CUET UG Information Practices Sample Paper - 2

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 the following SQL query on a table `SALES`:

```
SELECT ROUND(MOD(7, 3), -1) FROM DUAL;
```

What will be the output of this query?

(A) 1

(B) 0

(C) 10

(D) -1

Q2. Match the following Networking Devices with their primary functions:

List I (Device)	**List II (Function)**
(P) Repeater	(ii) Amplifies signals to prevent attenuation
(Q) Switch	(iii) Filters and forwards data packets to specific MAC addresses
(R) Gateway	(i) Connects different network protocols
(S) Router	(iv) Determines the best path for data between networks

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

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

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

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

Q3. What will be the output of the following Pandas code?

```
import pandas as pd
S = pd.Series([10, 20, 30], index=['a', 'b', 'c'])
print(S['a':'b'].values + 5)
```

(A) `[15, 25, 35]`

(B) `[15, 25]`

(C) `[10, 20]`

(D) `[5, 5]`

Q4. A network topology where every node is connected to a central hub is called _____, whereas a topology where nodes are connected in a closed loop is _____.

(A) Mesh, Star

(B) Star, Ring

(C) Bus, Star

(D) Ring, Mesh

Q5. Identify the correct SQL command to display the names of employees in lowercase whose names start with 'A' and have at least 4 characters.

(A) `SELECT LOWER(name) FROM emp WHERE name LIKE 'A___';`

(B) `SELECT LCASE(name) FROM emp WHERE name LIKE 'A%' AND LENGTH(name) >= 4;`

(C) `SELECT LOWER(name) FROM emp WHERE name = 'A***';`

(D) `SELECT SUBSTR(name,1,4) FROM emp WHERE name LIKE 'A%';`

Q6. In a relational database, which of the following properties ensures that a primary key cannot contain a NULL value?

(A) Referential Integrity

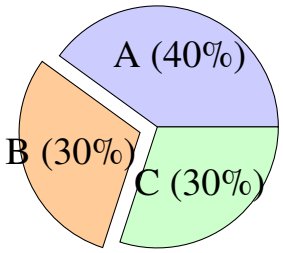
(B) Entity Integrity

(C) Domain Integrity

(D) Check Constraint

Q7. Observe the following output generated by the code:

```
plt.pie(sizes, explode=[0, 0.1, 0], labels=['A', 'B', 'C'])
```



What is the effect of the `explode` parameter as shown in the diagram above?

(A) It adds a shadow to the entire chart.

(B) It separates the second slice (B) from the center.

(C) It changes the color of the first and third slice.

(D) It displays the percentage values automatically.

Q8. Which of the following describes a 'Digital Footprint'?

(A) The physical size of a computer hard drive.

(B) The trail of data left by users while using the internet.

(C) A biometric scan used for high-security login.

(D) A software that tracks the hardware components of a PC.

Q9. Given a DataFrame `df`, which command will return the last 3 rows for only the columns 'City' and 'Sales'?

(A) `df.tail(3)[['City', 'Sales']]`

(B) `df[['City', 'Sales']].tail(3)`

(C) Both (A) and (B)

(D) `df.iloc[-3:, [0, 1]]` (Assuming they are the first two columns)

Q10. In SQL, the `GROUP BY` clause is used in conjunction with _____ to filter groups based on a specific condition.

(A) `WHERE`

(B) `ORDER BY`

(C) `HAVING`

(D) `DISTINCT`

Q11. Match the SQL String functions with their outputs for the string 'Informatics':

Function	**Output**
(i) `INSTR('Informatics', 'mat')`	(b) 6
(ii) `MID('Informatics', 3, 6)`	(a) 'format'
(iii) `RIGHT('Informatics', 4)`	(c) 'tics'
(iv) `LENGTH('Informatics')`	(d) 11

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

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

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

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

Q12. If a DataFrame `df` has 5 rows and 3 columns, what will be the output of `df.size`?

(A) 5

(B) 3

(C) 8

(D) 15

Q13. Which protocol is used for secure communication over a computer network and is widely used on the Internet?

(A) HTTP

(B) FTP

(C) HTTPS

(D) SMTP

Q14. Which of the following is an example of an open-source license?

(A) GPL (General Public License)

(B) Windows 11 License

(C) Adobe Photoshop EULA

(D) MS Office Product Key

Q15. To change the color of the bars in a bar chart to 'green' and add a label to the X-axis as 'Months', which command is correct?

(A) `plt.bar(x, y, color='green'); plt.xlabel('Months')`

(B) `plt.plot(x, y, c='g'); plt.labelx('Months')`

(C) `plt.bar(x, y, c='green'); plt.xaxis('Months')`

(D) `plt.histogram(x, y, color='green'); plt.xlabel('Months')`

Q16. Consider a DataFrame `df` with columns 'A', 'B', and 'C'. Which of the following code snippets will correctly replace all NaN values in column 'B' with the mean of that column?

(A) `df['B'] = df['B'].fillna(df['B'].mean())`

(B) `df.fillna(column='B', value=df['B'].mean())`

(C) `df['B'].dropna().mean()`

(D) `df['B'].replace(np.nan, df['B'].median())`

Q17. What is the correct order of execution for the following clauses in a SQL SELECT statement?
(1) SELECT, (2) FROM, (3) WHERE, (4) GROUP BY, (5) HAVING, (6) ORDER BY

(A) 1-2-3-4-5-6

(B) 2-3-4-5-1-6

(C) 2-1-3-4-5-6

(D) 3-2-4-5-1-6

Q18. Which of the following functions will return the name of the day (e.g., 'Friday') for a given date in MySQL?

(A) `DAYNAME()`

(B) `DAYOFWEEK()`

(C) `WEEKDAY()`

(D) `DATE_FORMAT(date, '%W')`

Q19. A DataFrame `df` has a shape (10, 5). If you execute `df.drop(['col1', 'col2'], axis=1)`, what will be the shape of the resulting DataFrame?

(A) (10, 5)

(B) (8, 5)

(C) (10, 3)

(D) (10, 2)

Q20. Which property of a Series object in Pandas returns True if there are any NaN values present?

(A) `S.hasnans`

(B) `S.empty`

(C) `S.isnull()`

(D) `S.nan_exists`

Q21. Consider two tables `STUDENT` (Roll, Name) and `SPORTS` (Roll, Game). To display names of students who do not play any game, which SQL query is most appropriate?

