Q#	Correct Answer	Rationale
1	C	Python's simple syntax, extensive ecosystem of third-party libraries (like NumPy and Pandas), and ease of sharing code make it popular in Data Science.
2	C	Jupyter Notebooks use Code cells for executable code and Markdown cells for rich text, equations, and documentation.
3	B	Magic commands (prefixed with % or %%) are special commands in Jupyter that extend the functionality of the notebook's environment and can perform tasks like timing code or running external scripts.
4	C	The %timeit line magic is specifically designed to measure the execution time of a single statement by running it multiple times and providing an average.
5	B	The %run line magic is used to execute a Python script from a file, effectively importing its content and running its top-level code.
6	C	A filepath (or path) is the unique location of a file in a file system, which typically includes the sequence of directory names leading to the file and the file name itself.
7	C	Unlike many other languages, Python uses indentation to logically structure and define blocks of code, such as those under loops or conditional statements.
8	C	Python is dynamically-typed, meaning you do not declare the variable type; the interpreter determines the type during program execution.
9	B	In Python, the multiplication operator (*) between a string and an integer repeats the string by the integer's value.
10	C	Objects defined with curly braces {} and containing key:value pairs are Python Dictionaries.
11	B	Tuples are immutable data structures, meaning their elements cannot be changed after creation, thus attempting to change an element raises a TypeError.
12	B	The loop will execute as long as x≤3 (for x=0,1,2,3). After the last iteration where x=3, x becomes 4. The condition 4≤3 is false, the loop terminates, and 4 is printed.
13	B	The list comprehension iterates through the list a and calculates the square of each element: 02=0, 12=1, 22=4, 32=9.
14	C	The evaluation is done from left to right. Since X(5) is not greater than Y(10), the first condition fails. The program then checks if X==Y (5 == 10), which is false. Finally, the else block executes, printing "L".
15	C	In Python 3, the range() function returns a range object, which is an iterable sequence, not a list of numbers; it is printed as range(start, stop).
16	D	The list method .sort() modifies the list in place and returns None. Therefore, b will be None, and a will be [2, 5, 8].
17	C	A lambda function is an anonymous function restricted to a single expression, which is implicitly returned.
18	A	The lambda function lambda x: x * 2 takes an argument x and returns x multiplied by 2. When called with (5), it returns 5×2=10.
19	B	The comprehension creates a set of the squares for i=1,2,3: {12,22,32}={1,4,9}. Sets are enclosed in curly braces.
20	C	Negative indexing in Python starts from -1 (the last element). Index -2 corresponds to the second-to-last element, which is 13.
21	B	The slice a[1:5:2] means: start at index 1 (value 20), stop before index 5 (value 50), and step by 2. This selects elements at indices 1 and 3, which are 20 and 40.
22	C	In Python, a function that returns multiple values without explicitly defining them as a list or tuple implicitly returns them packaged as a Tuple.
23	C	Pandas introduces Series (1-dimensional labeled array) and DataFrame (2-dimensional labeled table) as its core data structures.
24	B	A Series is a 1D, labeled, array-like object that can hold various data types (integers, floats, strings, Python objects, etc.).
25	C	When creating a Series, the first argument provides the values, and the index parameter provides the labels for those values.
26	C	Pandas Series arithmetic operations (like addition) are performed by aligning the data based on their index labels. If a label exists in one Series but not the other, the result for that label is a missing value (NaN).
27	C	A DataFrame is a 2D labeled data structure with columns and rows, providing a tabular view similar to a spreadsheet.
28	D	df.pos() is not a standard or correct operator to access elements in a Pandas DataFrame. The correct methods are [], .loc[], and .iloc[].
29	C	The statement is incorrect. While it is true that columns can be of the generic 'object' type (typically string), Pandas' read_csv() function is capable of inferring and assigning various correct datatypes (e.g., int64, float64, bool) to columns.
30	B	The .info() method is used to get a concise summary of a DataFrame, including the data type of each column, the count of non-null values, and the memory usage.
31	B	The statement is false. Pandas DataFrames have a dynamic schema; users can easily add, delete, or rename columns after initialization.
32	B	Any groupby operation follows the Split-Apply-Combine process: data is Split into groups, a function is Applied to each group, and the results are Combined into a new structure.
33	B	The standard Pandas method for renaming columns in a DataFrame is rename(), typically used with a dictionary mapping old column names to new ones.
34	B	The most direct and idiomatic way to add a new column is by assigning a list or Series of values to a new column name using dictionary-style bracket notation: df['new_col'] = values.
35	B	The fundamental data structure of NumPy is the N-dimensional array, or ndarray, which is a powerful and efficient container for large datasets.
36	B	NumPy uses zero-based indexing. The 5th row is at index 5−1=4. The 4th column is at index 4−1=3. The correct access is scores[4, 3].
37	A	np.linspace(start, stop, num) returns an array of evenly spaced numbers over a specified interval. Here, it creates 5 numbers between 0 and 10, including both endpoints: 0,2.5,5.0,7.5,10.0.
38	A	NumPy's main contribution is the ndarray, which enables highly efficient, vectorized operations on multidimensional arrays of numbers, making it essential for numerical computing.
39	A	In a shallow copy, the new object contains references to the original objects. Thus, changes to mutable elements in the copy will be reflected in the original. A deep copy recursively copies all objects, so changes do not affect the original.
40	B	A NumPy view (shallow copy) shares the underlying data memory with the original array, meaning modifications in the view affect the original. A copy (deep copy) allocates new memory, making it fully independent.