CUET UG Information Practices Sample Paper - 16

Duration: 1 Hour **Maximum Marks: 250**

Instructions

- This paper contains a total of 50 Multiple Choice Questions.
- Each correct answer carries **+5 marks**.
- Each incorrect answer carries **-1 mark**.
- No negative marking for unattempted questions.

Q1. Consider a DataFrame `df` with 100 rows and 5 columns. A user performs the operation: `df.iloc[20:50:5, 1:4:2].size`. What will be the final integer output?

(A) 12

(B) 18

(C) 15

(D) 30

Q2. In SQL, what will be the result of the following expression?

```
SELECT ROUND(MOD(15, 4) * POWER(2, 3), -1) FROM DUAL;
```

(A) 20

(B) 24

(C) 30

(D) 10

Q3. Match the following Relational Algebra operations with their core purposes:

List I (Operation)	List II (Purpose)
(P) Selection (σ)	(i) Vertical subset of a relation
(Q) Projection (π)	(ii) Combines rows from two tables
(R) Cartesian Product ($\times$)	(iii) Horizontal subset based on condition
(S) Join ($\bowtie$)	(iv) All possible pairs of rows

(A) P-(iii), Q-(i), R-(iv), S-(ii)

(B) P-(i), Q-(iii), R-(ii), S-(iv)

(C) P-(iii), Q-(ii), R-(iv), S-(i)

(D) P-(iv), Q-(i), R-(iii), S-(ii)

Q4. A DataFrame `sales_df` has a column 'Amount'. Which of the following code snippets correctly calculates the percentage of missing values in that specific column?

(A) `sales_df['Amount'].isnull().sum() / sales_df['Amount'].count() * 100`

(B) `sales_df['Amount'].isna().sum() / len(sales_df) * 100`

(C) `sales_df['Amount'].count() / sales_df['Amount'].size * 100`

(D) `sales_df['Amount'].dropna().size / 100`

Q5. Observe the following Matplotlib code:

```
plt.pie([25, 35, 40], labels=['X', 'Y', 'Z'], explode=[0.05, 0, 0], autopct='%1.2f%%')
```

What does the value `0.05` in the `explode` parameter represent?

(A) The percentage of the radius by which the first slice is moved outwards.

(B) The width of the boundary line for the first slice.

(C) the fraction of the radius by which the 'X' slice is offset from the center.

(D) The transparency level of the first slice.

Q6. Which SQL function is used to find the starting position of the string 'Data' within 'BigDataAnalysis' starting from the 5th character?

(A) `INSTR('BigDataAnalysis', 'Data')`

(B) `SUBSTR('BigDataAnalysis', 5, 4)`

(C) `INSTR('BigDataAnalysis', 'Data', 5)`

(D) `LOCATE('Data', 'BigDataAnalysis', 5)`

Q7. Identify the correct SQL query to display the total sales for each region where the total sales exceed ₹ 50000, excluding the 'West' region, and sorted by total sales in descending order.

(A)
```
SELECT Region, SUM(Sales) FROM Shop WHERE Region<>'West' GROUP
BY Region HAVING SUM(Sales)>50000 ORDER BY 2 DESC;
```

(B)
```
SELECT Region, SUM(Sales) FROM Shop GROUP BY Region HAVING
SUM(Sales)>50000 AND Region<>'West' ORDER BY SUM(Sales);
```

(C)
```
SELECT Region, SUM(Sales) FROM Shop WHERE SUM(Sales)>50000
GROUP BY Region HAVING Region<>'West' ORDER BY Sales DESC;
```

(D)
```
SELECT Region, SUM(Sales) FROM Shop WHERE Region='West' GROUP
BY Region HAVING SUM(Sales)>50000 ORDER BY SUM(Sales) DESC;
```

Q8. Which property of a Pandas Series `S` returns the data in a format that is not a Series but a sequence of values without the index labels?

(A) `S.index`

(B) `S.values`

(C) `S.ndim`

(D) `S.shape`

Q9. A network engineer needs to connect two different networks that use different communication protocols. Which device is best suited for this task?

(A) Bridge

(B) Switch

(C) Gateway

(D) Repeater

Q10. What will be the output of the following SQL query?

```
SELECT SUBSTR(TRIM(' Informatics '), 3, 5);
```

(A) `form`

(B) `forma`

(C) `ormat`

(D) `orma`

Q11. In Matplotlib, if you provide a list to the `bins` parameter like `plt.hist(data, bins=[0, 10, 25, 50])`, what kind of histogram is created?

(A) A histogram with 4 equal-width bins.

(B) A histogram with unequal bin widths.

(C) A histogram with a fixed range from 0 to 50 only.

(D) A cumulative histogram.

Q12. Match the following Pandas DataFrame methods with their descriptions:

List I (Method)	**List II (Description)**
(i) `df.info()`	(a) Displays statistical summary of numeric columns
(ii) `df.describe()`	(b) Removes rows with any NaN values
(iii) `df.dropna()`	(c) Transposes rows and columns
(iv) `df.T`	(d) Provides metadata, null counts, and memory usage

(A) (i)-d, (ii)-a, (iii)-b, (iv)-c

(B) (i)-a, (ii)-d, (iii)-c, (iv)-b

(C) (i)-d, (ii)-b, (iii)-a, (iv)-c

(D) (i)-b, (ii)-a, (iii)-d, (iv)-c

Q13. Which of the following is an example of an 'Active' Digital Footprint?

(A) A website tracking your IP address without your knowledge.

(B) Posting a comment on a public social media forum.

(C) Cookies stored by a browser to remember your login.

(D) Server logs recording the time you spent on a page.

Q14. What is the correct way to select all rows from a DataFrame `df` where the value in column 'Score' is between 70 and 90 (both inclusive)?

(A) `df[df['Score'] >= 70 & df['Score'] <= 90]`

(B) `df[(df['Score'] >= 70) & (df['Score'] <= 90)]`

(C) `df.loc[70:90, 'Score']`

(D) `df.query('Score between 70 and 90')`

Q15. In SQL, which of the following ensures 'Referential Integrity' between two tables?

(A) Primary Key

(B) Unique Constraint

(C) Foreign Key

(D) Check Constraint

Q16. What is the output of the following Pandas code?

```
import pandas as pd
S = pd.Series([1, 2, 3], index=['X', 'Y', 'Z'])
print(S.loc['X':'Y'].values + S.iloc[0:2].values)
```

(A) `[2, 4]`

(B) `[2, 4, 6]`

(C) `NaN`

(D) `Error`

Q17. Which SQL command is used to fetch the last 4 characters from the 'ProductID' column?