(A) `SELECT Name FROM STUDENT WHERE Roll NOT IN (SELECT Roll FROM SPORTS);`

(B) `SELECT Name FROM STUDENT S, SPORTS P WHERE S.Roll = P.Roll;`

(C) `SELECT Name FROM STUDENT NATURAL JOIN SPORTS;`

(D) `SELECT Name FROM STUDENT WHERE Roll = NULL;`

Q22. Identify the correct statement regarding MAC addresses:

(A) It is a 32-bit logical address assigned by the ISP.

(B) It is a 48-bit physical address embedded in the NIC.

(C) It changes every time a device connects to a new network.

(D) It is used by the Router to find the best path over the internet.

Q23. What will be the output of `print(df.iloc[1:4, 0:2])` if `df` has 5 rows and 3 columns?

(A) Rows 1, 2, 3 and Columns 0, 1

(B) Rows 1, 2, 3, 4 and Columns 0, 1, 2

(C) Rows 2, 3, 4 and Columns 1, 2

(D) Rows 1, 2, 3 and Columns 1, 2

Q24. In Matplotlib, which parameter in `plt.hist()` is used to specify the number of intervals or bins for the data distribution?

(A) `intervals`

(B) `range`

(C) `bins`

(D) `width`

Q25. Which type of cyber attack involves overwhelming a system with traffic to make it unavailable to users?

(A) Phishing

(B) DoS (Denial of Service)

(C) Eavesdropping

(D) Identity Theft

Q26. Consider the string S = "Education". What is the output of `SUBSTR(S, -4, 2)` in MySQL?

(A) "ti"

(B) "io"

(C) "at"

(D) "on"

Q27. In Pandas, which method is used to export data from a DataFrame to a CSV file without including the index labels?

(A) `df.to_csv('file.csv', index=False)`

(B) `df.write_csv('file.csv', index=None)`

(C) `df.save_csv('file.csv', header=False)`

(D) `df.csv('file.csv')`

Q28. Which SQL aggregate function ignores NULL values but can be used with the `DISTINCT` keyword?

(A) `SUM()`

(B) `COUNT()`

(C) `AVG()`

(D) All of the above

Q29. What is the full form of FOSS in the context of Societal Impacts?

(A) Free and Open Software System

(B) Firm and Open Source Software

(C) Free and Open Source Software

(D) Format and Open Software Standard

Q30. Match the following Relational Algebra operations with their SQL equivalents:

Relational Algebra	**SQL Clause**
(1) Selection (σ)	(i) SELECT (Columns)
(2) Projection (π)	(ii) WHERE
(3) Cartesian Product ($\times$)	(iii) UNION
(4) Set Union ($\cup$)	(iv) CROSS JOIN

(A) 1-(i), 2-(ii), 3-(iii), 4-(iv)

(B) 1-(ii), 2-(i), 3-(iv), 4-(iii)

(C) 1-(ii), 2-(i), 3-(iii), 4-(iv)

(D) 1-(iv), 2-(iii), 3-(ii), 4-(i)

Q31. Which Pandas attribute provides the data type of each column in a DataFrame?

(A) `df.type`

(B) `df.dtypes`

(C) `df.info`

(D) `df.columns.type`

Q32. Which device is primarily used to connect a LAN to a WAN?

(A) Modem

(B) Switch

(C) Hub

(D) Repeater

Q33. What does the `INSTR()` function return if the substring is not found in the target string?

(A) NULL

(B) -1

(C) 0

(D) False

Q34. Which transmission medium is immune to electromagnetic interference (EMI)?

(A) Twisted Pair Cable

(B) Coaxial Cable

(C) Optical Fiber

(D) Satellite

Q35. To display the minimum salary of each department only if that minimum salary is greater than ₹ 50000, which query is correct?

(A) `SELECT MIN(sal) FROM emp GROUP BY dept HAVING MIN(sal) > 50000;`

(B) `SELECT MIN(sal) FROM emp WHERE sal > 50000 GROUP BY dept;`

(C) `SELECT MIN(sal) FROM emp GROUP BY dept WHERE MIN(sal) > 50000;`

(D) `SELECT MIN(sal) FROM emp HAVING MIN(sal) > 50000;`

Q36. In Pandas, if you use `S.loc[2:5]` on a Series with integer indices, does it include the value at index 5?

(A) Yes

(B) No

(C) Depends on the data

(D) Throws an error

Q37. Which of the following is NOT a valid chart type in `matplotlib.pyplot`?

(A) `bar()`

(B) `scatter()`

(C) `pie()`

(D) `linechart()`

Q38. Identify the software that is free but does not allow users to modify its source code.

(A) Freeware

(B) Shareware

(C) Open Source Software

(D) Proprietary Software

Q39. What will be the output of `SELECT TRUNCATE(15.79, 1);`

(A) 15.8

(B) 16

(C) 15.7

(D) 15.70

Q40. Which Pandas method is used to sort a DataFrame based on the values of one or more columns?

(A) `df.sort()`

(B) `df.sort_values()`

(C) `df.order_by()`

(D) `df.arrange()`

Q41. Consider the following code snippet:

```
import matplotlib.pyplot as plt
x = [1, 2, 3, 4]
y = [10, 20, 25, 30]
plt.plot(x, y, linestyle='dashed', marker='o', color='r')
```

```
plt.show()
```

Which of the following describes the resulting chart?

(A) A red bar chart with circular markers.

(B) A red line chart with dashed lines and circular markers at data points.

(C) A solid red line chart with no markers.

(D) A red scatter plot with dashed connecting lines.

Q42. In a Histogram, if we set the parameter `cumulative=True`, what does the resulting plot represent?

(A) A plot where each bin's height is the sum of its count and all previous bins.

(B) A plot that shows only the frequency of the largest bin.

(C) A plot that ignores all data points below the mean.

(D) A plot that displays the data in reverse alphabetical order.

Q43. Observe the following table `STORE` and answer the question:

Item_ID	Item_Name	Category	Price
101	Soap	Personal Care	40
102	Shampoo	Personal Care	120
103	Biscuits	Edibles	25
104	Juice	Edibles	90

What will be the output of: `SELECT Category, SUM(Price) FROM STORE GROUP BY Category HAVING COUNT(*) > 1;`

(A) Edibles 115

(B) Personal Care 160

(C) Personal Care 160, Edibles 115

(D) No Output

Q44. Which of the following is the correct function to add a title to a Pie Chart in Matplotlib?

(A) `plt.add_title("Sales")`

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

(C) `plt.pie_title("Sales")`

(D) `plt.header("Sales")`

Q45. Which command is used to display the legend in a chart after labels have been defined in the `plot()` function?

