Basics of Data Analytics (Assignment1):-

1. **Define the role of a Data Analyst in your own words. What value do they bring to an organisation?**

Answer:

A data analyst helps to collect raw data and transform it into meaningful, sequential insights that help people to make decisions more easily and in a better way.

They bring a high value to an organisation by making smarter decisions, operating more efficiently and staying ahead in the game of a data-driven world. In short, it turns complex data sets into simple, attractive and meaningful data that anyone in the organisation can understand and act accordingly.

2. **List three tools commonly used by Data Analysts and explain what each is mainly used for.**

Answer:

The list of three tools commonly used by Data Analysts is:

1. Excel
2. SQL
3. Power BI

Each of them is described below:

1. Excel- Excel is one of the vital tools used by data analysts, it is because it helps them to work with data more efficiently and effectively. Data analytics includes a certain process:

- Define the problem

- Data collection and understanding
- Data preparation
- Data visualisation
- Data analysis

To work and follow this process, Excel plays a very crucial role.

2. SQL- SQL stands for “Structured Query Language”, which helps data analysts to get the correct data. The name itself defines that it helps in providing organised data and prepares it for analysis. SQL is used in databases.

3. Power BI- It is a powerful data visualisation reporting tool used by data analysts. It helps in producing clear data(turns raw data into clear) and clickable reports, which help in engaging visuals for all, and help in presenting user-friendly insights.

3. **Write the end-to-end analytics workflow in the correct order and briefly explain each step.**

Answer:

Data analytics includes a certain process:

- **Define the problem-** This is the most vital step. In this step, we find out what the issue or the problem which we need to solve. For example, If our company has launched a new product and if the Power BI report states that in the chart, this product has not been in a good stage as the graph is gradually falling every year, then we need to sort out what the problem is for which this is happening.

- **Data collection and understanding-** In this step, we gather the data needed to be analysed, and the data may come from Excel, SQL, Power BI any tool-based data reports. It helps in understanding the cause of the issue or the problem that needs to be diagnosed.

- **Data preparation-** It helps in fixing errors or bugs and helps in handling the missing values. It helps in formatting data correctly and sets a goal by creating good-quality data, which leads to accurate insights.

- **Data visualisation-** Data visualisation helps people to quickly understand and visualise the trends and the issues, and gives a basic idea of how to work on the loopholes and set good, productive insights.

- **Data analysis-** It is the step where the data is analysed, and the problem is solved, which is stated in the first part of the process, which is “Define the problem”.
  In this step, we study the data to find patterns, trends and important numbers that help explain what is happening. The main motive is to understand the insight behind the data and answer the original problem.

4. **What is Prompt Engineering, and explain any two types of prompts used in Generative AI?**

Answer:

Prompt Engineering is the process of designing clear and effective instructions to guide generative AI tools to produce accurate, useful and high-quality responses. Examples: Gemini, ChatGPT. It helps the AI understand exactly what we want so that we can get better results in a more organised manner.

a. **Instruction Prompt:** It clearly depicts to the AI what task has to be performed. It is direct and task-focused. Example- “Write an email to the manager explaining a delay in submitting the project report.”

b. **Few-Shot Prompt:** Here, we give the AI one or more options or examples of the output we want.

5. **What are the key differences between a Business Analyst and a Data Analyst in terms of roles, responsibilities, and focus?**

Answer:

Business Analyst	**Data Analyst**
1. It focuses on the business problems,	**1.** It focuses on data, patterns, and insights to support decisions.

processes, and solutions.	
2. It acts as a bridge between business terms and technical issues.	**2.** It acts as a bridge between raw data and decision-making.
3. Work closely with product, IT and management teams.	**3.** Finds trends, patterns and insights.
4.	**4.**
5. They understand the business needs and suggest solutions.	**5.** They analyse data and provide insights.

6. **Explain any three AI-powered ETL (Extract, Transform, Load) tools and how they are used in analytics.**

Answer:

i. **Informatica's CLAIRE** uses AI to automate and improve the ETL process, where the ETL means extract, transform and load.

How it's used:

§ **Automates data profiling and anomaly detection.**

§ **Optimises workflows for faster data pipelines.**

ii. **Matillion ETL** with AI features integrate cloud-based AI features to simplify data workflows.

How it's used:

§ **Uses AI to suggest transformations and mappings.**

§ **Simplifies cloud data integration (e.g., Snowflake, Redshift).**

iii. **Talend with AI/ML** is an ETL platform enhanced with AI and machine learning for smarter data processing.

How it's used:

§ **Automates data profiling and anomaly detection.**

§ **Optimises workflows for faster data pipelines.**

7. **Give three applications of Data Analytics across different industries and explain how it creates value.**

Answer:

Ø **Retail- Customer Behaviour Analysis:** Retailers use data analytics to study customer purchase patterns, preferences and trends.

How it creates value-

1. **It helps in personalised marketing.**
2. **Increases sales and customer satisfaction by offering the right products at the right time.**

Ø **Healthcare- Predictive Analytics:** Hospitals and clinics use analytics to predict patient outcomes, disease outbreaks.

How it creates value-

1. **Enables early intervention, improving patient care.**
2. **Helps resource planning (staff, beds, equipment) efficiently.**

Ø **Finance- Fraud Detection:** Banks and financial institutions analyse transaction data to detect unusual or fraudulent activities.

How it creates value-

1. **Protects customers and the bank from financial losses.**
2. **Builds trust with clients by providing secure services.**

8. **Explain the evolution of analytics, highlighting the different stages from Descriptive to Generative AI.**

Answer:

- **Descriptive Analytics:** It describes what has happened in the past using historical data. Tools and techniques used: Excel, dashboards, basic reports, and summary statistics.
  Example- “Sales last month were Rs. 50,000.” Value: It helps an organisation to understand past performance and track trends.

- **Diagnostic Analytics:** It explains why something happened by looking at the data relationships and patterns. Tools and techniques used: Drill-down analysis, correlation, SQL queries, and pivot tables. Example- “Sales dropped last month because online orders decreased by 20%.” Value: It helps in identifying root causes of issues and makes informed decisions.

- **Predictive Analytics:** It forecasts what is likely to happen in the future using historical data and statistical models. **Tools and techniques used: Machine learning, regression models, time series forecasting. Example- “Based on trends, next month’s sales are expected to rise by 10%.” Value: It enables proactive planning and risk mitigation.**

- **Prescriptive Analytics:** It recommends what actions to take to achieve desired outcomes. Tools and techniques used: Optimisation algorithms, simulations, decision-modelling. Example- “To maximise profit, increase marketing spend in Region A and reduce inventory in Region B.” Value: It supports data-driven decision-making and strategy optimisation.

- **Generative AI Analytics:** It uses AI to create insights, content, or recommendations automatically from data. Tools and techniques used: ChatGPT, Copilot. Example- “Generate a report summarising key sales trends, visualisations, and recommendations.” Value: It saves time, enhances creativity, and provides automated, actionable insights at scale.