1. **What is Power BI and why is it used in businesses?**

Power BI is a business intelligence (BI) tool by Microsoft that turns raw data into interactive reports and dashboards so businesses can understand what's happening and make better decisions.

**What Power BI is**

Power BI helps us:

- Connect to multiple data sources (Excel, SQL, MySQL, APIs, cloud apps)
- Clean and transform data (using Power Query)
- Build data models and relationships
- Create interactive visualizations (charts, tables, KPIs)
- Share insights securely across teams

**Why businesses use Power BI**

**Better decision-making**

- Converts complex data into clear insights
- Helps management spot trends, risks, and opportunities quickly

**Saves time & increases productivity**

- Automates reports that were previously manual (Excel-heavy work)
- Refreshes data automatically

**Connects multiple data sources**

- Combines data from different departments (sales, finance, HR, ops)
- Creates a single source of truth

**Interactive & real-time insights**

- Filters, drill-downs, slicers
- Near real-time dashboards for faster action

**Secure sharing & collaboration**

- Role-level security (who sees what)
- Easy sharing via Power BI Service and Microsoft 365

**Cost-effective**

- Cheaper than many enterprise BI tools
- Scales well for small to large businesses

2. **Name and explain the three main components of Power BI.**

The three main components of Power BI are Power BI Desktop, Power BI Service, and Power BI Mobile. Together, they cover data creation, sharing, and consumption.

**Power BI Desktop (Build & Model)**

A free Windows application used to create reports.

- Connects to data sources (Excel, SQL, CSV, APIs)
- Cleans and transforms data using Power Query
- Builds data models and relationships
- Creates visualizations and reports using DAX

Used by data analysts and developers

**Power BI Service (Publish & Share)**

A cloud-based platform (app.powerbi.com) for hosting reports.

- Publishes reports from Power BI Desktop
- Creates dashboards from reports
- Schedules data refresh
- Manages sharing, access, and security

Used by teams and decision-makers

**Power BI Mobile (Consume Anywhere)**

Mobile apps for Android and iOS.

- Views dashboards and reports on the go
- Gets real-time alerts
- Interacts with visuals (filters, drill-down)

Used by managers and executives

**3. Explain the Power BI workflow.**

The Power BI workflow explains how data moves from raw sources to business insights in a clear, step-by-step process

Power BI Workflow (Step by Step)

**Connect to data (Get Data)**

- Import or connect to data from sources like Excel, CSV, SQL/MySQL, APIs, cloud apps
- Supports Import, DirectQuery, and Live Connection

**Transform & clean data (Power Query)**

- Remove duplicates, handle nulls, change data types
- Merge and append tables
- Create calculated columns during transformation

**Data modeling**

- Create relationships between tables
- Define hierarchies (Date → Year → Month → Day)
- Apply data types and cardinality
- Optimize model (star schema)

**Create calculations (DAX)**

- Create measures (SUM, AVG, YTD, % growth)
- Create calculated columns & tables
- Build KPIs and business logic

**Build reports (Visualizations)**

- Add charts, tables, slicers, filters
- Enable drill-down, drill-through, tooltips
- Design interactive reports

**Publish to Power BI Service**

- Publish reports and datasets to the Power BI cloud
- Create dashboards by pinning visuals
- Set refresh schedules

**Share & collaborate**

- Share reports with users or groups
- Apply Row-Level Security (RLS)
- Use workspaces and apps for distribution

**Consume insights (Power BI Mobile)**

- View dashboards on mobile devices
- Receive alerts on KPIs
- Make data-driven decisions anywhere

**4. List any four data cleaning tasks that can be performed in Power Query.**

**Remove duplicates**

- Deletes repeated rows to ensure data accuracy
- Example: Keep one record per customer or order

**Handle missing or null values**

- Replace nulls with default values (0, “Unknown”, average, etc.)

- Or remove rows/columns with nulls

**Change data types**

- Convert columns to correct types (Text, Number, Date, Decimal)
- Prevents calculation and visualization errors

**Split or merge columns**

- Split a column by delimiter (comma, space, hyphen)
- Merge multiple columns into one (e.g., First Name + Last Name)

**5. Write step by step instructions to load the above dataset**

Open Power BI Desktop – Home – Get Data – Text/CSV –choose the csv file – Load/Transform Data

**6. Define Data View, Report View, and Model View. Explain the purpose of each view.**

Data View
A tabular view that shows the actual data rows and columns after loading.

Purpose:

- Inspect and understand the data
- Check values, nulls, and data types
- Create calculated columns and measures
- Validate data before reporting

Used mainly for data verification and calculations

Report View

The main canvas where you design visual reports.

Purpose:

- Create charts, tables, KPIs, and slicers
- Build interactive dashboards
- Apply filters, drill-downs, and tooltips
- Present insights to users

Model View
A visual diagram of tables and relationships.

Purpose:

- Define and manage relationships between tables
- Set cardinality (one-to-many, many-to-many)

- Control cross-filter direction
- Design an optimized data model (star schema)

**7. Discuss the different data sources that Power BI supports.**

**File-based data sources**

Used when data is stored in files on your system or shared drive.

Examples:

- Excel (.xlsx)
- CSV / Text files
- XML
- JSON
- PDF
- Folder (combine multiple files)

Purpose:
Quick analysis, small to medium datasets, easy data sharing.

**Database data sources**

Used for structured data stored in databases.

Examples:

- SQL Server
- MySQL
- PostgreSQL
- Oracle
- IBM DB2
- Microsoft Access

Purpose:
Enterprise-level data, large datasets, reliable and secure storage.

**Cloud-based data sources**

Used when data is hosted on cloud platforms.

Examples:

- Azure SQL Database
- Azure Data Lake
- Azure Blob Storage

- Google BigQuery
- Amazon Redshift
- Snowflake

Purpose:
Scalable analytics, real-time data, cloud-first businesses.

**8. Split Owner Name to create two new columns as First Name and Last Name**

Open Power Query Editor

- In Power BI Desktop → Home → Transform Data

Select the *Owner Name* column

- Click on the Owner Name column header
  (e.g., John Smith)

Split the column

- Go to the Transform tab
- Click Split Column → By Delimiter

Choose delimiter settings

- Delimiter: Space
- Split at: Left-most delimiter
- Click OK

Power Query creates two columns:

- Owner Name.1
- Owner Name.2

Rename the columns

- Rename:
  - Owner Name.1 → First Name
  - Owner Name.2 → Last Name

Apply changes

- Click Close & Apply

dataset now has First Name and Last Name as separate columns.