(A) `SELECT RIGHT(ProductID, 4) FROM Inventory;`

(B) `SELECT SUBSTR(ProductID, -4) FROM Inventory;`

(C) `SELECT MID(ProductID, LENGTH(ProductID)-3) FROM Inventory;`

(D) `All of the above`

Q18. In networking, which protocol is responsible for assigning a dynamic IP address to a device when it connects to a network?

(A) DNS

(B) DHCP

(C) SMTP

(D) ARP

Q19. Consider the DataFrame `df`:

	A	B
0	10	NaN
1	20	50

What is the result of `df.fillna(method='ffill', axis=1)`?

(A) Column B row 0 becomes 10.

(B) Column B row 0 remains NaN.

(C) Column A row 1 becomes 50.

(D) Row 1 is deleted.

Q20. Which of the following is NOT a type of Cybercrime?

(A) Ransomware attack

(B) Cyberstalking

(C) Software Piracy

(D) Using Open Source Software

Q21. What is the SQL output of `SELECT DAYOFMONTH('2023-12-25'), MONTHNAME('2023-`

(A) `25, December`

(B) `Monday, 12`

(C) `25, 12`

(D) `December, 25`

Q22. Which Matplotlib function is used to add a text label to the data points in a bar chart to show their exact values?

(A) `plt.label()`

(B) `plt.annotate()`

(C) `plt.legend()`

(D) `plt.text()`

Q23. A DataFrame `df` has columns 'Name', 'Age', 'Salary'. Which command will return the average salary of employees older than 30?

(A) `df[df['Age'] > 30]['Salary'].mean()`

(B) `df['Salary'].mean(where=df['Age']>30)`

(C) `df.groupby('Age').mean()['Salary']`

(D) `df.loc[df['Age']>30, 'Salary'].sum() / len(df)`

Q24. Identify the correct SQL query to combine the 'FirstName' and 'LastName' with a space in between and rename the result as 'Full_Name'.

(A) `SELECT CONCAT(FirstName, LastName) AS Full_Name FROM Users;`

(B) `SELECT FirstName + ' ' + LastName AS Full_Name FROM Users;`

(C) `SELECT CONCAT(FirstName, ' ', LastName) AS Full_Name FROM Users;`

(D) `SELECT FirstName || LastName AS Full_Name FROM Users;`

Q25. Which topology is most expensive to implement in a large network because of the high number of cables required?

(A) Star

(B) Bus

(C) Mesh

(D) Ring

Q26. What is the output of the following code?

```
df = pd.DataFrame([[1, 2], [3, 4]], columns=['X', 'Y'])
df['Z'] = df['X'] + df['Y']
print(df.iloc[1, 2])
```

(A) 3

(B) 4

(C) 7

(D) 6

Q27. In SQL, which clause is used with `GROUP BY` to filter groups based on an aggregate condition?

(A) `WHERE`

(B) `ORDER BY`

(C) `HAVING`

(D) `DISTINCT`

Q28. What is the term for the process of converting unreadable ciphertext back into readable plaintext?

(A) Encryption

(B) Decryption

(C) Steganography

(D) Hashing

Q29. If `df.shape` returns `(5, 10)`, what does `df.ndim` return?

(A) 50

(B) 2

(C) 15

(D) 10

Q30. Which SQL aggregate function is used to find the number of unique entries in the 'Department' column?

(A) `COUNT(UNIQUE Department)`

(B) `COUNT(DISTINCT Department)`

(C) `SUM(DISTINCT Department)`

(D) `UNIQUECOUNT(Department)`

Q31. In Matplotlib, what is the default color of the bars in a bar chart if no color is specified?

(A) Blue

(B) Black

(C) Red

(D) Green

Q32. Which of the following Pandas methods is used to read data from a file where values are separated by a tab (`\t`)?

(A) `pd.read_csv(file, sep='\t')`

(B) `pd.read_table(file)`

(C) `pd.read_excel(file)`

(D) `Both (A) and (B)`

Q33. What is the purpose of the 'Primary Key' in a table?

(A) To allow null values in a column.

(B) To uniquely identify each record in a table.

(C) To link two tables together.

(D) To sort the data automatically.

Q34. Which SQL function would you use to get the current date only (without the time)?

(A) `NOW()`

(B) `SYSDATE()`

(C) `CURDATE()`

(D) `TIME()`

Q35. Which of the following is a violation of Intellectual Property Rights (IPR)?

(A) Plagiarism

(B) Patent infringement

(C) Copyright infringement

(D) All of the above

Q36. What does the `df.head(2)` command do?

(A) Returns the first two columns.

(B) Returns the first two rows.

(C) Returns the last two rows.

(D) Returns the summary of the first two rows.

Q37. In SQL, what is the output of `SELECT LENGTH('Informatic');`?

(A) 10

(B) 11

(C) 9

(D) 12

Q38. Which networking device operates at the Data Link Layer and uses MAC addresses to forward data?

(A) Hub

(B) Switch

(C) Router

(D) Gateway

Q39. How can you add a title to a Matplotlib plot?

(A) `plt.set_title("Title")`

(B) `plt.title("Title")`

(C) `plt.header("Title")`

(D) `plt.label("Title")`

Q40. Which of the following describes 'Phishing'?

(A) Stealing a physical computer.

(B) Sending fraudulent emails to obtain sensitive information.

(C) Spreading a virus via USB.

(D) Monitoring someone's internet activity.

Q41. What is the output of `pd.Series([10, 20], index=['A', 'B']) + pd.Series([5, 5], index=['B', 'C'])`?

(A) `A: 15, B: 25, C: 5`

(B) `A: NaN, B: 25, C: NaN`

(C) `B: 25`

(D) `Error`

Q42. Which SQL function is used to convert all letters in a string to uppercase?

(A) `UPPER()`

(B) `UCASE()`

(C) `CAPITAL()`

(D) `Both (A) and (B)`

Q43. In a Pie Chart, which parameter is used to show the numeric percentage on each slice?

(A) `autopct`

(B) `percentage`

(C) `values`

(D) `labels`

Q44. Which Pandas method is used to sort a DataFrame based on the values of a specific column?

(A) `df.sort()`

(B) `df.sort_index()`

(C) `df.sort_values()`

(D) `df.arrange()`

Q45. In SQL, what will `SELECT ROUND(78.926, 2);` return?

(A) 78.92

(B) 78.93

(C) 79.00

(D) 78.9

Q46. What does the 'S' in FOSS stand for?

