Objective Type Questions

A. Tick (✓) the correct option.

1. You have taken delivery of a new car. After a fortnight, the car supplier asked you to write your experience over driving the car. You have replied through your email. This is an example of _____.

   a. Qualitative Data

   b. Quantitative Data

   c. Both a and b

   d. None of the above

2. A list of students that have passed middle school examination is displayed over a board of that school. The list contains the grade obtained by the students. This is an example of _____.

   a. Qualitative Data

   b. Quantitative Data

   c. Both a and b

   d. None of the above

3. A food delivery app has asked for your feedback on the quality of the food. You have written two paragraphs to describe the food. This is an example of _____.

   a. Qualitative Data

   b. Quantitative Data

   c. Both a and b

   d. None of the above

4. You want to go on a family trip next Sunday. A list of possible maximum temperatures from Monday to Saturday is available in newspapers but not for the coming Sunday. Which algorithm will you use to calculate the possible maximum temperature on the coming Sunday?

   a. Clustering

   b. Regression

   c. Anomaly detection

   d. Binary classification

5. You are using your smart maps application for reaching a particular destination. Which type of technique is being used by the service provider for finding whether you are following the correct route?

   a. Clustering

   b. Regression

   c. Anomaly detection

   d. Reinforced learning

6. Your smartphone intimates you regarding spam mail. Which method is being used by the smartphone to distinguish spam emails from good emails?

a. Clustering

b. Regression

c. Anomaly detection

d. Binary classification

Standard Questions

B. State whether these statements are True or False.

1. Data science is a science of exploring available data and utilizing it in your day-to-day transactions. **True**
2. Data analysis is the process of analyzing the huge amount of data. **True**
3. The data analyst collects a huge amount of information from raw data lakes. **False**
4. Supervised learning describes a class of problems that involves using a model to learn a mapping between input values and the target variable. **True**

A. Short Answer Questions

1. **Unsupervised Learning**

   Unsupervised learning compares only input data without any suggested output or target variables. Training models are not required here.

2. **Data Mining**

   The data mining engineers has to mine this data and put it is structured form by utilizing several software and algorithms. Thus data engineers have to utilize massy data and build an infrastructure for real and tangible analysis.

3. **Role of Statisticians in Data Science**

   statisticians are responsible for:

   1. Searching, analyzing, and interpreting data
   2. Identifying market trends and predicting future requirements
   3. Guiding stakeholders financial
   4. Advising on business strategy development
   5. Assisting decision-making processes.

B. Answer the questions below in no less than 100 words.

1. What are the common career paths for data science? Explain any two in detail.

   Common career paths for data science are

       a. Senior Data Scientist

       b. Data Analytics Manger

       c. Software engineer

       d. Statistician

       e. Database Administrator

   Data Scientist: The job of a data scientist is to collect relevant data form various relevant sources available universally, A data scientist's role combines computer science, statistics and mathematics. He/she is responsible to store and organize the unstructured data.

   Data Mining: The data mining engineers has to mine this data and put it is structured form by utilizing several software and algorithms. Thus data engineers have to utilize massy data and build an infrastructure for real and tangible analysis.

2. What are the duties of a data scientist?

   1. Data Collection & Cleaning
   2. Exploratory Data Analysis (EDA)
   3. Data Visualization & Reporting
   4. Business & Strategy Support

3. Explain the differences between classification and regression.

   Classification predicts categories or classes. For example, a classification algorithm can separate out images of dogs and cats and tell you this is a cat and this is a dog.

   Whereas,

   Regression predicts values on the basis of past trends. For example, a regression algorithm can predict what will be the next day's temperature by looking at the temperatures of last few days.

4. How is a fraudulent transaction detected?

   Anomaly Detection for Fraudulent Transactions is a powerful technique used to identify suspicious activities that deviate from normal behavior in financial systems. It's especially critical in banking, e-commerce, and digital payments where fraud can be subtle and fast-moving.

5. At what stage are you supposed to adopt a career as a data scientist, and how?

You can start working to become a data scientist in high school or college by learning math, coding (like Python), and how to understand data. To get the job, study hard, practice on real projects, and maybe get a degree or certificate.

Case study:

Scenario:

School Sports Day Participation

Background:

The students of Sunshine Middle School participated in their annual Sports Day. The sports coordinator recorded the number of participants from each grade (VI, VII, VIII) in four events:

- **Athletics (100m race)**
- **Long Jump**
- **Relay Race**
- **Tug of War**

The data is given below:

Grade	Athletics	Long Jump	Relay Race	Tug of War
VI	12	8	15	10
VII	15	10	12	8
VIII	10	12	10	15

Questions:

1. **Data Interpretation:**
   o Which grade had the **highest participation** in **Athletics**?
   o Which event had the **lowest participation** from **Grade VII**?
2. **Data Representation:**
   o Represent the data for **Grade VIII** in a **bar graph** (hand-drawn or digital).
   o Which **type of chart** (bar graph/pie chart) would best compare participation across all events for **Grade VI**? Justify your answer.

3. **Analysis:**

o Calculate the **total participation** across all events for **each grade**. Which grade had the **most participants overall**?

o If the school wants to **encourage more participation in Long Jump**, what **suggestion** would you give based on the data?

4. **Critical Thinking:**

o Why do you think **Tug of War** has **different participation trends** across grades? (Give two possible reasons.)

Scenario:

A travel agency is planning a trip to Jaipur, and they need to consider the weather conditions throughout the year to advise their clients.

Questions:

2.How can the agency use historical weather data to predict potential weather challenges during the trip?

1. **Relevant Weather Data for Planning**

The travel agency should consider the following weather data for Jaipur:

- **Temperature** (average highs and lows) – Helps determine the best time for comfortable travel.
- **Rainfall & Monsoon Patterns** – Identifies wet seasons that may disrupt outdoor activities.
- **Humidity Levels** – High humidity can make summers feel hotter and affect comfort.
- **Wind Speed & Dust Storms** – Important for desert regions like Jaipur, especially in summer.
- **Sunshine Hours & UV Index** – Useful for advising on sun protection and sightseeing schedules.

What types of weather data (e.g., temperature, rainfall, humidity) would be most relevant for this planning?

Using Historical Weather Data for Prediction

The agency can:

- Analyze **monthly averages** (temperature, rainfall) to identify peak tourist seasons and off-seasons.
- Check **extreme weather trends** (heatwaves, heavy rains) to avoid scheduling trips during risky periods.
- Compare past years' data to predict anomalies (e.g., unusually hot summers or delayed monsoons).
- Use **seasonal forecasts** to anticipate unusual weather disruptions (e.g., excessive rain in July-August).

What data visualization techniques could be used to present this weather information to clients?

Data Visualization Techniques for Clients

To make weather data easy to understand, the agency can use:

- **Line Graphs** – Show monthly temperature and rainfall trends.
- **Bar Charts** – Compare average rainfall across different months.
- **Heatmaps** – Display humidity and temperature variations visually.
- **Infographics** – Summarize the best and worst travel months with icons (e.g., sun, rain, snow).
- **Interactive Dashboards** – Allow clients to explore weather patterns by month.