(A) `plt.show_legend()`

(B) `plt.display()`

(C) `plt.legend()`

(D) `plt.label()`

Q46. What will be the output of `SELECT POWER(INSTR('Database', 'a'), 2);`

(A) 4

(B) 16

(C) 9

(D) 2

Q47. To retrieve the first 4 characters of the 'City' column from a DataFrame `df`, which Pandas expression is correct?

(A) `df['City'].str[0:4]`

(B) `df['City'].substring(0, 4)`

(C) `df['City'].left(4)`

(D) `df['City'].head(4)`

Q48. Match the following Chart parameters with their descriptions:

Parameter	Description
(i) `autopct`	(a) Labels for wedges in a Pie Chart
(ii) `width`	(b) Displays percentage on Pie Chart wedges
(iii) `labels`	(c) Separation between wedges in a Pie Chart
(iv) `explode`	(d) Thickness of bars in a Bar Chart

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

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

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

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

Q49. Which property is used in Pandas to rename the columns of an existing DataFrame directly?

(A) `df.rename(columns={'old':'new'})`

(B) `df.columns = ['new1', 'new2']`

(C) `df.set_colnames(['new1'])`

(D) Both (A) and (B)

Q50. A network spanning a city or a large campus is classified as a _____.

(A) LAN

(B) MAN

(C) WAN

(D) PAN

Detailed Solutions

Q1.

Solution

Concept:

The `MOD(n, m)` function in SQL returns the remainder of a division operation where n is the dividend and m is the divisor. The `ROUND(n, d)` function is used to round a number to a specified number of decimal places. When the second argument d is negative, the function rounds the number to the left of the decimal point (tens, hundreds, etc.).

Solution:

1. Evaluation of the inner function: `MOD(7, 3)`. Dividing 7 by 3 gives a quotient of 2 and a remainder of 1. Therefore, `MOD(7, 3)` = 1.
2. Evaluation of the outer function: `ROUND(1, -1)`. The value to be rounded is 1. The precision is −1, which means we round to the nearest tens place.
3. Rounding Logic: To round 1 to the nearest ten, we look at the digits. Since 1 is closer to 0 than it is to 10 (specifically, it is less than the midpoint 5), the value rounds down.
4. The result of `ROUND(1, -1)` is 0.

Final Answer: The output of the query is 0.

Answer: (B)

Q2.

Solution

Concept:

Networking hardware components operate at different layers of the OSI model and perform distinct tasks to facilitate data transmission. Understanding the core purpose of repeaters, switches, gateways, and routers is essential for network design and troubleshooting.

Solution:

1. **Repeater:** Over long distances, signals lose strength (attenuation). A repeater receives a signal and regenerates it at its original strength before retransmitting it. Thus, (P) matches with (ii).
2. **Switch:** This is an intelligent device that connects multiple devices on a LAN. It uses a MAC address table to ensure data packets are sent only to the specific intended recipient. Thus, (Q) matches with (iii).
3. **Gateway:** This node serves as an entrance to another network. It is unique because it can connect two networks that use entirely different base protocols or architectures. Thus, (R) matches with (i).
4. **Router:** This device routes data packets across different networks by determining the most efficient path (route) using IP addresses. Thus, (S) matches with (iv).

Final Answer: The correct sequence is P-(ii), Q-(iii), R-(i), S-(iv).

Answer: (A)

Q3.

Solution

Concept:

In the Python Pandas library, slicing a Series using labels (index names) behaves differently than standard Python list slicing. While positional slicing excludes the stop index, label-based slicing is inclusive of the endpoint.

Solution:

1. Define the Series `S`: Index 'a' has value 10. Index 'b' has value 20. Index 'c' has value 30.
2. Slicing operation: `S['a':'b']`. Because this uses labels, both 'a' and 'b' are included in the result. The resulting sub-series contains values `[10, 20]`.
3. Vectorized addition: `.values + 5`. The `.values` attribute converts the slice to a NumPy-like array. Adding 5 performs an element-wise operation: 10 + 5 = 15 20 + 5 = 25
4. The final resulting array is `[15, 25]`.

Final Answer: The output is `[15, 25]`.

Answer: (B)

Q4.

Solution

Concept:

Network Topology refers to the physical or logical layout of a network. Each topology has a specific structure that determines how nodes are interconnected and how data flows through the system.

Solution:

1. **Star Topology:** In this configuration, all nodes (workstations, printers, etc.) are individually connected to a central connection point, such as a hub or a switch. If the central hub fails, the whole network goes down, but if one node fails, the rest remain active.
2. **Ring Topology:** In this setup, each device is connected to two other devices, one on either side, forming a circular pathway for data. Data travels from node to node until it reaches its destination.
3. Comparing with the blanks in the question: The first blank (central hub) refers to Star. The second blank (closed loop) refers to Ring.

Final Answer: Star, Ring.

Answer: (B)

Q5.

Solution

Concept:

To manipulate and filter text data in SQL, we combine scalar functions with conditional clauses. `LOWER()` or `LCASE()` handles case transformation, while the `LIKE` operator allows for pattern matching using wildcards (% for zero or more characters).

Solution:

1. **Case Requirement:** The user wants the output in lowercase. Both `LOWER(name)` and `LCASE(name)` are valid in MySQL/standard SQL.

2. **Starting Character:** The name must start with 'A'. The pattern `'A%'` ensures that 'A' is the first character, followed by any sequence of characters.

3. **Length Constraint:** The name must have at least 4 characters. While `LIKE 'A___'` specifically looks for exactly 4 characters, the question asks for "at least 4". The function `LENGTH(name) >= 4` is the most accurate way to enforce this.

4. Combining these: `SELECT LCASE(name) FROM emp WHERE name LIKE 'A%' AND LENGTH(name) >= 4;`.

Final Answer: `SELECT LCASE(name) FROM emp WHERE name LIKE 'A%' AND LENGTH(name) >= 4;`

Answer: (B)

Q6.

Solution

Concept:

Database integrity constraints are rules applied to table columns to ensure the accuracy and reliability of data. Specifically, Entity Integrity ensures that every table has a primary key and that the primary key column(s) must be unique and not contain any NULL values.

Solution:

1. **Primary Key Definition:** A primary key uniquely identifies each record in a table. By definition, it cannot be empty (NULL) because a NULL value cannot uniquely identify a row. 2. **Entity Integrity:** This rule states that no primary key attribute of a relation can be null. This ensures that every entity (row) is identifiable. 3. **Referential Integrity:** This involves foreign keys and ensures that relationships between tables remain consistent. 4. **Domain Integrity:** This ensures that all data in a column falls within a defined set of valid values (e.g., data types or ranges). 5. Therefore, the property that specifically forbids NULL values in a primary key is Entity Integrity.