(A) System

(B) Software

(C) Source

(D) Security

Q47. Which transmission medium uses light pulses to transmit data?

(A) Coaxial Cable

(B) Twisted Pair

(C) Optical Fiber

(D) Microwave

Q48. What is the correct SQL syntax to delete a row where 'ID' is 101?

(A) `REMOVE FROM Table WHERE ID=101;`

(B) `DELETE FROM Table WHERE ID=101;`

(C) `DROP FROM Table WHERE ID=101;`

(D) `DELETE ID=101 FROM Table;`

Q49. What does `df.columns` return?

(A) A list of all values in the DataFrame.

(B) The number of columns.

(C) An Index object containing the column labels.

(D) The data types of the columns.

Q50. Which SQL function returns the remainder of a division?

(A) `REMAINDER()`

(B) `DIV()`

(C) `MOD()`

(D) `PERCENT()`

Detailed Solutions

Q1.

Solution

Concept:

The `.iloc` indexer in Pandas is used for integer-location based indexing. It follows the syntax `df.iloc[row_start:row_stop:row_step, col_start:col_stop:col_step]`. The `.size` attribute of a DataFrame or a sliced subset returns the total number of elements, which is calculated as `number of rows` × `number of columns`.

Solution:

1. **Row Slicing:** The row slice is `20:50:5`. This means starting from index 20, up to (but excluding) 50, with a step of 5. The indices selected are 20, 25, 30, 35, 40, and 45. - Total rows = 6. 2. **Column Slicing:** The column slice is `1:4:2`. This means starting from index 1, up to (but excluding) 4, with a step of 2. The indices selected are 1 and 3. - Total columns = 2. 3. **Calculation:** The `.size` attribute calculates the total elements in this 6×2 subset. - 6×2 = 12.

Final Answer: The total size is 12.

Answer: (A)

Q2.

Solution

Concept:

This query involves nested SQL functions: `MOD()`, `POWER()`, and `ROUND()`. - `MOD(n, m)` returns the remainder of n divided by m. - `POWER(a, b)` returns a raised to the power of b. - `ROUND(n, -1)` rounds the number to the nearest tens place.

Solution:

1. **Step 1: MOD(15, 4)** 15 ÷ 4 = 3 with a remainder of 3. So, `MOD(15, 4) = 3`. 2. **Step 2: POWER(2, 3)** $2^3 = 2 \times 2 \times 2 = 8$. 3. **Step 3: Multiplication** The expression becomes $3 \times 8 = 24$. 4. **Step 4: ROUND(24, -1)** Rounding 24 to the nearest tens place: since the units digit is 4 (less than 5), we round down. - Result = 20.

Final Answer: The output is 20.

Answer: (A)

Q3.

Solution

Concept:

Relational Algebra is the theoretical foundation of SQL. - **Selection (σ):** Filters rows (tuples) based on a condition (horizontal subset). - **Projection (π):** Selects specific columns (attributes) from a table (vertical subset). - **Cartesian Product ($\times$):** Pairs every row of one table with every row of another. - **Join ($\bowtie$):** Combines related rows from two tables based on a common attribute.

Solution:

1. (P) Selection matches (iii) - Horizontal subset based on condition. 2. (Q) Projection matches (i) - Vertical subset of a relation. 3. (R) Cartesian Product matches (iv) - All possible pairs of rows. 4. (S) Join matches (ii) - Combines rows from two tables. Comparing this with the options, Option (A) provides the correct mapping.

Final Answer: P-(iii), Q-(i), R-(iv), S-(ii)

Answer: (A)

Q4.

Solution

Concept:

In Pandas: - `isnull()` or `isna()` identifies missing (NaN) values. - `sum()` applied to the boolean result of `isnull()` gives the count of missing values. - `len(df)` or `df.shape[0]` gives the total number of rows (including NaNs). - `count()` returns the number of non-null values.

Solution:

1. To find the percentage of missing values, we need: - (Number of Missing Values) / (Total Number of Rows) $\times$ 100. 2. `sales_df['Amount'].isna().sum()` correctly counts the NaNs. 3. `len(sales_df)` provides the total count of potential entries. 4. Multiplying by 100 converts the ratio to a percentage. 5. Option (B) follows this logic perfectly. Option (A) is incorrect because `count()` excludes NaNs, leading to an incorrect ratio.

Final Answer: The correct snippet is Option (B).

Answer: (B)

Q5.

Solution

Concept:

In Matplotlib's `plt.pie()` function, the `explode` parameter is used to "pull" specific slices away from the center of the pie chart for emphasis. It takes a list of values, where each value corresponds to a slice.

Solution:

1. The `explode` list is `[0.05, 0, 0]`. This means only the first slice ('X') will be moved. 2. The numerical value represents the fraction/distance of the radius by which that specific wedge is offset from the center. 3. 0.05 means the wedge 'X' is moved out by 5% of the radius. 4. Therefore, it represents the offset distance from the center.

Final Answer: It is the fraction of the radius by which the 'X' slice is offset.

Answer: (C)

Q6.

Solution

Concept:

The `INSTR()` function in SQL is used to find the position of a substring within a string. The syntax is `INSTR(string, substring, [start_position])`. - `string`: The main string to search in. - `substring`: The text you are looking for. - `start_position`: (Optional) The character index where the search begins.

Solution:

1. We need to find the substring 'Data' within 'BigDataAnalysis'. 2. The search must start from the 5th character. 3. In SQL, string indexing typically starts at 1. The word 'BigDataAnalysis' has 'B' at 1, 'i' at 2, 'g' at 3, 'D' at 4, and 'a' at 5. 4. If we start searching from index 5, the function will look for 'Data' in 'aDataAnalysis'. 5. The first 'Data' starts at index 4 in the original string, but since we start at index 5, it will skip the 'D' at index 4 and look for the next occurrence or return the position relative to the start of the original string if found. 6. The correct syntax for this specific requirement (specifying a start position) is `INSTR('BigDataAnalysis', 'Data', 5)`.

Final Answer: The correct function is `INSTR('BigDataAnalysis', 'Data', 5)`.

Answer: (C)

Q7.

