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Class	10th	Chapter	05
Subject	Computer Science	Board	Punjab

CHAPTER 05: Data Science

EXERCISE SOLUTIONS

Multiple Choice Questions (MCQs)

1. What is the first step in the Data Science Life Cycle (DSLC)?

(a) Collecting Data (b) Visualizing Data (c) Understanding the Problem (d) Analyzing the Data

Correct Answer: (c) Understanding the Problem

2. Which method is best for collecting opinions from many students?

(a) IoT Devices (b) Survey (c) Web Scraping (d) Database

Correct Answer: (b) Survey

3. What is "bias" in data?

(a) Very large data size (b) Unfair or one-sided data (c) Well-cleaned data (d) High-speed data

Correct Answer: (b) Unfair or one-sided data

4. Which tool is ideal for beginners to create charts?

(a) Tableau (b) Python (c) Google Sheets (d) Hadoop

Correct Answer: (c) Google Sheets

5. A relational store information in the form of----------.

(a) Slides (b) Tables (c) Blocks (d) Layers

Correct Answer: (b) Tables *(Note: Relational Database)*

6. Which of the following charts is best for comparing groups?

(a) Pie Chart (b) Bar Chart (c) Line Chart (d) Area Chart

Correct Answer: (b) Bar Chart

7. What is the main goal of analyzing data?

(a) Delete old data (b) Decorate data (c) Find patterns and make decisions (d) Upload to the internet

Correct Answer: (c) Find patterns and make decisions

8. Which of the following tools is an advanced data visualization platform?

(a) MS Paint (b) Google Data Studio (c) Notepad (d) WhatsApp

Correct Answer: (b) Google Data Studio *(now Looker Studio)*

9. What should be done before storing data?

(a) Add animations (b) Clean and validate it (c) Encrypt it (d) Translate it

Correct Answer: (b) Clean and validate it

10. Which one is an example of a data source?

(a) YouTube (b) Survey form (c) Whiteboard (d) Slide show

Correct Answer: (b) Survey form

Short Questions

1. What is the importance of understanding a problem before collecting data?

Answer:

Understanding the problem first ensures that data collection is focused, relevant, and efficient. It prevents wasting time and resources on gathering unnecessary or irrelevant data that does not answer the core objective.

2. Name any two methods of collecting data and give one example of each.

Answer:

1. **Surveys / Questionnaires:** Collecting feedback directly from individuals. *Example:* A Google Form sent to students asking about their preferred subjects.
2. **Web Scraping:** Automatically extracting data from websites using software. *Example:* Scraping daily product prices from an e-commerce website.

3. What do we mean by "cleaning" data?

Answer:

Cleaning data involves identifying and fixing errors, duplicate entries, missing values, incorrect formatting, or irrelevant records within a dataset to ensure accuracy and consistency before analysis.

4. Why is it important to validate data before using it?

Answer:

Validating data ensures that the collected information is accurate, complete, logically consistent, and meets correct data formatting criteria, preventing flawed insights or wrong decisions during analysis.

5. What is the purpose of visualizing data using charts?

Answer:

Data visualization presents complex numerical datasets in graphical form (like bar or pie charts), making it easier to identify trends, patterns, outliers, and insights quickly.

6. How does bias in data affect results?

Answer:

Bias in data introduces systemic unfairness or skewness toward a specific group or outcome. It leads to inaccurate conclusions, wrong predictions, and discriminatory decision-making.

7. Write two steps you will follow to clean a messy survey.

Answer:

Remove Duplicates: Identify and delete duplicate response entries submitted by the same participant. .1

Handle Missing Values: Fill in missing responses using averages/defaults or eliminate incomplete survey rows entirely. .2

8. Name any two tools used for creating charts.

Answer:

Google Sheets (or Microsoft Excel) .1

Tableau (or Google Data Studio / Power BI) .2

Long Questions

1. Explain the six steps of the Data Science Life Cycle (DSLC) with one line each.

Answer:

Problem Understanding: Clearly define the core objectives and questions that need to be answered. .1

Data Collection: Gather relevant data from various sources like surveys, sensors, or databases. .2

Data Cleaning and Preparation: Fix missing values, formatting errors, and remove duplicate entries. .3

Data Exploration and Analysis: Analyze the cleaned dataset to discover underlying trends, correlations, and patterns. .4

Data Visualization: Create graphical charts and visual dashboards to represent findings clearly. .5

Deployment and Decision Making: Use the derived insights to solve problems and guide business or policy decisions. .6

2. Give a detailed comparison between Bar Chart, Pie Chart, and Line Chart with examples.

Answer:

- **1. Bar Chart:**
  - **Description:** Uses rectangular bars where the length/height represents categorical quantities. Best for comparing independent discrete categories or groups.
  - **Example:** Comparing the total number of students enrolled in different school clubs (e.g., Science Club, Sports Club, Art Club).
- **2. Pie Chart:**
  - **Description:** Uses a circular graph divided into slices, where each slice represents a proportional percentage/share of a whole (100%).
  - **Example:** Displaying the percentage breakdown of a monthly student budget spent on food, transport, books, and entertainment.
- **3. Line Chart:**
  - **Description:** Connects individual data points with continuous straight line segments. Best for displaying trends over time (time-series data).

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Example: Tracking a student's test score performance across monthly exams over an entire academic year.

3. Differentiate between DBMS and SQL.

Answer:

Feature	DBMS (Database Management System)	SQL (Structured Query Language)
Definition	A software application used to store, manage, retrieve, and organize databases.	A standard computer programming language used to communicate with databases.
Type	Software System / Database Engine.	Query Language.
Function	Provides an interface, security, storage mechanism, and multi-user management.	Used to write queries for creating, reading, updating, and deleting data (CRUD operations).
Examples	MySQL, PostgreSQL, Oracle, SQLite, Microsoft Access.	SELECT, INSERT, UPDATE, DELETE, CREATE TABLE.

4. Write a Query in SQL to get all data of a student who's roll_number is 15 from student table.

Answer:

```
SQL
SELECT *
FROM student
WHERE roll_number = 15;
```

Explanation:

- SELECT *: Retrieves all columns/attributes from the dataset.
- FROM student: Specifies the source table named student.
- WHERE roll_number = 15: Filters the records to return only the specific row matching roll number 15.