Final Answer: Entity Integrity.

Answer: (B)

Q7.

Solution

Concept:

In Matplotlib, the `pie()` function is used to create pie charts. The `explode` parameter is a list or array that specifies the fraction of the radius with which to offset each wedge. This is commonly used to highlight or ”pop out” a specific portion of the chart.

Solution:

1. The `explode` parameter takes a sequence where each value corresponds to a slice in the `sizes` list. 2. In the given code, `explode=[0, 0.1, 0]`. 3. The first value (0) corresponds to the first slice (size 40) — no offset. 4. The second value (0.1) corresponds to the second slice (size 30) — it is shifted outward from the center by 10% of the radius. 5. The third value (0) corresponds to the third slice (size 30) — no offset. 6. Thus, only the second slice is separated or ”exploded” from the rest of the chart.

Final Answer: It separates the second slice from the center.

Answer: (B)

Q8.

Solution

Concept:

A Digital Footprint refers to the unique set of traceable digital activities, contributions, and communications manifested on the Internet or digital devices. It includes both active footprints (data you intentionally share) and passive footprints (data collected without your active involvement).

Solution:

1. Whenever a user interacts with the internet—be it through social media, online shopping, or visiting websites—they leave behind data. 2. This data can include IP addresses, login details, search history, and ”likes” or comments. 3. This ”trail” of data is cumulative and can often be used to identify or profile the user’s behavior and preferences. 4. Option (B) accurately describes this concept as the ”trail of data left by users while using the internet.”

Final Answer: The trail of data left by users while using the internet.

Answer: (B)

Q9.

Solution

Concept:

Accessing specific rows and columns in a Pandas DataFrame can be done using standard indexing `[]` or the `.iloc` / `.loc` indexers. To chain operations, you can filter columns first and then apply a row-selection method like `.tail()`, or vice versa.

Solution:

1. **Option A (`df.tail(3)[['City', 'Sales']]`):** First, `df.tail(3)` selects the last three rows of the entire DataFrame. Then, the double brackets filter that result to only include the 'City' and 'Sales' columns. This works correctly. 2. **Option B (`df[['City', 'Sales']].tail(3)`):** First, the DataFrame is reduced to only two columns. Then, `.tail(3)` is called on this smaller DataFrame to get the last three rows. This also works correctly. 3. Since both methods yield the exact same result, "Both (A) and (B)" is the most comprehensive answer.

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

Answer: (C)

Q10.

Solution

Concept:

In SQL, aggregate functions (like SUM, COUNT, AVG) work on groups of rows. While the `WHERE` clause filters individual rows before they are grouped, a different clause is needed to filter the summarized results after grouping.

Solution:

1. `GROUP BY` is used to arrange identical data into groups. 2. `WHERE` cannot be used with aggregate functions (e.g., you cannot say `WHERE SUM(sales) > 1000`). 3. The `HAVING` clause was added to SQL specifically to filter groups based on conditions involving aggregate functions or the grouped columns themselves. 4. `ORDER BY` is used for sorting the final result, and `DISTINCT` is used to remove duplicates. 5. Therefore, `HAVING` is the correct clause used in conjunction with `GROUP BY` for filtering.

Final Answer: `HAVING`.

Answer: (C)

Q11.

Solution

Concept:

SQL String functions allow for the manipulation and analysis of character data. 1. `INSTR(str, substr)` returns the position of the first occurrence of a substring. 2. `MID(str, pos, len)` extracts a substring starting from a specific position for a given length. 3. `RIGHT(str, n)` returns the rightmost n characters. 4. `LENGTH(str)` returns the total number of characters in the string.

Solution:

1. `INSTR('Informatics', 'mat')`: The substring 'mat' starts at the 6th character (I-1, n-2, f-3, o-4, r-5, m-6). So, (i) matches (b). 2. `MID('Informatics', 3, 6)`: Starting at the 3rd character ('f'), it takes 6 characters: 'f', 'o', 'r', 'm', 'a', 't'. Result is 'format'. So, (ii) matches (a). 3. `RIGHT('Informatics', 4)`: The last 4 characters are 't', 'i', 'c', 's'. Result is 'tics'. So, (iii) matches (c). 4. `LENGTH('Informatics')`: Counting all letters, the total is 11. So, (iv) matches (d).

Final Answer: (i)-b, (ii)-a, (iii)-c, (iv)-d.

Answer: (A)

Q12.

Solution

Concept:

Pandas DataFrame attributes provide metadata about the object. - `shape` returns a tuple representing the dimensionality (rows, columns). - `size` returns an integer representing the total number of elements in the DataFrame. - `ndim` returns the number of axes (which is always 2 for a DataFrame).

Solution:

1. The `size` of a DataFrame is calculated as the product of the number of rows and the number of columns. 2. Given: Rows = 5, Columns = 3. 3. Calculation:

$$\text{Size} = \text{Rows} \times \text{Columns}$$

$$\text{Size} = 5 \times 3 = 15$$

4. Therefore, `df.size` will output 15, which represents the total count of data cells in the table.

Final Answer: 15.

Answer: (D)

Q13.

Solution

Concept:

Network protocols define the rules for data exchange. While many protocols facilitate communication, some are designed specifically to add a layer of security (encryption) to protect sensitive data from being intercepted by malicious actors.

Solution:

1. **HTTP (Hypertext Transfer Protocol):** The standard protocol for transferring web pages, but it sends data in plain text, which is insecure. 2. **FTP (File Transfer Protocol):** Used for transferring files between a client and server, also generally insecure in its basic form. 3. **HTTPS (Hypertext Transfer Protocol Secure):** This is the secure version of HTTP. It uses SSL/TLS encryption to ensure that all data transmitted between the web browser and the server is private and integral. 4. **SMTP (Simple Mail Transfer Protocol):** Used specifically for sending emails. 5. HTTPS is the primary protocol for secure web communication.

Final Answer: HTTPS.

Answer: (C)

Q14.

Solution

Concept:

Software licensing determines how software can be used, modified, and distributed. Open-source licenses allow users to access the source code, modify it, and redistribute it, often for free, provided they follow certain conditions (like keeping the same license).

Solution:

1. **GPL (GNU General Public License):** A widely used free software license which guarantees end users the freedom to run, study, share, and modify the software. This is the definition of open-source. 2. **Windows 11 / MS Office / Adobe Photoshop:** These are examples of proprietary software. The source code is not available to the public, and users must pay for a license to use them under strict ”End User License Agreements” (EULA). 3. Therefore, GPL is the only open-source license among the options provided.