Solution

Concept:

When writing complex SQL queries involving filtering and grouping, the order of execution is crucial: 1. `FROM` (Identify the table) 2. `WHERE` (Filter individual rows before grouping) 3. `GROUP BY` (Create groups) 4. `HAVING` (Filter groups based on aggregate results) 5. `SELECT` (Pick columns) 6. `ORDER BY` (Sort the final output)

Solution:

1. **Filtering the Region:** We need to exclude 'West'. This should be done using `WHERE Region <> 'West'` or `WHERE Region != 'West'` because it is a condition on individual rows. 2. **Grouping:** We must group by `Region` to calculate the total sales per region. 3. **Filtering Groups:** We need total sales > 50000. Since `SUM(Sales)` is an aggregate, this condition must go in the `HAVING` clause. 4. **Sorting:** The requirement is to sort by total sales in descending order. This is handled by `ORDER BY 2 DESC` (referring to the second column in the select list) or `ORDER BY SUM(Sales) DESC`. 5. **Evaluating Option A:** `SELECT Region, SUM(Sales) FROM Shop WHERE Region<>'West' GROUP BY Region HAVING SUM(Sales)>50000 ORDER BY 2 DESC;` matches all logic.

Final Answer: Option (A) is the correct query.

Answer: (A)

Q8.

Solution

Concept:

A Pandas Series consists of two main components: the index labels and the actual data values. Different attributes provide access to different metadata of the Series.

Solution:

1. `S.index`: Returns the index (labels) of the Series. 2. `S.values`: Returns the underlying data of the Series as a NumPy ndarray. This contains only the values, stripped of the Pandas-specific index labels. 3. `S.ndim`: Returns the number of dimensions (which is 1 for a Series). 4. `S.shape`: Returns a tuple representing the dimensions (e.g., `(5,)`). 5. Since the question asks for the data in a format that is a sequence of values without labels, `.values` is the correct attribute.

Final Answer: The property is `S.values`.

Answer: (B)

Q9.

Solution

Concept:

Networking devices have specific roles based on the OSI layer they operate in: - **Repeaters/Hubs:** Physical Layer (Layer 1); deal with signals/bits. - **Bridges/Switches:** Data Link Layer (Layer 2); deal with MAC addresses. - **Routers:** Network Layer (Layer 3); deal with IP addresses. - **Gateways:** All Layers; used to connect networks with completely different protocols (e.g., connecting a LAN to the Internet or a proprietary network).

Solution:

1. A Switch or Bridge connects segments of the same network type. 2. A Router connects different networks but usually those using the same suite of protocols (like TCP/IP). 3. A **Gateway** acts as a ”converter” or ”protocol translator.” It is specifically designed to allow communication between networks that use different architectures and protocols. 4. Therefore, for connecting two networks with different communication protocols, a Gateway is the best choice.

Final Answer: The device is Gateway.

Answer: (C)

Q10.

Solution

Concept:

This involves two SQL functions: `TRIM()` and `SUBSTR()`. - `TRIM(string)`: Removes leading and trailing spaces. - `SUBSTR(string, start, length)`: Extracts a substring starting at the `start` index for the specified `length`.

Solution:

1. **Inner Function - TRIM(’ Informatics ’):** The leading and trailing spaces are removed. The result is the string `'Informatics'`. 2. **Outer Function - SUBSTR(’Informatics’, 3, 5):** - The string is `'Informatics'`. - Index 1: I, Index 2: n, Index 3: f, Index 4: o, Index 5: r, Index 6: m, Index 7: a... - Starting at index 3 (the letter ’f’). - Extracting 5 characters: ’f’, ’o’, ’r’, ’m’, ’a’. 3. The resulting string is `'forma'`.

Final Answer: The output is ’forma’.

Answer: (B)

Q11.

Solution

Concept:

In Matplotlib, a histogram is used to represent the distribution of numerical data. The `bins` parameter defines the intervals into which the data is grouped. If `bins` is an integer, it creates equal-width intervals. If `bins` is a list, it defines the specific edges of each bin.

Solution:

1. The provided list is `[0, 10, 25, 50]`. 2. This defines three distinct bins: - Bin 1: $[0, 10)$ (Width = 10) - Bin 2: $[10, 25)$ (Width = 15) - Bin 3: $[25, 50]$ (Width = 25) 3. Since the differences between the edges are not the same (10, 15, and 25), the bins have different widths. 4. This results in a histogram with unequal bin widths, often used when data density varies significantly across ranges.

Final Answer: A histogram with unequal bin widths.

Answer: (B)

Q12.

Solution

Concept:

Pandas provides several methods to inspect and manipulate the structure and content of a DataFrame. - `info()`: Summarizes the DataFrame, including the number of non-null entries and memory usage. - `describe()`: Generates descriptive statistics (mean, std, min, max, etc.). - `dropna()`: Handles missing data by removing axis labels with null values. - `T`: The transpose attribute, which flips the DataFrame over its main diagonal.

Solution:

1. (i) `df.info()` $\rightarrow$ (d) Metadata, null counts, and memory. 2. (ii) `df.describe()` $\rightarrow$ (a) Statistical summary of numeric columns. 3. (iii) `df.dropna()` $\rightarrow$ (b) Removes rows with any NaN values. 4. (iv) `df.T` $\rightarrow$ (c) Transposes rows and columns. 5. Matching these pairs leads to the sequence (i)-d, (ii)-a, (iii)-b, (iv)-c.

Final Answer: Option (A) is the correct match.

Answer: (A)

Q13.

Solution

Concept:

A Digital Footprint is the trail of data you leave behind while using the internet. - **Active Digital Footprint:** Created when a user deliberately shares information (e.g., social media posts, emails). - **Passive Digital Footprint:** Created when data is collected about a user without their active participation or direct knowledge (e.g., IP logging, browsing history).

Solution:

1. Website tracking IP (Option A), Cookies (Option C), and Server logs (Option D) are all collected automatically in the background, making them **Passive**. 2. Posting a comment (Option B) requires the user to intentionally type and submit data to a public platform. 3. Therefore, social media activity is a classic example of an **Active** Digital Footprint.

Final Answer: Posting a comment on a public social media forum.

Answer: (B)

Q14.

Solution

Concept:

Filtering DataFrames in Pandas requires boolean indexing. To combine multiple conditions, you must use bitwise operators like `&` (AND) or `|` (OR). Each individual condition must be enclosed in parentheses to ensure correct operator precedence.

Solution:

1. The requirement is: `Score >= 70` AND `Score <= 90`. 2. **Option A:** `df[df['Score'] >= 70 & df['Score'] <= 90]` fails because without parentheses, Python tries to evaluate `70 & df['Score']`, which causes an error. 3. **Option B:** `df[(df['Score'] >= 70) & (df['Score'] <= 90)]` correctly wraps both conditions in parentheses and uses the bitwise `&`. 4. **Option C:** `df.loc[70:90]` treats 70 and 90 as index labels, not as values within the 'Score' column. 5. **Option D:** `df.query()` is a valid method, but the syntax in the option is slightly off for standard Python evaluation compared to Option B.

