Class: 9th

Subject: Computer

Unit 9: Data Science and Data Gathering

Multiple Choice Questions (MCQs)

1. What is data?

(a) Processed information

(b) Raw facts gathered about things ✅

(c) A collection of numbers only

(d) A list of observed events

2. Which of the following is an example of qualitative data?

(a) Temperature readings in degrees Celsius

(b) Number of students in a class

(c) Favourite ice cream flavours ✅

(d) Test scores out of 100

3. What type of data involves distinct, separate values that are countable?

(a) Nominal Data

(b) Ordinal Data

(c) Discrete Data ✅

(d) Continuous Data

4. What is an example of continuous data?

(a) Number of cars in a parking lot

(b) Height of students in centimetres ✅

(c) Types of fruits

(d) Shirt sizes (small, medium, large)

5. What type of data is used to categorize items without implying any order?

(a) Ordinal Data

(b) Discrete Data

(c) Nominal Data ✅

(d) Continuous Data

6. How can you organise data to make it easier to analyse?

(a) By writing it in long paragraphs

(**b**) By creating tables, charts, and graphs ✅

(c) By storing it in random files

(d) By keeping it in a messy notebook

7. Which tool can be used to create surveys online?

(a) Microsoft Word

(**b**) Google Forms ✅

(c) Excel Spreadsheets

(d) Adobe Photoshop

8. What is the main purpose of data collection?

(a) To create random numbers

(**b**) To gather information to answer questions or make decisions ✅

(c) To delete old data

(d) To format text documents

9. What is the primary purpose of data

visualization?

(a) To generate random numbers

(b) To convert text into data

(c) To make data easier to understand by turning it into pictures ✅

(d) To hide complex data

10. Which tool is specifically designed for creating detailed and interactive visualizations?

(a) Microsoft Excel

(b) Google Sheets

(c) Tableau ✅

(d) PowerPoint

11. What is the first step in the data science process?

(a) Data Cleaning

(b) Data Analysis

(c) Data Collection

(d) Understanding the problem ✅

12. What does the 'Volume' characteristic of Big Data refer to?

(a) The speed at which data is generated

(b) The different forms data can take

(c) The sheer amount of data being collected ✅

(d) The way data is processed

13. What is an outlier in a dataset?

(a) The most frequent value

(b) The average of all values

(c) An unusual or extreme value that doesn't fit the pattern ✅

(d) The middle value when all values are arranged in order

14. What does data encryption do?

(a) It converts data into a code to prevent unauthorized access. ✅

(b) It makes data available to everyone online.

(c) It automatically deletes old data.

(d) It speeds up internet connection.

Important MCQs:

1. What is data?

(a) Processed facts

(b) Raw facts collected about things ✅

(c) Grouped information

(d) Final analysis

2. Which of the following is an example of qualitative data?

(a) Student names ✅

(b) Test scores

(c) Heights of plants

(d) Temperature readings

3. Which of these is an example of quantitative data?

(a) Favourite colours

(b) Fruit types

(c) Number of visitors ✅

(d) Shirt sizes

4. What does qualitative data describe?

(a) Amounts and numbers

(b) Duration and length

(c) Characteristics or qualities ✅

(d) Measurable quantities

5. Which of these is nominal data?

(a) Shirt sizes

(b) Temperature levels

(c) Book genres ✅

(d) Satisfaction ratings

6. Which of the following is ordinal data?

(a) Types of books

(b) Education levels ✅

(c) Colours of cars

(d) Names of fruits

7. What type of data is used to rank items in meaningful order?

(a) Nominal

(b) Ordinal ✅

(c) Discrete

(d) Continuous

8. Which of these is a key feature of nominal data?

(a) It is ranked

(b) It is counted

(c) It is non-numeric ✅

(d) It has fixed intervals

9. What is discrete data?

(a) Data that is continuous in nature

(b) Data that takes whole, countable values ✅

(c) Data with non-numeric labels

(d) Data used only in surveys

10. Which is an example of discrete data?

(a) Heights of students

(b) Weights of fruits

(c) Number of cars in a parking lot ✅

(d) Temperatures of rooms

11. Which is an example of continuous data?

(a) Number of apples

(b) Number of students

(c) Weight of a mango ✅

(d) Favourite movie genre

12. What makes quantitative data different from qualitative data?

(a) It uses symbols

(b) It is descriptive

(c) It is numeric ✅

(d) It is not useful

13. What operation can be performed only on continuous data but not on discrete?

(a) Counting

(b) Subtracting

(c) Division ✅

(d) Grouping

14. Which type of data helps answer "How much?" or "How long?"

(a) Nominal

(b) Ordinal

(c) Qualitative

(d) Quantitative ✅

15. In which type of data are values non-numeric and categorical?

(a) Quantitative

(b) Continuous

(c) Discrete

(d) Qualitative ✅

16. What is the main benefit of organising data in a table?

(a) It looks beautiful

(b) It reduces errors and improves clarity ✅

(c) It increases the data

(d) It hides mistakes

17. Which of the following is not a common type of chart?

(a) Pie chart

(b) Bar chart

(c) Scatter plot

(d) Table ✅

18. Which graph is best to show trends over time?

(a) Bar graph

(b) Line graph ✅

(c) Pie chart

(d) Histogram

19. What is the purpose of a histogram?

(a) To show percentages

(b) To compare parts of a whole

(c) To display the frequency of data in intervals ✅

(d) To show relationships between variables

20. Which data collection method involves asking people questions directly?

(a) Observation

(b) Interview ✅

(c) Graph

(d) Chart

21. What is a good practice when designing surveys?

(a) Use only long-answer questions

(b) Avoid testing your survey

(c) Ensure anonymity ✅

(d) Confuse the respondent

22. Which tool is used to collect data using written questions filled out by people?

(a) Survey

(b) Questionnaire ✅

(c) Graph

(d) Interview

23. What does ‘data integration’ mean?

(a) Deleting extra data

(b) Saving data as images

(c) Combining information from different sources ✅

(d) Making surveys

24. Which of the following is a method of data collection?

(a) Histogram

(b) Line graph

(c) Observation ✅

(d) Table

25. What does 'data extraction' involve?

(a) Copying all content from the internet

(b) Highlighting irrelevant details

(c) Identifying and saving relevant information ✅

(d) Designing a survey

26. What is the first step in gathering data from

online sources?

(a) Print all webpages

(b) Create bar graphs

(c) Search for relevant information using keywords ✅

(d) Guess answers from your memory

27. Which of the following is an example of an online database?

(a) BBC News

(b) Wikipedia

(c) IEEE Xplore ✅

(d) Facebook

28. Which of the following is not a best practice for surveys?

(a) Use rating scales

(b) Keep it long and complex ✅

(c) Be specific and clear

(d) Test the survey before using

29. What is the main purpose of using charts and graphs in data organisation?

(a) To increase the amount of data

(b) To confuse the reader

(c) To make data easy to understand and interpret ✅

(d) To replace surveys

30. What is the final step after collecting and extracting data?

(a) Ignore the data

(b) Data integration ✅

(c) Data destruction

(d) Data copying

31. What is structured data?

(a) Information that is organized and easily searchable ✅

(b) Information consisting only of images

(c) Data that is random and unordered

(d) Only videos and audios

32. Which of the following is an example of unstructured data?

(a) Spreadsheet

(b) Database

(c) Social media posts and videos ✅

(d) Tables and columns

33. What is true about spreadsheets?

(a) Used only in large businesses

(b) They organize data in rows and columns ✅

(c) Store only images and videos

(d) Best for complex data management

34. What type of data do NoSQL databases handle?

(a) Only structured data

(b) Only spreadsheet data

(c) Unstructured and flexible data ✅

(d) Only images and videos

35. What is the main purpose of data warehouses?

(a) Only data storage

(**b**) Analyzing large amounts of data to make business decisions ✅

(c) Storing only personal information

(d) Organizing only videos and images

36. What is data visualization?

(a) Writing data in a notebook

(**b**) Turning data into pictures like charts and graphs ✅

(c) Deleting unnecessary data

(d) Collecting raw data

37. Why is data visualization important?

(a) It makes data look complicated

(**b**) It helps in understanding data quickly and easily ✅

(c) It hides the real data

(d) It removes errors automatically

38. Which of the following tools is specifically designed for creating detailed and interactive data visualizations?

(a) Microsoft Excel

(b) Google Sheets

(c) Tableau ✅

(d) Notepad

39. Which chart is most suitable for visualizing nominal data?

(a) Line chart

(b) Pie chart ✅

(c) Histogram

(d) Scatter plot

40. What type of data is best visualized by histograms and dot plots?

(a) Nominal data

(b) Ordinal data

(c) Discrete data ✅

(d) Continuous data

41. What is the first step in working with data to prepare it for analysis?

(a) Data visualization

(b) Data pre-processing ✅

(c) Data storage

(d) Data mining

42. Which of the following is NOT a data pre-processing technique?

(a) Evaluating data quality

(b) Identifying outliers

(c) Creating charts

(d) Handling missing data ✅

43. What is an outlier in a dataset?

(a) A missing value

(b) An unusual or extreme value that does not fit the pattern ✅

(c) A repeated value

(d) A perfectly average value

44. How can missing data be handled during data cleaning?

(a) Ignoring it completely

(b) Filling it with average values or other appropriate methods ✅

(c) Deleting the entire dataset

(d) Adding random numbers

45. Which of the following is a measure of central tendency?

(a) Variance

(b) Median ✅

(c) Standard deviation

(d) Range

46. What does the mean of a dataset represent?

(a) The most frequent value

(b) The middle value

(c) The average value, sum of all values divided by

number of values ✅

(d) The difference between highest and lowest values

47. When is median preferred over mean?

(a) When there are no outliers

(b) When data is categorical

(c) When the dataset contains outliers or extreme values ✅

(d) When data is incomplete

48. What does variance measure in a dataset?

(a) The average value

(b) How spread out the data points are from the mean ✅

(c) The middle value

(d) The most common value

49. Qualitative analysis deals with:

(a) Numeric data only

(b) Non-numeric data such as text, images, and

sounds ✅

(c) Only data stored in spreadsheets

(d) Only outliers and missing data

50. Which method is used in qualitative data analysis to count the frequency of specific words or themes?

(a) Statistical analysis

(b) Thematic analysis

(c) Content analysis ✅

(d) Regression analysis

51. What is the main advantage of cloud storage in data management?

(a) It stores data only on physical devices

(b) It allows access to files from any device connected to the internet ✅

(c) It requires special software installation

(d) It does not support file sharing

52. What does remote access allow a user to do?

(a) Connect to a local printer only

(**b**) Use files and software on a distant computer or network via the internet ✅