Final Answer: GPL (General Public License).

Answer: (A)

Q15.

Solution

Concept:

Matplotlib's `pyplot` module provides various functions to customize plots. For a bar chart (`plt.bar()`), you can pass properties like `color` directly into the function call. Labels for axes are added using separate functions like `xlabel()` and `ylabel()`.

Solution:

1. **Plotting the Bar:** To create a bar chart, we use `plt.bar(x, y)`. To set the color to green, we add the argument `color='green'` or `c='green'`. 2. **Labeling the X-axis:** The correct function to set the label for the horizontal axis is `plt.xlabel('Label Name')`. 3. Evaluating Option A: `plt.bar(x, y, color='green'); plt.xlabel('Months')` uses the correct syntax for both requirements. 4. Option B uses `labelx` (incorrect), Option C uses `xaxis` (incorrect), and Option D uses `histogram` (wrong chart type).

Final Answer: `plt.bar(x, y, color='green'); plt.xlabel('Months')`

Answer: (A)

Q16.

Solution

Concept:

Handling missing data (NaN) is a crucial part of data preprocessing in Pandas. The `fillna()` method is used to replace null values with a specific value, such as a constant or a calculated statistic (mean, median, mode).

Solution:

1. To target a specific column, we use the syntax `df['column_name']`. 2. The `mean()` function calculates the average of the non-null values in that column. 3. `df['B'].fillna(...)` will return a new series where NaN values are replaced. 4. To update the original DataFrame, we assign the result back to `df['B']`. 5. Option (A) correctly follows this logic: `df['B'] = df['B'].fillna(df['B'].mean())`.

Final Answer: `df['B'] = df['B'].fillna(df['B'].mean())`

Answer: (A)

Q17.

Solution

Concept:

SQL queries follow a strict logical processing order that differs from the order in which they are written. This sequence determines how data is filtered, grouped, and finally displayed.

Solution:

1. **FROM (2):** The database first identifies the source tables. 2. **WHERE (3):** Rows are filtered based on the initial condition. 3. **GROUP BY (4):** The remaining rows are grouped. 4. **HAVING (5):** These groups are filtered based on conditions. 5. **SELECT (1):** The specific columns/expressions are calculated and picked. 6. **ORDER BY (6):** The final result set is sorted. 7. Therefore, the logical sequence is 2-3-4-5-1-6.

Final Answer: 2-3-4-5-1-6.

Answer: (B)

Q18.

Solution

Concept:

MySQL provides various date and time functions to extract specific components from a date object. To get the name of the day in plain English, we use functions that format the date into a string representation.

Solution:

1. `DAYNAME(date)`: Returns the name of the weekday for a date (e.g., 'Monday'). 2. `DAYOFWEEK(date)`: Returns the index of the weekday (1 = Sunday, 2 = Monday...). 3. `WEEKDAY(date)`: Returns the index (0 = Monday, 1 = Tuesday...). 4. `DATE_FORMAT(date, '%W')`: This is also a valid way to get the full name of the day. 5. While both (A) and (D) can work, `DAYNAME()` is the most direct built-in function for this specific purpose.

Final Answer: `DAYNAME()`

Answer: (A)

Q19.

Solution

Concept:

The `drop()` method in Pandas allows for the removal of rows or columns. The `axis` parameter determines the direction: `axis=0` for rows and `axis=1` for columns.

Solution:

1. Initial shape: (10, 5), meaning 10 rows and 5 columns. 2. Command: `df.drop(['col1', 'col2'], axis=1)`. 3. Action: Two specific columns are removed from the DataFrame. 4. Calculation: New row count = 10 (unchanged). New column count = 5 – 2 = 3. 5. The resulting shape is (10, 3).

Final Answer: (10, 3).

Answer: (C)

Q20.

Solution

Concept:

Series attributes in Pandas allow users to quickly check the status of the data. Knowing whether a Series contains missing values is vital for data cleaning.

Solution:

1. `S.hasnans`: This is a property that returns a boolean (True/False) indicating if there are any NaN (Not a Number) values in the Series. 2. `S.empty`: Checks if the Series is completely devoid of any elements. 3. `S.isnull()`: This is a **method** (requires parentheses) that returns a boolean mask (a series of True/False values for every element), not a single boolean for the whole series. 4. Therefore, the direct property is `hasnans`.

Final Answer: `S.hasnans`

Answer: (A)

Q21.

Solution

Concept:

Filtering data in SQL based on existence or non-existence in another table is often performed using subqueries with the `IN` or `NOT IN` operator. This is particularly useful for identifying records in one table that lack a corresponding relationship in another.

Solution:

1. To find students who do **not** play any game, we need to find Roll numbers that exist in the `STUDENT` table but are absent from the `SPORTS` table. 2. The subquery `(SELECT Roll FROM SPORTS)` retrieves all Roll numbers of students involved in sports. 3. The outer query `SELECT Name FROM STUDENT WHERE Roll NOT IN (...)` filters the student list to keep only those whose Roll is not in the list returned by the subquery. 4. `NATURAL JOIN` or a standard join would only return students who **do** have a match in both tables. 5. Checking `Roll = NULL` is incorrect because `Roll` is likely a primary key (not null) and `NULL` comparisons must use `IS NULL`.

Final Answer: `SELECT Name FROM STUDENT WHERE Roll NOT IN (SELECT Roll FROM SPORTS);`

Answer: (A)

Q22.

Solution

Concept:

A MAC (Media Access Control) address is a hardware identification number that uniquely identifies each device on a network. It is assigned by the manufacturer and is permanent for the life of the network interface.

Solution:

1. **Address Length:** A MAC address is a 48-bit address, usually represented as six groups of two hexadecimal digits (e.g., 00:1A:2B:3C:4D:5E). 2. **Physical vs. Logical:** Unlike an IP address (which is a 32-bit logical address assigned by software/ISP), the MAC address is "burned" into the Network Interface Card (NIC). 3. **Persistence:** It does not change when you move from one network (like home Wi-Fi) to another (like office Wi-Fi). 4. **Usage:** It is used within a local network (Data Link Layer) to deliver frames to the correct hardware. Routers use IP addresses for internet-wide routing.

Final Answer: It is a 48-bit physical address embedded in the NIC.

Answer: (B)

Q23.

Solution

Concept:

The `.iloc` indexer in Pandas is used for integer-location based indexing. It follows the standard Python slicing convention where the start index is **included** and the stop index is **excluded**.