Final Answer: Option (B) is the syntactically correct and standard way.

Answer: (B)

Q15.

Solution

Concept:

Integrity constraints ensure the accuracy and consistency of data in a relational database. - **Primary Key:** Ensures unique identification of rows. - **Unique:** Ensures no duplicate values in a column. - **Foreign Key:** A field in one table that refers to the Primary Key in another table. - **Check:** Ensures values in a column meet a specific condition.

Solution:

1. **Referential Integrity** refers to the relationship between tables. 2. It ensures that a value in a "child" table must exist in the "parent" table. 3. This relationship is strictly enforced by the **Foreign Key** constraint. 4. If you try to delete a record in the parent table that is still referenced in the child table, the Foreign Key constraint will block the action to maintain integrity.

Final Answer: Foreign Key.

Answer: (C)

Q16.

Solution

Concept:

Pandas supports element-wise addition between Series or arrays. - `loc` is label-based indexing (inclusive of the end label). - `iloc` is integer-based indexing (exclusive of the end index). - The `.values` attribute extracts the data as a NumPy array. When two NumPy arrays of the same shape are added, they perform addition based on their position (index 0 + index 0, etc.).

Solution:

1. **Slice 1:** `S.loc['X':'Y']` includes labels 'X' and 'Y'. The values are `[1, 2]`. 2. **Slice 2:** `S.iloc[0:2]` includes integer positions 0 and 1 (2 is excluded). The values are `[1, 2]`. 3. **Extraction:** Using `.values` on both results gives us two NumPy arrays: `array([1, 2])` and `array([1, 2])`. 4. **Addition:** `[1, 2] + [1, 2]` results in `[1+1, 2+2]`, which is `[2, 4]`. 5. Note: If we added the Series directly without `.values`, Pandas would align by labels. Since the labels match, the result would be the same but as a Series. Using `.values` returns the array `[2, 4]`.

Final Answer: The output is `[2, 4]`.

Answer: (A)

Q17.

Solution

Concept:

Extracting a specific number of characters from the end of a string is a common requirement in SQL. Different database dialects (MySQL, SQL Server, etc.) use different functions, but most standard SQL environments support several ways to achieve this.

Solution:

1. **Option A:** `RIGHT(ProductID, 4)` is a standard function that directly returns the specified number of characters from the right side of the string. 2. **Option B:** `SUBSTR(ProductID, -4)` uses a negative index. In many SQL engines (like MySQL), a negative start position means "start counting from the end of the string." 3. **Option C:** `MID(ProductID, LENGTH(ProductID)-3)` calculates the starting position manually. For example, if length is 10, $10 - 3 = 7$. Starting at 7 and going to the end gives characters 7, 8, 9, and 10 (total 4 characters). 4. Since all three methods effectively retrieve the last 4 characters, Option (D) is correct.

Final Answer: All of the above.

Answer: (D)

Q18.

Solution

Concept:

IP addresses can be assigned statically (manually) or dynamically. - **DNS (Domain Name System):** Translates domain names (google.com) to IP addresses. - **DHCP (Dynamic Host Configuration Protocol):** Automatically assigns IP addresses and other communication parameters to devices. - **SMTP:** Used for sending emails. - **ARP:** Maps IP addresses to physical MAC addresses.

Solution:

1. When you connect your phone to a Wi-Fi network, you don't manually type an IP address. 2. The router runs a **DHCP** server. 3. The device sends a request, and the DHCP server "leases" an available IP address from its pool to that device for a specific duration. 4. This ensures there are no IP conflicts on the network.

Final Answer: DHCP.

Answer: (B)

Q19.

Solution

Concept:

The `fillna()` method is used to replace NaN (Not a Number) values. - `method='ffill'` (forward fill) propagates the last valid observation forward. - `axis=1` refers to columns (horizontal filling), while `axis=0` refers to rows (vertical filling).

Solution:

1. Look at Row 0: Column A has `10`, Column B has `NaN`. 2. We are filling along `axis=1` (across columns). 3. The `ffill` logic looks at the previous value in the same row. 4. For Row 0, Column B (`NaN`), the "previous" value in that row is Column A (`10`). 5. Therefore, the `NaN` in Column B is replaced by the value `10` from Column A.

Final Answer: Column B row 0 becomes 10.

Answer: (A)

Q20.

Solution

Concept:

Cybercrime refers to illegal activities carried out using computers or the internet. - **Ransomware:** Malicious software that encrypts data and demands payment. - **Cyberstalking:** Using the internet to harass or threaten an individual. - **Software Piracy:** Unauthorized copying or distribution of copyrighted software. - **Open Source Software (OSS):** Software with source code that anyone can inspect, modify, and enhance.

Solution:

1. Ransomware, Cyberstalking, and Piracy are all illegal acts punishable by law (e.g., the IT Act in India). 2. Using **Open Source Software** (like Linux, Python, or VLC) is a perfectly legal and encouraged practice in the tech community. It promotes collaboration and transparency. 3. Therefore, it is not a cybercrime.

Final Answer: Using Open Source Software.

Answer: (D)

Q21.

Solution

Concept:

SQL Date functions extract specific components from a date string or object. - `DAYOFMONTH(date)`: Returns the day of the month as a number (1-31). - `MONTHNAME(date)`: Returns the full name of the month (January, February, etc.).

Solution:

1. The input date is `'2023-12-25'`. 2. **Part 1:** `DAYOFMONTH('2023-12-25')` looks at the day part of the ISO date format (YYYY-MM-DD). The day is 25. 3. **Part 2:** `MONTHNAME('2023-12-25')` looks at the month part, which is 12. The 12th month of the year is December. 4. Combining the two results: `25, December`.

Final Answer: The output is 25, December.

Answer: (A)

Q22.

Solution

Concept:

While Matplotlib has several ways to add text, specific functions are used for labeling data points in charts like bar charts or scatter plots. - `plt.text(x, y, string)`: Places text at a specific coordinate on the plot. - `plt.annotate()`: More advanced, allows adding text with arrows pointing to data points. - For a bar chart, to show exact values above bars, developers usually loop through the bars and use `plt.text()` or `plt.annotate()` at the height of each bar.

Solution:

1. `plt.label()` is not a standard Matplotlib function (functions are usually `xlabel` or `ylabel`). 2. `plt.legend()` describes the data series but doesn't label individual points. 3. `plt.text()` is the fundamental function used to place any string (like the bar's value) at a specific (x, y) location on the chart. 4. Therefore, to show exact values, `plt.text()` is the most appropriate tool among the choices.