(c) Access files only when physically present at the device

(d) Work offline without internet connection

53. Why are data backups important?

(a) They permanently delete files

(**b**) They create copies of important data to protect against loss ✅

(c) They slow down the computer

(d) They make files inaccessible

54. What is collaborative authoring?

(a) One person writes a document alone

(**b**) Multiple people work together on the same document in real-time ✅

(c) Sharing files without editing

(d) Printing documents separately

55. Which feature of collaborative tools helps avoid losing work by saving every change automatically?

(a) Offline mode

(b) Version control ✅

(c) File compression

(d) Antivirus protection

56. What is the main purpose of data science?

(a) To solve crimes using detective skills

(b) To solve problems and make better decisions using data ✅

(c) To create software programs only

(d) To organize files on a computer

57. Which fields are combined in data science to work effectively with data?

(a) Physics, Chemistry, Biology

(b) Computer Science, Mathematics & Statistics, Business Knowledge ✅

(c) Literature, History, Geography

(d) Engineering, Medicine, Law

58. What is the first step in the Data Science Workflow?

(a) Data Cleaning

(b) Data Visualization

(c) Problem Identification ✅

(d) Data Analysis

59. What does the term "Big Data" primarily refer to?

(a) Small data sets managed by traditional tools

(b) Extremely large and complex data sets requiring special tools ✅

(c) Data that only contains numbers

(d) Data used only in healthcare

60. Which of the following is NOT one of the "Three Vs" of Big Data?

(a) Volume

(b) Velocity

(c) Variety

(d) Validity ✅

61. How do businesses use Big Data?

(a) To avoid customer feedback

(b) To make better decisions by analyzing trends and patterns ✅

(c) To slow down product development

(d) To delete large amounts of data

62. Which tool is commonly used for managing and querying databases in data science?

(a) Excel

(b) Python

(c) SQL ✅

(d) R

63.. What is predictive modelling in data science?

(a) A method to clean data errors

(b) A technique to forecast future events based on past data ✅

(c) A tool for creating charts

(d) A way to store big data

64. How does Big Data help in healthcare?

(a) By deleting patient records

(b) By monitoring patient health and predicting disease outbreaks ✅

(c) By increasing hospital bills

(d) By reducing doctor visits

65. Which of these data types does Big Data NOT include?

(a) Text

(b) Images

(c) Videos

(d) None of the above ✅

66. What advantage does Python offer in data science?

(a) It is used to query databases only

(b) It has powerful libraries for data manipulation and visualization ✅

(c) It cannot handle large data sets

(d) It is only used for data cleaning

67. What role does Graph Analytics play in data science?

(a) It analyses relationships between different data points ✅

(b) It deletes unnecessary data

(c) It only works with numerical data

(d) It speeds up data collection

68. What is a future prediction for data science tools?

(a) Decreased automation in data cleaning

(b) Reduced use of AI in data analysis

(c) Enhanced automation and better data privacy features ✅

(d) Elimination of data visualization

Exercise Short Questions:

Q1: What is the difference between qualitative and quantitative data?

Answer:

- Qualitative data describes qualities or categories (e.g., color, type).
- Quantitative data deals with numbers and measurable values (e.g., age, height).

Q2: Give an example of continuous data and explain why it is considered continuous.

Answer:

Example: A person's weight.

It is considered continuous because it can take any value within a range (e.g., 55.3 kg, 55.31 kg, etc.).

Q3: Which method would you use to collect opinions from a large group of people about a new school policy?

Answer:

An online survey using tools like Google Forms is

the most effective method.

Q4: What type of data is the number of students in your class?

Answer:

It is quantitative discrete data because it consists of whole number counts.

Q5: Why is it important to organise data into tables or charts before analyzing it?

Answer:

It makes the data easier to read, compare, and identify patterns or trends quickly.

Q6: What is one advantage of using online tools like Google Forms for collecting survey data?

Answer:

They allow quick collection, automatic storage, and easy analysis of large datasets.

Q7: Why might you need to integrate data from different sources when working on a project?

Answer:

To gain a complete picture, cross-check accuracy, and enhance understanding of the subject.

Q8: Describe a scenario where discrete data might be more useful than continuous data.

Answer:

Example: Recording the number of books sold each day.

It is better represented by discrete data because it involves whole numbers.

Q9: Explain why data visualization is important. How does it help in understanding complex information?

Answer:

Data visualization like graphs or charts helps by summarizing complex data visually, making it easier to spot trends, patterns, and relationships.

Q10: Describe what a line graph is used for and provide an example of data that could be displayed using a line graph.

Answer:

A line graph is used to show changes over time.

Example: A student's marks in each monthly test throughout the year.

Q11: Explain the use of scatter plots in visualizing continuous data. Provide an example of a situation where a scatter plot would be useful.

Answer:

A scatter plot shows the relationship between two continuous variables.

Example: Analyzing the connection between hours studied and exam scores.

Important Short Questions:

1. What is data? Give two examples.

Data are raw facts that can be processed to generate useful information. Examples: Weather data, Sales data.

2. Why is understanding data important in today's world?

It helps in making informed decisions, solving problems, and promoting innovation.

3. Differentiate between qualitative and quantitative data.

Qualitative data describe characteristics (non-numeric), while quantitative data represent measurable amounts (numeric).

4. What is nominal data? Give one example.

Nominal data is categorical without any order. Example: Colors (Red, Blue, Green).

5. Give an example of ordinal data and explain its significance.

Example: Shirt sizes (Small, Medium, Large). Ordinal data helps in meaningful ranking.

6. What is discrete data? Provide one example.

Discrete data includes countable values. Example:

Number of students in a class.

7. Explain continuous data with an example.

Continuous data can take any value in a range. **Example**: Height of a student (e.g., 160.2 cm).