Solution:

1. **Row Slicing `1:4`:** This includes index 1, 2, and 3. It excludes index 4. 2. **Column Slicing `0:2`:** This includes index 0 and 1. It excludes index 2. 3. In Pandas (and Python) indexing starts at 0. - Index 0: 1st row/column - Index 1: 2nd row/column - Index 2: 3rd row/column - Index 3: 4th row/column 4. Thus, `1:4` gives the 2nd, 3rd, and 4th rows (indices 1, 2, 3) and `0:2` gives the 1st and 2nd columns (indices 0, 1).

Final Answer: Rows 1, 2, 3 and Columns 0, 1.

Answer: (A)

Q24.

Solution

Concept:

A histogram is used to represent the frequency distribution of a continuous variable. The data is divided into consecutive, non-overlapping intervals called "bins."

Solution:

1. In the `matplotlib.pyplot.hist(x, bins=None, ...)` function, the `bins` parameter defines the number of equal-width bins in the range. 2. If `bins` is an integer, it defines the number of equal-width bins in the range. 3. If `bins` is a sequence, it defines the bin edges, including the left edge of the first bin and the right edge of the last bin. 4. `range` defines the upper and lower outliers, while `width` is used in bar charts, not directly as a primary interval parameter in `hist()`.

Final Answer: `bins`.

Answer: (C)

Q25.

Solution

Concept:

Cyber-attacks aim to compromise the confidentiality, integrity, or availability of a system. A Denial of Service (DoS) attack specifically targets the ”Availability” of the system.

Solution:

1. **DoS Attack:** The attacker floods the target (server or network) with excessive requests or traffic, exhausting its resources so that legitimate users cannot access the service. 2. **Phishing:** A deceptive practice of sending emails appearing to be from a reputable source to induce individuals to reveal personal information. 3. **Eavesdropping:** Secretly listening to a private conversation or data transmission. 4. **Identity Theft:** Using someone else's personal data for fraudulent purposes. 5. Overwhelming a system to make it unavailable is the classic definition of a DoS attack.

Final Answer: DoS (Denial of Service).

Answer: (B)

Q26.

Solution

Concept:

In MySQL, the `SUBSTR()` or `SUBSTRING()` function is used to extract a portion of a string. When the starting position is a negative number, the extraction begins from the end of the string, counting backwards.

Solution:

1. The string is ”Education”. 2. Let's map the negative indices (counting from the end): - n (-1), o (-2), i (-3), t (-4), a (-5), c (-6), u (-7), d (-8), E (-9). 3. The starting position is -4, which corresponds to the character 't'. 4. The second argument, 2, specifies the length of the substring to be extracted. 5. Starting at 't' and taking 2 characters, we get 't' and 'i'. 6. Result: ”ti”.

Final Answer: ”ti”.

Answer: (A)

Q27.

Solution

Concept:

The `to_csv()` method in Pandas is used to write DataFrame data into a Comma Separated Values (CSV) format. By default, Pandas includes the row indices in the exported file, which may not always be desired.

Solution:

1. To prevent the index from being written to the file, the parameter `index` must be set to `False`. 2. Option (A) `df.to_csv('file.csv', index=False)` is the correct syntax. 3. Using `index=None` or `header=False` (which removes the column names) does not achieve the specific goal of excluding the index labels while keeping the data intact. 4. There is no `write_csv()` or `save_csv()` method in standard Pandas; `to_csv()` is the standard function.

Final Answer: `df.to_csv('file.csv', index=False)`

Answer: (A)

Q28.

Solution

Concept:

Aggregate functions in SQL (SUM, AVG, MIN, MAX, COUNT) perform calculations on a set of values and return a single value. A key feature of these functions is their treatment of NULL values and their compatibility with the `DISTINCT` keyword.

Solution:

1. **Null Handling:** All standard aggregate functions (except `COUNT(*)`) ignore NULL values in their calculations. For example, `AVG()` will only average the non-null entries. 2. **DISTINCT Keyword:** You can use `DISTINCT` inside any of these functions to perform the calculation only on unique values (e.g., `SUM(DISTINCT salary)`). 3. Since `SUM()`, `COUNT()`, and `AVG()` all follow these rules, "All of the above" is correct.

Final Answer: All of the above.

Answer: (D)

Q29.

Solution

Concept:

Societal Impacts in Computer Science cover ethics, laws, and software distribution models. FOSS is a philosophy and movement that advocates for users' rights to use and modify software.

Solution:

1. **F:** Free (as in freedom, not necessarily price). 2. **O:** Open. 3. **S:** Source. 4. **S:** Software. 5. 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.

Final Answer: Free and Open Source Software.

Answer: (C)

Q30.

Solution

Concept:

Relational Algebra is a theoretical language used to model database queries. Every operation in relational algebra has a corresponding implementation in SQL.

Solution:

1. **Selection (σ):** This operation filters rows based on a condition, which is handled by the `WHERE` clause in SQL. 2. **Projection (π):** This operation selects specific columns, which is handled by the `SELECT` clause in SQL. 3. **Cartesian Product ($\times$):** This combines every row of one table with every row of another, implemented as `CROSS JOIN` or a comma-separated `FROM` clause. 4. **Set Union ($\cup$):** This combines the results of two queries, implemented as the `UNION` operator in SQL. 5. Matching these: 1-(ii), 2-(i), 3-(iv), 4-(iii).

Final Answer: 1-(ii), 2-(i), 3-(iv), 4-(iii).

Answer: (B)

Q31.

Solution

Concept:

When working with large DataFrames, it is essential to understand the underlying data types of the columns to perform operations correctly. Different attributes and methods in Pandas provide varying levels of detail regarding the schema.

Solution:

1. `df.dtypes:` This is an attribute that returns a Series with the data type of each column. It is the most direct way to get only the data types. 2. `df.info():` This is a method that provides a comprehensive summary of the DataFrame, including the number of non-null entries, column names, and data types. 3. `df.type:` This is not a valid attribute for a DataFrame; to check the type of the DataFrame itself, one would use the Python `type(df)` function. 4. Therefore, to specifically get the data types of each column in a concise format, `dtypes` is the correct attribute.

Final Answer: `df.dtypes`.

Answer: (B)

Q32.

Solution

Concept:

Networking devices are classified based on their role in connecting different segments of a network or entirely different types of networks.