Final Answer: The function is `plt.text()`.

Answer: (D)

Q23.

Solution

Concept:

Pandas allows for filtering data based on conditions and then applying aggregate functions (like `mean()`, `sum()`, `count()`) to the result. - `df[condition]`: Filters the rows. - `['Column']`: Selects the specific column to operate on. - `.mean()`: Calculates the average.

Solution:

1. **Step 1: Filtering.** We need rows where `Age > 30`. The syntax is `df[df['Age'] > 30]`. 2. **Step 2: Column Selection.** From this filtered data, we only care about the 'Salary' column. So we append `['Salary']`. 3. **Step 3: Aggregation.** We apply `.mean()` to the resulting Series. 4. Putting it together: `df[df['Age'] > 30]['Salary'].mean()`. 5. Option (A) matches this logic perfectly.

Final Answer: Option (A) is the correct command.

Answer: (A)

Q24.

Solution

Concept:

In SQL (specifically MySQL), the `CONCAT()` function is used to join two or more strings into one. To include spaces or special characters, they must be included as separate arguments within the function.

Solution:

1. `CONCAT(FirstName, LastName)` would join them directly (e.g., 'AmitSharma'). 2. To add a space, we must provide three arguments: the first name, a space string `' '`, and the last name. 3. Syntax: `CONCAT(FirstName, ' ', LastName)`. 4. To rename the output column, the `AS` keyword is used. 5. Option (C) follows the standard SQL syntax for this operation.

Final Answer: `SELECT CONCAT(FirstName, ' ', LastName) AS Full_Name FROM Users;`

Answer: (C)

Q25.

Solution

Concept:

Network topologies define how devices are connected. - **Bus:** Single cable; cheap but unreliable if the cable fails. - **Star:** Central hub; moderate cost. - **Mesh:** Every device is connected to every other device.

Solution:

1. In a Full Mesh topology, the number of cables required is given by the formula $n(n-1)/2$, where n is the number of devices. 2. For 10 devices, you need 45 cables. For 100 devices, you need nearly 5,000 cables. 3. This exponential growth in cabling and ports makes Mesh the most expensive and difficult to scale physically in large networks, despite its high redundancy.

Final Answer: Mesh topology.

Answer: (C)

Q26.

Solution

Concept:

When a new column is created in a Pandas DataFrame by adding two existing columns, Pandas performs element-wise addition based on the index. - `iloc[row_index, col_index]` uses 0-based integer positions to access specific data.

Solution:

1. **Initial DataFrame:** Rows: 0, 1 | Columns: X, Y - Row 0: X=1, Y=2 - Row 1: X=3, Y=4 2. **Column Creation:** `df['Z'] = df['X'] + df['Y']` - Row 0: Z = 1 + 2 = 3 - Row 1: Z = 3 + 4 = 7 3. **Modified DataFrame Structure:** Columns are now X (index 0), Y (index 1), and Z (index 2). 4. **Accessing Data:** `df.iloc[1, 2]` - Row index 1 is the second row. - Column index 2 is the third column (Column 'Z'). - The value at Row 1, Column Z is 7.

Final Answer: The output is 7.

Answer: (C)

Q27.

Solution

Concept:

In SQL, filtering data can happen at two stages: before grouping and after grouping. - `WHERE` filters individual rows (raw data). - `HAVING` filters groups based on aggregate results (like `SUM`, `AVG`, `COUNT`).

Solution:

1. The `GROUP BY` clause collapses multiple rows into single summary rows. 2. If you want to filter these summary rows (for example, "show only departments where the average salary is above 5000"), you cannot use `WHERE` because `WHERE` does not know about the averages calculated during grouping. 3. The `HAVING` clause was specifically designed to be used with `GROUP BY` to apply conditions to the aggregated values.

Final Answer: The clause is `HAVING`.

Answer: (C)

Q28.

Solution

Concept:

Cryptography involves two main processes to keep data secure during transmission: 1. **Encryption:** Converting human-readable "Plaintext" into scrambled "Ciphertext" using an algorithm and a key. 2. **Decryption:** The reverse process of converting "Ciphertext" back into "Plaintext".

Solution:

1. When a user receives an encrypted message, it looks like gibberish (ciphertext). 2. To read the message, the system applies a decryption key. 3. This process restores the original information so it can be understood by the recipient. 4. Hashing is a one-way process (cannot be reversed), and Steganography is hiding data within other data (like an image). Therefore, Decryption is the correct term.

Final Answer: Decryption.

Answer: (B)

Q29.

Solution

Concept:

Pandas DataFrame attributes provide specific information about the data structure: - `shape`: Returns a tuple `(rows, columns)`. - `size`: Returns total elements (`rows × columns`). - `ndim`: Returns the number of dimensions of the object.

Solution:

1. A Series is a 1-dimensional array, so its `ndim` is 1. 2. A DataFrame is a 2-dimensional tabular structure (rows and columns), so its `ndim` is always 2. 3. Even if the shape is `(5, 10)`, `(1, 1)`, or `(100, 500)`, as long as it is a DataFrame, it exists in a 2D space. 4. Thus, `df.ndim` will return 2.

Final Answer: The value is 2.

Answer: (B)

Q30.

Solution

Concept:

To count values in SQL, we use the `COUNT()` function. By default, `COUNT(column)` includes duplicate values. To count only unique entries, we must use the `DISTINCT` keyword inside the parentheses.

Solution:

1. If a column 'Department' has values: ['IT', 'HR', 'IT', 'Sales'], `COUNT(Department)` would return 4. 2. To find out how many *different* departments exist, we use `COUNT(DISTINCT Department)`. 3. This evaluates to: ['IT', 'HR', 'Sales'], returning a count of 3. 4. Standard SQL syntax requires the keyword `DISTINCT` to precede the column name inside the function.

Final Answer: `COUNT(DISTINCT Department)`.

Answer: (B)

Q31.

Solution

Concept:

In Matplotlib, when creating a bar chart using `plt.bar(x, height)`, the library applies a set of default aesthetic parameters unless explicitly overridden by the user. These include the width of the bars, the alignment, and the color.

Solution:

1. The default color for bars in a standard Matplotlib bar plot is a specific shade of **Blue** (specifically, the first color in the default "category10" color cycle, often referred to as 'C0'). 2. While users can change this using the `color` parameter (e.g., `color='red'`), simply calling `plt.bar()` with only data will result in blue bars. 3. This is consistent across different versions of Matplotlib to maintain visual uniformity in quick data explorations.

Final Answer: The default color is Blue.