8. Which arithmetic operations can be performed on quantitative data?

Addition, subtraction, multiplication, division, average, and range.

9. How is continuous data different from discrete data in terms of division?

Continuous data (like weight) can be divided, but discrete data (like cars) cannot be divided meaningfully.

10. State two key characteristics of qualitative data.

Non-numeric

Categorical (classified by attributes like names, types, colors)

11. Why is it important to organize data before

analysis?

Answer:

Organizing data reduces errors and helps in clear analysis and interpretation by arranging the information systematically.

12. How does organized data help save time?

Answer:

It makes it easier to locate specific information quickly, just like finding a book from a neat shelf instead of a messy one.

13. Name any two tools used for data presentation.

Answer:

Two tools used for data presentation are:

1. Tables
2. Charts

14. What is a bar chart used for?

Answer:

A bar chart is used to compare different values and identify trends or patterns in data.

15. What is the purpose of a survey in data collection?

Answer:

A survey collects information by asking questions to people in order to understand their opinions or preferences.

16. Write any two best practices for designing a good survey.

Answer:

1. Be clear and specific in questions.

2. Use multiple choice or rating scale questions for easy responses.

17. What is meant by data extraction?

Answer:

Data extraction means selecting and saving the most relevant information from a large set of data for analysis.

18. What are online databases? Give one example.

Answer:

Online databases are websites that store a large amount of research-based information.

Example: Google Scholar

19. Define data integration with an example.

Answer:

Data integration is combining information from different sources into a single summary.

Example: Merging data from multiple articles to write a report on social media's impact on teenagers.

20. What is the difference between a chart and a graph?

Answer:

A chart simplifies complex information visually, while a graph shows the relationship between different data points.

21. What is structured data? Give one example.

Answer:

Structured data is well-organised and stored in a

specific format, making it easy to search and analyse.

Example: Data in a spreadsheet or database table.

22. What is unstructured data? Give one example.

Answer:

Unstructured data has no fixed format and is harder to organise.

Example: Social media posts, videos, or emails.

23.What is the main use of a spreadsheet?

Answer:

Spreadsheets are used to store and manage simple data in rows and columns. They allow calculations, sorting, and creating charts.

Example: Microsoft Excel or Google Sheets.

24. What is the function of a data warehouse?

Answer:

A data warehouse stores large amounts of data from various sources to support analysis and decision-making in businesses.

Example: Google BigQuery.

25. How is a NoSQL database different from a traditional database?

Answer:

NoSQL databases can store unstructured data using flexible formats like documents or key-value pairs, unlike traditional databases that use tables.

Example: MongoDB and Cassandra.

26. Define data visualization and explain its importance in data analysis.

Answer:

Data visualization is the process of representing data and information in the form of visual elements such as charts, graphs, and pictures. It helps to make complex data easier to understand by highlighting patterns, trends, and relationships. Visualization is important because it provides quick insights and supports better and faster decision-making.

27. List any three popular tools used for data visualization.

Answer:

Three popular tools used for data visualization are:

1. Microsoft Excel
2. Google Sheets
3. Tableau

28. How is nominal data visualized? Give examples of chart types used.

Answer:

Nominal data represents categories without any specific order. It is commonly visualized using bar charts and pie charts. These charts help to show the frequency or proportion of different categories.

29. What is data pre-processing and why is it necessary before analysis?

Answer:

Data pre-processing is the process of preparing raw data for analysis by cleaning and organizing it. It is

necessary because raw data often contains errors, missing values, or inconsistencies, which can lead to incorrect conclusions if not fixed before analysis.

30. Describe two common techniques used in data pre-processing.

Answer:

Two common data pre-processing techniques are:

- **Data Cleaning**: Removing or correcting errors and handling missing data.
- **Data Validation**: Checking the completeness and accuracy of the data to ensure it is reliable for analysis.

31. What is data validation? Explain with an example.

Answer:

Data validation is the process of verifying that data is complete and accurate before analysis. For example, checking if all students in a list have recorded test scores and ensuring that these scores are within the valid range (e.g., 0 to 100).

32. Differentiate between quantitative and qualitative data analysis.

Answer:

- **Quantitative** analysis deals with numeric data and focuses on measuring and identifying patterns using statistics.
- **Qualitative** analysis deals with non-numeric data such as text or images, focusing on interpreting meanings, themes, and concepts.

33. Define the term "mean" and explain how it is calculated.

Answer:

The mean, or average, is the sum of all values divided by the number of values. For example, if test scores are 70, 80, and 90, the mean is (70 + 80 + 90) ÷ 3 = 80.

34. What is an outlier in data? How should it be handled?

Answer:

An outlier is an unusual or extreme data value that

does not fit the pattern of the rest of the data. Outliers should be investigated to determine if they are errors or valid values. Depending on the result, they can be corrected, removed, or retained in the dataset.

35. Explain the difference between data cleaning and data validation.

Answer:

Data validation checks whether data is complete and accurate. Data cleaning involves fixing errors, removing incorrect data, and handling missing or inconsistent values. Validation is about identifying problems; cleaning is about correcting them.

36. What is cloud storage and its role?

Answer:

Cloud storage saves files on the internet so you can access and share them from any device. It helps manage data by making backup and collaboration easier.

37. What is remote access? Give an example.

Answer:

Remote access lets you use a computer or files from far away via the internet. For example, you can save a project on Google Drive at home and edit it later at school.

38. Why are data backups important and how do cloud services help?

Answer:

Backups protect files from loss or damage. Cloud services automatically save copies online, so you can restore files if something goes wrong.