Solution:

1. **Hub/Switch:** These are used to connect multiple devices within the same Local Area Network (LAN). They do not typically handle external network transitions. 2. **Repeater:** This device simply boosts a signal within a cable run to extend its physical range; it does not connect different types of networks. 3. **Modem (Modulator-Demodulator):** A modem converts digital signals from a computer into analog signals (and vice versa) for transmission over telephone lines or cable systems. It is the bridge that connects a local private network (LAN) to the wider public internet (WAN). 4. Therefore, the Modem is the primary device for LAN-to-WAN connectivity.

Final Answer: Modem.

Answer: (A)

Q33.

Solution

Concept:

The `INSTR()` function in SQL is used to search for the first occurrence of a substring within a larger string. It returns an integer representing the starting position.

Solution:

1. In many programming languages (like Python), search functions might return -1 if a substring is not found. 2. However, in SQL (MySQL specifically), string indexing starts at 1. 3. If the `INSTR()` function fails to find the specified substring within the target string, it returns 0. 4. For example, `SELECT INSTR('Hello', 'z');` would result in 0.

Final Answer: 0.

Answer: (C)

Q34.

Solution

Concept:

Transmission media are susceptible to various types of interference. Electromagnetic Interference (EMI) occurs when external electromagnetic fields disrupt the signals in a conductor.

Solution:

1. **Copper Cables (Twisted Pair and Coaxial):** These use electrical signals. Because they are made of metal, they act as antennas and are highly susceptible to EMI from power lines, motors, or lighting. 2. **Wireless (Satellite/Radio):** These use electromagnetic waves through the air and are subject to many types of atmospheric and radio interference. 3. **Optical Fiber:** This medium transmits data as pulses of light through glass or plastic strands. Since light is not affected by electromagnetic fields, fiber optic cables are completely immune to EMI.

Final Answer: Optical Fiber.

Answer: (C)

Q35.

Solution

Concept:

Filtering aggregated data in SQL requires a specific combination of clauses. While the `WHERE` clause filters rows, the `HAVING` clause filters the resulting groups.

Solution:

1. **Objective:** Group by department, find the minimum salary, and filter that minimum. 2. **Clause Order:** The query must follow the order: `SELECT ... FROM ... GROUP BY ... HAVING ...`. 3. **Comparison:** - Option A uses the correct order and filters the aggregate `MIN(sal)`. - Option B filters individual salaries before grouping, which is not what the question asks (it asks to filter the group's minimum). - Option C uses `WHERE` after `GROUP BY`, which is syntactically invalid. 4. The correct query is `SELECT MIN(sal) FROM emp GROUP BY dept HAVING MIN(sal) > 50000;`.

Final Answer: `SELECT MIN(sal) FROM emp GROUP BY dept HAVING MIN(sal) > 50000;`

Answer: (A)

Q36.

Solution

Concept:

Pandas provides two primary indexers for selecting data: `.iloc` (integer-location based) and `.loc` (label-location based). When a Series or DataFrame has integer labels as its index, `.loc` interprets the numbers as labels, not positions.

Solution:

1. **Label-based Slicing:** Unlike integer-position slicing (which excludes the stop value), label-based slicing with `.loc` is **inclusive** of both the start and the stop labels. 2. **Scenario:** If you have a Series `S` with an index $[0, 1, 2, 3, 4, 5]$ and you call `S.loc[2:5]`. 3. **Execution:** The indexer looks for the label '2' and the label '5'. It returns all elements from label '2' up to and including label '5'. 4. Therefore, the value at index 5 is included in the output.

Final Answer: Yes.

Answer: (A)

Q37.

Solution

Concept:

The `matplotlib.pyplot` module provides a variety of functions to create different types of statistical and mathematical plots. Each chart type has a specific named function.

Solution:

1. **`bar()`:** Valid function for creating vertical bar charts. 2. **`scatter()`:** Valid function for creating scatter plots to show relationships between two variables. 3. **`pie()`:** Valid function for creating pie charts. 4. **`linechart()`:** This is **not** a valid function name in Matplotlib. To create a line chart, the function is simply called `plot()`. 5. Therefore, `linechart()` is the invalid option.

Final Answer: `linechart()`.

Answer: (D)

Q38.

Solution

Concept:

Software is categorized based on its cost and the permissions granted to the user regarding the source code. It is a common misconception that ”free” software is always ”open source.”

Solution:

1. **Freeware:** This software is available free of charge. However, the source code is kept secret (proprietary), and users are not permitted to modify or redistribute it. 2. **Shareware:** Software provided initially for free on a trial basis, with the expectation that the user will pay to continue using it. 3. **Open Source Software (OSS):** Software that is free and provides the source code for modification. 4. **Proprietary Software:** Software that is owned by an individual or a company; users usually pay for it and cannot see the source code. 5. The description ”free but no source code modification” perfectly matches Freeware.

Final Answer: Freeware.

Answer: (A)

Q39.

Solution

Concept:

The `TRUNCATE(n, d)` function in SQL is used to shorten a number n to d decimal places. Unlike the `ROUND()` function, `TRUNCATE()` does not look at the next digit to decide whether to round up or down; it simply removes the unwanted digits.

Solution:

1. The number provided is 15.79. 2. The second argument is 1, meaning we want to keep only one decimal place. 3. **Truncation process:** The function identifies the first decimal place (.7) and simply "cuts off" everything that follows it. 4. Even though the next digit is 9 (which would cause `ROUND` to result in 15.8), `TRUNCATE` ignores this. 5. The result is 15.7.

Final Answer: 15.7.

Answer: (C)

Q40.

Solution

Concept:

Sorting data is a fundamental operation in data analysis. Pandas offers specific methods to sort the index or the actual data values within a DataFrame.

Solution:

1. **`df.sort_values():`** This is the standard Pandas method used to sort a DataFrame by the data in one or more columns. It accepts parameters like `by=['ColName']` and `ascending=True/False`. 2. **`df.sort():`** This was used in much older versions of Pandas but has been deprecated and removed in favor of more specific functions. 3. **`df.order_by():`** This is a SQL clause, not a Pandas method. 4. **`df.sort_index():`** This method sorts the DataFrame based on the row labels (index) rather than the column data. 5. Thus, `sort_values()` is the correct method for column-based sorting.

Final Answer: `df.sort_values()`.

Answer: (B)

Q41.

Solution

Concept:

The `plt.plot()` function in Matplotlib is used to create line charts. It offers various parameters to customize the appearance of the line and the markers representing individual data points.