Answer: (A)

Q32.

Solution

Concept:

Pandas is highly flexible in reading various file formats. While CSV (Comma Separated Values) is the most common, data is often stored with different delimiters such as tabs, semicolons, or colons.

Solution:

1. **Option A:** `pd.read_csv()` is the primary function for reading delimited text files. Even though its name suggests "comma," the `sep` parameter allows you to specify any character. For a tab-separated file, `sep='\t'` is the standard argument. 2. **Option B:** `pd.read_table()` is a dedicated function in Pandas where the default delimiter is already set to a tab (`'\t'`). 3. Therefore, both methods are equally valid and will achieve the same result of loading a tab-separated file into a DataFrame.

Final Answer: Both (A) and (B) are correct.

Answer: (D)

Q33.

Solution

Concept:

A Primary Key is a fundamental concept in relational database management systems (RDBMS) used to maintain data integrity at the row level.

Solution:

1. **Unique Identification:** Every table needs a way to distinguish one row from another. For example, in a 'Students' table, two students might have the same name, but their 'RollNumber' (Primary Key) must be different. 2. **Constraints:** A Primary Key column cannot contain duplicate values and cannot contain NULL values. 3. **Relationships:** It also acts as the target for Foreign Keys in other tables to create relationships between data entities. 4. While it does help in searching and sometimes implicitly sorts data (depending on the engine), its primary and most essential purpose is the unique identification of records.

Final Answer: To uniquely identify each record in a table.

Answer: (B)

Q34.

Solution

Concept:

SQL provides several functions to work with date and time. It is important to distinguish between those that return the full timestamp and those that return only the date or time component.

Solution:

1. `NOW()`: Returns the current date and time (e.g., '2023-10-27 10:30:00'). 2. `SYSDATE()`: Similar to `NOW()`, it returns the current date and time at the moment the function executes. 3. `CURDATE()`: Specifically returns only the current date in 'YYYY-MM-DD' format, stripping away the hours, minutes, and seconds. 4. `TIME()`: This is usually used to extract the time part from a datetime expression, rather than fetching the current system date.

Final Answer: The function is `CURDATE()`.

Answer: (C)

Q35.

Solution

Concept:

Intellectual Property Rights (IPR) are legal rights that protect creations of the mind, such as inventions, literary and artistic works, designs, symbols, names, and images used in commerce. Violating these rights is both unethical and illegal.

Solution:

1. **Plagiarism:** Presenting someone else's work or ideas as your own without proper credit. 2. **Patent Infringement:** Using, making, or selling a patented invention without the permission of the patent holder. 3. **Copyright Infringement:** Using copyrighted material (like music, books, or software) without the authorization of the creator. 4. Since all these represent unauthorized use of protected intellectual property, they are all violations of IPR.

Final Answer: All of the above.

Answer: (D)

Q36.

Solution

Concept:

Pandas provides several methods to quickly inspect a DataFrame. The `head()` and `tail()` methods are the most commonly used for previewing data.

Solution:

1. **Syntax:** The method `df.head(n)` returns the first n rows of the DataFrame. 2. **Execution:** In the command `df.head(2)`, the argument is 2. This tells Pandas to fetch the rows at index 0 and index 1. 3. **Default Behavior:** If no argument is passed (i.e., `df.head()`), it defaults to returning the first 5 rows. 4. **Conclusion:** It does not return columns, nor does it return a summary (like `info()`). It specifically returns the top rows of the dataset.

Final Answer: Returns the first two rows.

Answer: (B)

Q37.

Solution

Concept:

The `LENGTH()` function in SQL is a string function used to count the number of characters present in a given string, including spaces and special characters.

Solution:

1. **Input String:** The string provided is `'Informatic'`. 2. **Character Count:** - 1: I, 2: n, 3: f, 4: o, 5: r, 6: m, 7: a, 8: t, 9: i, 10: c. 3. **Total:** There are exactly 10 characters in the string. 4. **Note:** If the string were `'Informatics'`, the result would be 11. However, based on the specific input provided in the question, the count is 10.

Final Answer: The length is 10.

Answer: (A)

Q38.

Solution

Concept:

Networking devices operate at different layers of the OSI model. - **Hubs** work at Layer 1 (Physical) and simply broadcast data. - **Switches** work at Layer 2 (Data Link) and are "intelligent" because they maintain a MAC address table. - **Routers** work at Layer 3 (Network) and use IP addresses.

Solution:

1. When a data frame arrives at a **Switch**, the switch looks at the destination MAC address. 2. It checks its internal table to see which port that MAC address is connected to. 3. Instead of broadcasting the data to everyone, it forwards it only to the specific intended recipient. 4. This reduction in traffic makes the network more efficient.

Final Answer: Switch.

Answer: (B)

Q39.

Solution

Concept:

In Matplotlib, adding labels and titles is part of the basic plotting workflow to make charts readable. While there are different methods for the object-oriented API and the Pyplot API, the Pyplot API is most commonly used in the CUET syllabus.

Solution:

1. **Option A:** `plt.set_title()` is used when working with subplots/axes objects (e.g., `ax.set_title()`). 2. **Option B:** `plt.title("String")` is the direct and standard Pyplot function to set the main title displayed at the top of the plot. 3. **Option C & D:** `header` is not a valid function, and `label` is used inside specific plot types (like `plt.plot(label='...')`) to define legend entries, not the chart title.

Final Answer: The correct function is `plt.title()`.

Answer: (B)

Q40.

Solution

Concept:

Phishing is a type of social engineering attack often used to steal user data, including login credentials and credit card numbers.

Solution:

1. **Method:** It occurs when an attacker, masquerading as a trusted entity (like a bank, a social media site, or a government agency), dupes a victim into opening an email, instant message, or text message. 2. **Goal:** The recipient is then tricked into clicking a malicious link, which can lead to the installation of malware or the revealing of sensitive information on a fake (spoofed) website. 3. **Contrast:** Physical theft (Option A) or monitoring activity (Spyware - Option D) are different categories of security threats.

Final Answer: Sending fraudulent emails to obtain sensitive information.

Answer: (B)

Q41.

Solution

Concept:

When adding two Pandas Series, the operation is performed based on index alignment. If an index label exists in one Series but not the other, the resulting value for that label will be `NaN` (Not a Number) because Pandas cannot add a number to a missing value.