39. What is collaborative authoring and its benefit?

Answer:

Collaborative authoring lets many people work on a document together online at the same time. It helps group projects finish faster and better by sharing work easily.

40. Name two benefits of collaborative tools.

Answer:

1. Faster work because many people contribute at once.

2. Version control to save and track all changes automatically.

41. What is data science?

Data science is the process of using data to solve problems and make decisions by finding patterns and insights.

42. Why is understanding data science important in daily life?

It helps us make better decisions, solve problems, and improve things like study habits, business strategies, and health care.

43. Name the three main fields combined in data science.

Computer Science, Mathematics & Statistics, and Business Knowledge.

44. What are the steps of the data science workflow?

Problem identification, data collection, data

cleaning, data analysis, data interpretation, and data visualization.

45. What is data cleaning and why is it important?

Data cleaning means fixing errors and organizing data so it is accurate and useful for analysis.

46. What is Big Data and what are its "Three Vs"?

Big Data is very large and complex data sets. The Three Vs are Volume (amount), Velocity (speed), and Variety (different types).

47. Give two examples of how businesses use Big Data.

Businesses use Big Data to understand customer preferences and improve product sales.

48. Name four common tools used in data science.

Excel, Python, R, and SQL.

49. What is predictive modelling in data science?

It is a technique to forecast future events based on past data.

50. How is data visualization helpful in data

science?

Answer:

It helps to represent data in charts and graphs, making it easier to understand and share insights.

51. What role do data science techniques play in the retail industry?

Answer:

Data science techniques help retailers understand shopping patterns by analyzing customer purchases. This enables stores to organize products better, improve customer experience, and increase sales by recommending related items together.

52. How are data science techniques used in healthcare?

Answer:

Hospitals use data science to monitor patient health and predict disease trends. For example, predictive modelling helps identify patients at risk of diseases like diabetes, enabling early treatment

and better patient care.

53. How do banks use data science to prevent fraud in the finance sector?

Answer:

Banks analyze transaction data to detect unusual spending patterns. Predictive modelling flags suspicious activities, helping banks act quickly to prevent fraud and protect customers' money.

54. How is data science applied in sports to improve player performance and team strategies?

Answer:

Coaches use data science to analyze player statistics and game data. This helps identify strengths and weaknesses, allowing teams to develop better strategies and make informed decisions during matches.

55. What advancements are expected in future data management and analysis tools?

Answer:

Future tools will feature enhanced automation,

improved data privacy, AI integration for faster analysis, and innovative visualization methods such as interactive dashboards.

56. What is meant by enhanced automation in data science tools?

Enhanced automation means data tools will automatically perform tasks like data cleaning and organizing, reducing manual work and allowing users to focus on complex analysis and predictions.

57. How will future digital tools improve data privacy?

Future tools will include advanced security features, such as encryption, to ensure that only authorized users can access sensitive data, protecting it from unauthorized access and cyber threats.

58. How does the integration of Artificial Intelligence (AI) with data science tools benefit analysis?

AI integration enables automatic report generation, faster data processing, and better detection of

patterns, helping businesses and researchers quickly understand data and make decisions.

59. What innovations in data visualization are expected in future data tools?

Innovations include interactive dashboards that allow users to explore data dynamically by clicking on chart sections for detailed insights, making complex information easier to understand.

60. What is the difference between structured data and unstructured data?

Structured data is organized in a fixed format like spreadsheets or databases, making it easy to search and analyze. Unstructured data has no specific format, such as text, images, or videos, making it harder to organize.

Exercise Long Questions:

🌟 **Q1. Explain the differences between qualitative and quantitative data. Provide examples of each type.**

Answer:

Data can be divided into two main types: qualitative and quantitative.

Qualitative Data:

Definition: Qualitative data describes qualities or characteristics. It is non-numerical and often expressed in words or categories.

- **Examples**:
  - Favorite color of students (e.g., red, blue, green).
  - Types of music students like (e.g., pop, classical, rock).
  - Students' opinions about school rules.

This type of data is usually collected through surveys, interviews, or observations and is useful for understanding people's choices, feelings, or preferences.

Quantitative Data:

Definition: Quantitative data involves numbers and

can be measured or counted. It represents quantities or amounts.

🔹 **Examples**:

- A student's height (e.g., 150 cm).
- Number of books read in a month.
- Marks scored in a test (e.g., 85 out of 100).

Quantitative data helps in statistical analysis and finding numerical patterns or averages.

Summary:

The main difference is that qualitative data describes while quantitative data measures. Both are important for different kinds of analysis.

🌟 **Q2. Describe the process of conducting a survey to gather data about students' favourite extracurricular activities.**

Answer:

Conducting a survey involves several steps to collect accurate and useful data. Here's how to conduct a survey about students' favorite

extracurricular activities:

Step 1: Define the Purpose

Decide what you want to learn. In this case, it's students' preferences for extracurricular activities like sports, music, or drama.

Step 2: Design the Questionnaire

Create simple and clear questions such as:

- "Which extracurricular activity do you enjoy the most?"
- "How many times a week do you participate in it?"
- "Would you like the school to offer more clubs or activities?"

Use multiple-choice or open-ended questions based on the data needed.

Step 3: Choose the Target Group

Decide which students will participate—e.g., students from grades 6 to 10.

Step 4: Collect the Data

Use tools like Google Forms, paper surveys, or class discussions to collect answers.

Step 5: Organize the Data

Gather the responses and organize them in a spreadsheet or table to sort and filter the data easily.