Solution:

1. **Line Style:** `linestyle='dashed'` (or `'--'`) creates a broken line rather than a solid one. 2. **Markers:** `marker='o'` places a circular dot at each (x, y) coordinate provided in the data lists. 3. **Color:** `color='r'` sets the color of both the line and the markers to red. 4. **Chart Type:** Since `plt.plot()` is used, it is fundamentally a line chart. 5. Combining these, the chart is a red line chart with dashed lines and circular markers.

Final Answer: A red line chart with dashed lines and circular markers at data points.

Answer: (B)

Q42.

Solution

Concept:

A standard histogram shows the frequency (count) of data points within specific ranges (bins). A cumulative histogram changes how these counts are displayed by accumulating them across the x-axis.

Solution:

1. When `cumulative=True` is passed to `plt.hist()`, the value of each bin is not just the count for that specific interval. 2. Instead, it is the count for that bin **plus** the counts of all preceding bins. 3. This means the last bin on the right will always represent the total number of data points in the dataset. 4. This is used to visualize the cumulative distribution of the data.

Final Answer: A plot where each bin's height is the sum of its count and all previous bins.

Answer: (A)

Q43.

Solution

Concept:

The `GROUP BY` clause organizes rows into groups. The `SUM()` function calculates the total for a numeric column per group, and the `HAVING` clause filters those groups based on an aggregate condition (like `COUNT(*)`).

Solution:

1. **Grouping by Category:** - **Personal Care:** Has 2 rows (Soap, Shampoo). Sum of Price = 40 + 120 = 160. - **Edibles:** Has 2 rows (Biscuits, Juice). Sum of Price = 25 + 90 = 115. 2. **Applying HAVING COUNT(*) > 1:** - Personal Care has 2 rows ($2 > 1$), so it stays. - Edibles has 2 rows ($2 > 1$), so it stays. 3. **Final Result:** Both categories are displayed with their respective sums. - Personal Care 160 - Edibles 115

Final Answer: Personal Care 160, Edibles 115.

Answer: (C)

Q44.

Solution

Concept:

Matplotlib provides a set of global functions under `pyplot` to add metadata to any active figure. These functions are generally consistent regardless of the type of chart (Bar, Pie, or Line) being plotted.

Solution:

1. To set the main title displayed at the top of the chart, the function is `plt.title()`. 2. `plt.add_title` and `plt.pie_title` are not valid Matplotlib functions. 3. `plt.header` is not a standard plotting function for titles. 4. The syntax is typically `plt.title("Your Title Here")`.

Final Answer: `plt.title("Sales")`.

Answer: (B)

Q45.

Solution

Concept:

A legend is an area describing the elements of the graph. In Matplotlib, even if you define labels within the plotting functions, they will not appear on the screen unless the legend is explicitly activated.

Solution:

1. When creating a plot, e.g., `plt.plot(x, y, label='Growth')`, the label is stored in the background. 2. To make this label visible in a box on the chart, the command `plt.legend()` must be called. 3. This function automatically searches for labels assigned to the plots and displays them. 4. `plt.show()` displays the entire figure window but does not create the legend box itself.

Final Answer: `plt.legend()`.

Answer: (C)

Q46.

Solution

Concept:

This question involves the nesting of two SQL functions: `INSTR()` and `POWER()`. 1. `INSTR(string, substring)`: Returns the position of the first occurrence of the substring. 2. `POWER(base, exponent)`: Returns the base raised to the power of the exponent ($base^{exponent}$).

Solution:

1. **Step 1:** Evaluate the inner function `INSTR('Database', 'a')`. - The string is 'Database'. - The first 'a' occurs at the 2nd position (D-1, a-2). - Result = 2. 2. **Step 2:** Evaluate the outer function `POWER(2, 2)`. - The base is the result from Step 1 (which is 2). - The exponent is 2. - Calculation: $2^2 = 4$. 3. The final output is 4.

Final Answer: 4.

Answer: (A)

Q47.

Solution

Concept:

Pandas provides a `.str` accessor for Series containing string data. This allows for vectorized string operations similar to Python's slicing. Slicing in Pandas using `.str[start:stop]` follows the standard Python convention.

Solution:

1. To get the first 4 characters, we need to slice the string from the beginning (index 0) up to (but not including) index 4. 2. The syntax `df['City'].str[0:4]` extracts characters at indices 0, 1, 2, and 3. 3. `df['City'].head(4)` would return the first 4 **rows** of the column, not the first 4 characters of the text within the rows. 4. `substring` and `left` are not standard Pandas Series methods for string slicing.

Final Answer: `df['City'].str[0:4]`

Answer: (A)

Q48.

Solution

Concept:

Different plot types in Matplotlib have unique parameters that control their specific visual elements. Understanding these parameters is key to creating informative visualizations like Pie charts and Bar charts.

Solution:

1. **`autopct`:** This parameter in `plt.pie()` is used to format and display the percentage value of each slice directly on the chart. (i) matches (b). 2. **`width`:** In `plt.bar()`, this controls the horizontal thickness of the bars. (ii) matches (d). 3. **`labels`:** Used in both charts to provide text descriptions for data points or wedges. (iii) matches (a). 4. **`explode`:** A list in `plt.pie()` that offsets a slice from the center for emphasis. (iv) matches (c). 5. Correct Sequence: (i)-b, (ii)-d, (iii)-a, (iv)-c.

Final Answer: (i)-b, (ii)-d, (iii)-a, (iv)-c.

Answer: (A)

Q49.

Solution

Concept:

There are two main ways to rename columns in Pandas: using the `rename()` method for specific changes or assigning a new list of names to the `.columns` attribute for a complete overwrite.

Solution:

1. **Option A:** `df.rename(columns={...})` is the most flexible method. It allows you to rename only specific columns without affecting others. 2. **Option B:** `df.columns = [...]` is a direct assignment. It is efficient if you are renaming all columns at once, but the list must match the total number of columns exactly. 3. Since both methods are valid and widely used in Pandas, Option (D) is correct. 4. Note: `set_colnames` is not a valid Pandas method.

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

Answer: (D)

Q50.

Solution

Concept:

Computer networks are categorized by their geographical scale. 1. **PAN:** Personal Area Network (Smallest - e.g., Bluetooth). 2. **LAN:** Local Area Network (Building/Office). 3. **MAN:** Metropolitan Area Network (City/Campus). 4. **WAN:** Wide Area Network (Global/Internet).

Solution:

1. A network that covers a larger area than a single building but is smaller than a wide-reaching country or global network is a MAN. 2. A MAN typically connects several LANs across a city or a large university campus. 3. It uses high-speed carriers like fiber optics to link the various sites within the metropolitan area.

Final Answer: MAN.

Answer: (B)

Answer Key

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