source that supports incremental refresh, and then select the tables to ingest. In the Set up incremental refresh dialog box, configure the incremental refresh for the selected tables.

Create parameters

Use Power Query Editor to create parameters with default values.

Define an incremental refresh policy

In Data view, right-click a table and select Incremental refresh. Specify the required and optional settings, and then click Apply.

Bootstrap the initial refresh

For models published to Premium capacities, you can bootstrap the initial refresh operation. This allows the service to create table and partition objects for the model, but not load and process historical data.

Set partitions to be processed individually
Use SQL Server Management Studio to set partitions to be processed individually, sequentially, or in parallel.

15) What is the role of Power Query in Power BI?
The purpose of Power Query in Power BI is to help users prepare and transform data before it's loaded into Power BI

16) Explain the difference between calculated columns and calculated tables in Power BI.
Calculated columns
These are new columns created from existing columns in a data table. Calculated columns are calculated row by row, and are often used with slicers to filter and segment data. They appear in the Fields list with a special icon that indicates they are calculated values
Calculated tables
These are virtual tables created using Data Analysis Expressions (DAX). They are based on calculations or filters applied to existing tables. Calculated tables are useful for storing data as part of the model and for intermediate calculations. They are recalculated when the tables they pull data from are updated or refreshed

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

Set Up Your Development Environment: -
Create a Visual Project
Design Your Visual
Testing and Debugging
Package Your Visual
Import the Custom Visual
Use the Custom Visual
Publish Your Report

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

Optimizing DAX can improve the performance of your Power BI reports and enhance the user experience.

Optimize DirectQuery

Use table-level storage to optimize DirectQuery models. By default, DirectQuery models retrieve data from the underlying data source for each visual, which can slow performance.

Optimize Power Query

Optimize whenever possible, whether it is during Power Query, DAX, or creating visualizations.

Optimize query performance

Query performance is a critical aspect of optimizing your Power BI data model.

Use the Performance Analyzer

Use the Performance Analyzer to make sure the visualization is smooth. Ideally, it should take less than 2 seconds for the best user experience.

Optimize data modeling

Make sure that your data model is in good shape and modeled as good as possible. This will improve your model's performance.

Optimize column data types

Columns with fewer unique values compress better

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

Connect to Azure

Open Power BI, navigate to "Get Data", and select an Azure connector. For example, you can connect to Azure SQL Database or Azure Data Lake Storage.

Connect to Office 365

Create a DSN (data source name) called CData Power BI Office 365. Then, you can get Office 365 data, create data visualizations, configure data refresh, publish to PowerBI.com, and refresh a dataset.

Integrate with Power Automate

Power Automate can help automate workflows across multiple applications and services. For example, you can integrate Power Automate with Power BI to refresh data, send notifications, or automate data entry.

Integrate with Power Pages

You can manage the Power BI Embedded service by opening the Power Platform admin center. Then, you can select the site where you want to manage the service, enable the toggle, and select the workspaces to display on your website

20) Explain the concept of aggregations in Power BI

Aggregations in Power BI are the process of combining values mathematically to produce an aggregate. This can be done on numeric or textual data, and can improve query performance by reducing the number of rows in a data model

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

Use Power Query Editor: Power Query Editor can help you clean data efficiently and effectively.

Implement data governance: Power BI offers tools to manage data quality rules, assessments, and reports. This helps maintain data quality across an organization.

Implement validation rules: Enforce validation rules at the source, such as user input forms, IoT devices, or APIs. This can help prevent low-quality data from entering your system.

Use the "Try" and "Otherwise" feature: This feature tries an expression and if it returns an error, it should be null or empty.

Implement error logging and monitoring: You can use the "Keep Errors" option to catch error rows in an exception table.

Create error logs: You can create two new tables to separate errors from other records, and direct errors to the Error Logs table. You can also hide the Error Logs page and use role management to deny access to clients who shouldn't see it.

Learn and improve from errors: Continuously learn and improve from data errors

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

Power BI Embedded is a service that allows you to embed Power BI content in your own applications, such as websites or web apps. It can be used to:

Create customer-facing reports

You can create dashboards, reports, and analytics that can be used to deliver data experiences to end users.

Reduce developer resources

You can automate the monitoring, management, and deployment of analytics.

Stand out from the competition

You can embed fully interactive reports and dashboards into your applications.

Control the user experience

You can choose from hundreds of visuals, basic reporting, and advanced analytics.

Integrate with portals

You can integrate Power BI content into any portal that accepts a URL or iframe.

Grant access to specific reports

You can grant access to specific reports to users outside the organization without having to share them over the web