Step 6: Analyze and Present

Analyze which activities are most popular and present the results in charts or graphs (like bar graphs or pie charts).

Summary:

Surveys are a helpful way to understand students' interests and make decisions that reflect their preferences.

🌟 **Q3. Compare and contrast continuous and discrete data. Use examples to show how each type of data might be used in a school setting.**

Answer:

Continuous Data:

Definition: Continuous data can take any value within a range. It includes decimal or fractional values.

- **Examples in School:**
  - Height of students (e.g., 145.5 cm, 160.2 cm).
  - Weight of students.
  - Time taken to finish a test (e.g., 35.4 minutes).
  - Continuous data is useful for measuring physical attributes and performance precisely.

Discrete Data:

Definition: Discrete data includes specific, countable values. It cannot be broken into smaller parts.

- **Examples in School:**
  - Number of students in a class.
  - Number of books issued from the library.
  - Number of days a student was absent.
  - Discrete data is useful for counting exact

values or items.

Comparison Table:

Feature	Continuous Data	Discrete Data
Can take decimals?	Yes	No
Example	Height: 152.4 cm	Number of students: 30
Used for	Measuring physical quantities	Counting fixed items

Summary:

Both types are important: continuous data helps with precise measurements, while discrete data helps with exact counts in school records.

🌟 **Q4. Analyse the benefits and challenges of using digital tools like Google Forms for data collection.**

Answer:

Digital tools like Google Forms make data collection easy and efficient, but they also come with certain limitations.

Benefits:

1. Easy to Use: Forms can be created quickly using

templates or custom questions.

2. Time-Saving: Responses are collected instantly and stored digitally.

3. Organized Data: Responses are automatically saved in spreadsheets for easy analysis.

4. Accessibility: Students can fill forms from any device with internet access.

5. Environment Friendly: No paper is needed, which saves resources.

Challenges:

1. Internet Requirement: Forms need a stable internet connection, which may not be available to all.

2. Limited Access: Students without smartphones or computers may be left out.

3. Data Privacy Issues: There is a risk of data being shared or leaked if not properly secured.

4. Typing Errors: Some students may give incorrect or incomplete answers due to carelessness.

Summary:

While tools like Google Forms make surveys fast and efficient, schools must ensure equal access and data security for them to be truly effective.

🌟 **Q5. Imagine you are tasked with organizing a school event and need to collect data on students' preferences for activities and refreshments.**

Answer:

To organize a successful event, it's important to gather information about what students want. Here's how you can do it:

Step 1: Identify the Information Needed

- You need to know:
- Which activities students enjoy (e.g., games, singing, art).
- What kind of refreshments they prefer (e.g., snacks, juice, fruits).

Step 2: Design a Survey Form

Create questions such as:

- “What activity would you like at the event?”
- “Which refreshment would you prefer?”
- “Do you have any food allergies?”

Include multiple-choice and short-answer questions.

Step 3: Distribute the Survey

Use tools like Google Forms or printed surveys to collect responses from all classes.

Step 4: Analyze the Responses

- Count how many students prefer each activity or food item. For example:
- 60 students chose "Sports Games"
- 45 students chose "Juice" as their refreshment
- Use a bar graph or pie chart to present the results.

Step 5: Make Event Decisions

Based on the data:

- Plan the most popular activities.
- Arrange refreshments that suit most students.

- Ensure that dietary needs or allergies are taken into account.

🌟 **Q6. Explain the role of tables and charts in data analysis. Provide an example.**

Role of Tables and Charts: Tables and charts are crucial tools in data analysis as they help in organizing, summarizing, and visualizing large sets of data for easy interpretation.

- Tables show data in rows and columns. They are ideal for displaying exact values and making comparisons.
- Charts (like bar graphs, line graphs, and pie charts) represent data visually, helping identify trends, patterns, and outliers.

Example: To analyze students' grades across subjects, we can use:

Table:

Students Name	Math	Science	English	History
Ali	85	90	78	88

Sara	92	87	80	90

Chart: A bar chart can visually compare the average scores of all students in each subject, making it easier to see which subject has the highest or lowest performance.

🌟 **Q7. Describe a situation where non-numeric data is essential. How would you collect, store, and analyze it?**

Situation: Imagine conducting a survey to understand students' opinions about the school cafeteria food. Responses like "Good," "Average," "Poor" are non-numeric (qualitative) data.

Collection:

Use tools like Google Forms or printed questionnaires with open-ended or multiple-choice questions.

Storage:

Store responses in spreadsheet software (Excel, Google Sheets).

Text responses can be organized in separate columns.

Analysis:

- Use qualitative analysis tools like NVivo or manual coding.
- Categorize responses into themes or sentiments (e.g., positive, negative).
- Use word clouds or bar charts to show how many students gave each type of response.

🌟 **Q8. Explain the concept of data visualization. How does it help in understanding complex data?**

Concept: Data visualization is the graphical representation of information and data using elements like charts, graphs, maps, and dashboards.

Purpose:

- Simplifies complex data
- Makes patterns and trends visible
- Aids in faster decision-making

🔹 **Examples of Visualizations:**

- **Bar Graph**: Comparing student performance in subjects
- **Line Graph**: Showing temperature changes over time
- **Pie Chart**: Representing percentages of students selecting different sports
- **Heat Map**: Showing areas in a city with high pollution

Real-Life Application:

- Businesses use dashboards to monitor sales trends
- Schools use charts to compare student attendance over semesters

🌟 **Q9. Discuss the importance and benefits of data visualization.**

Importance: Data visualization helps convert raw numbers into clear insights that are easier to understand and act upon.