Solution:

1. **Series 1:** Labels A, B with values 10, 20. 2. **Series 2:** Labels B, C with values 5, 5. 3. **Alignment Process:** - **Label A:** Exists in Series 1 (10) but missing in Series 2. Result: 10 + NaN = NaN. - **Label B:** Exists in both. Result: 20 + 5 = 25. - **Label C:** Missing in Series 1 but exists in Series 2 (5). Result: NaN + 5 = NaN. 4. **Final Result:** A Series with labels A, B, and C containing `NaN`, 25, and `NaN` respectively.

Final Answer: The output is A: NaN, B: 25, C: NaN.

Answer: (B)

Q42.

Solution

Concept:

SQL provides built-in functions to manipulate the case of string data. This is useful for standardizing data for comparison or display purposes.

Solution:

1. **`UPPER()`**: This is the standard ANSI SQL function used to convert a string to all uppercase letters. 2. **`UCASE()`**: This is a synonym for `UPPER()` supported by many database systems like MySQL. 3. Both functions take a single string argument and return the capitalized version of that string. 4. For example, `UPPER('cuet')` and `UCASE('cuet')` both return `'CUET'`.

Final Answer: Both (A) and (B) are correct.

Answer: (D)

Q43.

Solution

Concept:

In Matplotlib, a Pie Chart is created using `plt.pie()`. To make the chart informative, it is often necessary to display the percentage contribution of each slice directly on the chart.

Solution:

1. **`labels`**: Used to provide text descriptions for each slice outside the pie. 2. **`autopct`**: Short for "automatic percentage." It takes a format string (like `'%1.1f%%'`) and automatically calculates and displays the percentage value for each wedge. 3. **`explode`**: Used to offset a slice. 4. To show numeric percentages, the `autopct` parameter is the correct choice.

Final Answer: The parameter is `autopct`.

Answer: (A)

Q44.

Solution

Concept:

Pandas DataFrames can be sorted by their index or by the actual data values contained within the columns.

Solution:

1. `df.sort_index()`: Arranges the rows based on the row labels (0, 1, 2... or custom labels). 2. `df.sort_values()`: This is the method used to rearrange the DataFrame based on the values in one or more specific columns. - Syntax: `df.sort_values(by='ColumnName')`. 3. `df.sort()` was a method in very old versions of Pandas but has long been deprecated and removed in favor of the more explicit `sort_values()`.

Final Answer: The method is `df.sort_values()`.

Answer: (C)

Q45.

Solution

Concept:

The `ROUND(n, d)` function in SQL rounds a numeric value n to d decimal places. If d is positive, it rounds to the right of the decimal point.

Solution:

1. **Input:** 78.926. 2. **Decimal Places:** 2. 3. **Rounding Logic:** Look at the 3rd decimal place (the digit after the target). The digit is 6. 4. Since 6 is greater than or equal to 5, the 2nd decimal place (2) is incremented by 1. 5. Result: 78.93.

Final Answer: The output is 78.93.

Answer: (B)

Q46.

Solution

Concept:

FOSS stands for Free and Open Source Software. It refers to software that is licensed to grant users the right to use, study, change, and distribute the software and its source code to anyone and for any purpose.

Solution:

1. **Free:** This does not necessarily mean ”zero cost” (though it often is), but rather ”freedom” to run the program. 2. **Open:** This indicates that the inner workings (the source code) are accessible to the public. 3. **Source:** This is the specific term for the human-readable instructions written by programmers. Without the ”Source” code, software is a ”black box” that cannot be modified or inspected for security. 4. **Software:** The final product. 5. In the context of CUET Informatics Practices, understanding FOSS is key to the Societal Impacts unit, emphasizing collaborative development.

Final Answer: The ’S’ stands for Source.

Answer: (C)

Q47.

Solution

Concept:

Transmission media are the physical pathways used to carry information from a sender to a receiver in a network. They are broadly classified into Guided (wired) and Unguided (wireless).

Solution:

1. **Coaxial and Twisted Pair:** These use copper wires to transmit data as electrical signals (voltages). 2. **Microwave:** This is a wireless medium using electromagnetic radio waves. 3. **Optical Fiber:** This consists of thin strands of glass or plastic. Data is converted into light pulses using a laser or LED. 4. The light travels through the fiber using the principle of **Total Internal Reflection**. 5. Because it uses light, it is immune to electrical interference and offers much higher bandwidth than copper cables.

Final Answer: Optical Fiber.

Answer: (C)

Q48.

Solution

Concept:

The Data Manipulation Language (DML) part of SQL includes the `DELETE` command, which is used to remove existing records from a table.

Solution:

1. **Syntax:** The standard syntax is `DELETE FROM table_name WHERE condition;`. 2. **Analysis of Options:** - `REMOVE` is not a valid SQL keyword for deleting rows. - `DROP` is a Data Definition Language (DDL) command used to delete entire tables or databases, not individual rows. - Option (B) follows the correct structure: `DELETE FROM`, followed by the table name, then a `WHERE` clause to specify the unique ID. 3. If the `WHERE` clause were omitted, all rows in the table would be deleted.

Final Answer: `DELETE FROM Table WHERE ID=101;`

Answer: (B)

Q49.

Solution

Concept:

Pandas DataFrames have several attributes that describe the structure of the data. Knowing the difference between methods (functions) and attributes (properties) is essential for correct Python syntax.

Solution:

1. `df.columns` is an attribute (not a method, so no parentheses are used). 2. It returns a Pandas `Index` object. 3. This object contains the labels of the columns in the order they appear in the DataFrame. 4. While it behaves like a list in many ways (you can iterate over it), its technical type is an Index object, which allows for fast label-based lookups.

Final Answer: An Index object containing the column labels.

Answer: (C)

Q50.

Solution

Concept:

In mathematical operations within SQL, you often need to find the remainder of a division (modulo operation) rather than the quotient.

Solution:

1. `DIV` or `/` is used for division to get the quotient. 2. `MOD(n, m)` or the `%` operator (in some dialects) is used to find the remainder when n is divided by m. 3. For example, `SELECT MOD(10, 3);` would return 1, because $10 = 3 \times 3 + 1$. 4. This is a common Math function tested in the SQL unit of Informatics Practices.

Final Answer: The function is `MOD()`.

Answer: (C)

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	A	2	A	3	A	4	B	5	C
6	C	7	A	8	B	9	C	10	B
11	B	12	A	13	B	14	B	15	C
16	A	17	D	18	B	19	A	20	D
21	A	22	D	23	A	24	C	25	C
26	C	27	C	28	B	29	B	30	B
31	A	32	D	33	B	34	C	35	D
36	B	37	A	38	B	39	B	40	B
41	B	42	D	43	A	44	C	45	B
46	C	47	C	48	B	49	C	50	C