Benefits:

- Quick Understanding: Simplifies large datasets into visual formats
- Better Decision-Making: Helps managers identify areas needing attention
- Spotting Patterns: Easily reveals trends, outliers, or correlations
- Effective Communication: Visuals are more engaging and persuasive than plain numbers

For Businesses and Decision-Makers:

- Helps track KPIs using dashboards
- Improves marketing strategies by understanding customer data
- Assists in financial forecasting and risk management

🌟 **Q10. Differentiate between nominal, ordinal, discrete, and continuous data with visualizations and examples.**

1. Nominal Data

Definition:

- Nominal data refers to categories or labels without any logical order or ranking.
- It is qualitative (non-numeric) in nature.

Characteristics:

- Cannot be ordered or ranked.
- Used for identification or classification.
- Each value represents a distinct category

🔹 **Examples**:

- Gender (Male, Female, Other)
- Eye color (Blue, Green, Brown)
- Types of pets (Cat, Dog, Bird)

Suitable Visualization:

- **Pie Chart** – To show the percentage of each category.
- **Bar Chart** – To compare the number of items in each category.

🔹 **Example Use:**

A pie chart showing the percentage of students

with different favorite subjects (Math, Science, English, etc.).

2. Ordinal Data

Definition:

Ordinal data refers to categories that can be ranked or ordered, but the differences between them are not measurable.

Characteristics:

- Order matters, but we can't measure the exact difference between values.
- Also qualitative, but with meaningful order.

🔹 **Examples**:

- Customer feedback (Poor, Fair, Good, Excellent)
- Education level (Primary, Secondary, Tertiary)
- Movie ratings (1 star to 5 stars)

Suitable Visualization:

- **Bar Chart** – To show the frequency of each rank.
- **Stacked Column Chart** – If comparing multiple

groups.

- **Example Use:**

A bar chart showing how many students rated the school cafeteria as Poor, Fair, Good, or Excellent.

3. Discrete Data

Definition:

- Discrete data consists of countable numerical values.
- It is quantitative, and values are separate or distinct (no fractions/decimals).

Characteristics:

- Countable whole numbers.
- Gaps exist between values.

- **Examples**:
  - Number of students in a class
  - Number of books in a library
  - Number of goals in a football match

Suitable Visualization:

- **Bar Chart** – To display countable values.
- **Column Chart** – For grouped data.

🔹 **Example Use:**

A bar chart showing how many students are enrolled in each section of Grade 9 (Section A – 30, Section B – 28, etc.)

4. Continuous Data

Definition:

Continuous data refers to measurable quantities that can take any value within a range, including decimals and fractions.

Characteristics:

- Can be measured but not counted.
- No gaps between values.

🔹 **Examples**:

- Student height (e.g., 150.5 cm)
- Temperature readings (e.g., 36.7°C)
- Time taken to complete a test

Suitable Visualization:

- Line Graph – To show change over time.
- Histogram – To show distribution of values.

🔹 **Example Use:**

A histogram showing the distribution of student heights in a class (140–145 cm, 145–150 cm, etc.).

Important Long Questions:

🌟 **Q1. What is data? Explain with the help of real-life examples.**

Definition of Data:

Data refers to raw facts and figures collected from observations, events, or experiences. These raw facts have no meaning on their own until they are organized or processed to form useful information.

Forms of Data:

Data can exist in different forms, such as:

- Numbers (e.g., 35°C, 90%)
- Words (e.g., “Satisfied”, “Red”)
- Images (e.g., photos from a camera)
- Sounds (e.g., voice recordings)
- Symbols (e.g., emojis 😊, $, #)

🔹 **Real-life Examples:**

1. Weather Data:

Information collected from weather stations such as temperature, humidity, rainfall.

🔹 **Example**: 30°C temperature and 60% humidity recorded at 12 PM.

2. Sales Data:

Number of products sold, their prices, and dates.

🔹 **Example**: 100 units of soap sold at Rs. 50 each on Monday.

3. Social Media Data:

Likes, comments, shares on a post.

🔹 **Example**: A video gets 500 likes, 70 comments,

and 100 shares.

4. Survey Data:

Responses collected from people regarding services or opinions.

- **Example**: 75% of students prefer online learning over physical classes.

5. Website Data:

Number of visitors, pages viewed, and time spent.

- **Example**: 1,000 users visited the home page of a school website in one day.

How Raw Data Becomes Useful:

When we organize, analyze, or summarize raw data, it becomes information that helps in making decisions.

- **Example**: If a company notices more sales on weekends, they can increase staff or stock on those days.

Summary:

So, data is the foundation of information. By

collecting and processing data, we can understand patterns, behaviors, and make better decisions.

🌟 **Q2. Why is understanding data important in today's world? Discuss with examples.**

Answer:

In today's digital and fast-paced world, understanding data is crucial for making informed decisions, solving problems, and creating new ideas or innovations.

Importance of Understanding Data:

1. Better Decision-Making:

- Data helps in making smart and logical choices rather than guessing.
- **Example**: A store owner can track which items sell most and restock accordingly.

2. Problem-Solving:

- By analyzing data, we can identify issues and fix them early.
- **Example**: If a student is scoring low in math,

performance data helps teachers to provide extra support.

3. Innovation and Improvement:

- Companies and institutions use data to create new products and services.
- **Example**: Mobile apps improve features based on user feedback data.

4. Prediction and Planning:

- Data helps to predict future trends and plan accordingly.
- **Example**: Weather data helps plan outdoor events or travel.

Examples from Different Fields:

- **Business**: Sales data shows which products are most profitable.
- **Technology**: Website data helps understand user behavior for improving design.
- **Environment**: Climate data helps track global warming.

- **Marketing**: Social media data shows customer preferences and trends.
- **Health**: Patient data helps doctors choose better treatments.

🌟 **Q3. What is Data Science? Explain with the help of a suitable example.**

Answer:

- **Data Science** is the study of collecting, analyzing, and interpreting data to solve problems and make better decisions. It is like being a detective who uses data instead of clues to find solutions.
- **Data science** helps us answer important questions by looking at facts, numbers, or records. For example, if we want to know why some students get higher marks in exams than others, data science can help. We can collect information about their study habits, sleeping hours, group study, and attendance. After analyzing this data, we might find that students who revise daily and study in groups score

better.

- **Data science** combines Computer Science (to store and manage data), Mathematics and Statistics (to analyze data and find patterns), and Business Knowledge (to apply results in real life). It turns raw data into useful insights—just like raw ingredients are turned into a delicious recipe.

🌟 **Q4. Why is understanding data science important in daily life? Explain with real-life examples.**

Answer:

Understanding data science is important in today's world because it helps us make better decisions, solve real-life problems, and improve performance in many areas of life.

Here are a few real-life examples:

Students: By analyzing their daily routines, students can find out the time of day when they are most focused. This helps them plan their study schedule

better and improve their grades.

Businesses: Companies use data science to understand what customers like. For example, if a business sees that a certain product is selling more, they can increase its production and improve it.

Doctors: Medical professionals use data to predict disease trends. By analyzing patient history and health records, doctors can suggest early treatments and save lives.

Sports Teams: Coaches analyze players' data like speed, accuracy, and stamina to plan better game strategies and boost team performance.

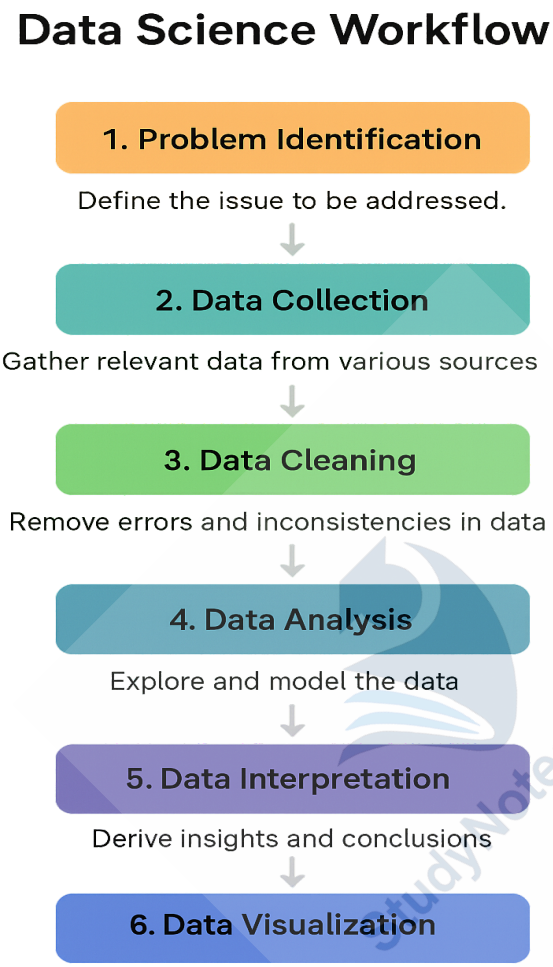
Thus, data science helps us understand what is happening, why it is happening, and what we can do about it—making our decisions smarter and more effective.

🌟 **Q5.Explain the steps of the Data Science Workflow with examples.**

Answer:

A Data Science Workflow is a step-by-step process

used by data scientists to turn raw data into useful information. It includes six main steps:



1. Problem Identification:

- This is the first step where the problem is clearly defined.
- **Example**: A school wants to find out why many students come late in the morning.

2. Data Collection:

- In this step, data is collected from various sources.
- **Example**: The school collects information about students' arrival times, weather conditions, transport method, and sleep timings.

3. Data Cleaning:

- The collected data often contains errors or missing values. In this step, such issues are fixed.
- **Example**: If some students forgot to fill the survey or wrote wrong time, those entries are corrected or removed.

4. Data Analysis:

- Here, the cleaned data is studied to find patterns or reasons behind the problem.
- **Example**: The school finds that most late arrivals happen on rainy days or when traffic is heavy.

5. Data Interpretation:

- The results from analysis are now understood and conclusions are made.
- **Example**: It is concluded that weather and traffic are the main reasons students come late.

6. Data Visualization:

- Data is shown in charts, graphs, or tables to make it easier to understand.
- **Example**: A bar chart is made showing how many students are late due to different reasons like weather, transport, or sleep.

💡 **Summary**:

These six steps—Problem Identification, Data Collection, Data Cleaning, Data Analysis, Data Interpretation, and Data Visualization—help in solving real-life problems using data. In the example above, the school can now decide to start classes a bit later on rainy days or provide better transport solutions.

Note:

This chapter is designed to provide a solid foundation of knowledge, with the goal of deepening understanding and encouraging further exploration of the subject. The content has been carefully selected to support effective learning and inspire students to engage with the topic more deeply.

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Purpose: To contribute to education by offering insightful, valuable content that enhances learning and understanding.

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