Section A – NumPy Basics (1–15)

1. What is NumPy? Why is it faster than Python lists?
2. Create a 1-D NumPy array with values from 1 to 20.
3. Create a 2-D NumPy array of shape (3, 4) filled with zeros.
4. Create an identity matrix of size 5×5.
5. Generate 10 random integers between 1 and 100 using NumPy.
6. Find the data type of a NumPy array.
7. Convert a Python list [2,4,6,8] into a NumPy array.
8. Reshape a 1-D array of size 12 into a 3×4 matrix.
9. Find the maximum, minimum, and mean of a NumPy array.
10. Perform element-wise addition and multiplication of two arrays.
11. Explain broadcasting with an example.
12. Extract all even numbers from a NumPy array.
13. Replace all values greater than 50 with 50 in an array.
14. Find the transpose of a 2-D array.
15. Compute the dot product of two matrices.

Section B – NumPy Intermediate (16–25)

16. Create a NumPy array of 20 evenly spaced values between 0 and 1.
17. Find the index of the maximum value in an array.
18. Sort a NumPy array in ascending and descending order.
19. Stack two arrays vertically and horizontally.
20. Convert a 2-D array into a 1-D array.
21. Count the number of non-zero elements in an array.
22. Create a boolean mask for values greater than the array mean.
23. Replace missing values (np.nan) with the mean of the array.
24. Find the diagonal elements of a matrix.
25. Create a 3-D NumPy array and explain its shape.

Section C – Pandas Basics (26–35)

26. What is a Pandas Series and DataFrame?
27. Create a DataFrame from a dictionary.
28. Read a CSV file using Pandas.

29. Display the first 5 and last 5 rows of a DataFrame.
30. Find the shape, columns, and data types of a DataFrame.
31. Select a single column and multiple columns from a DataFrame.
32. Select rows using iloc and loc.
33. Add a new column to an existing DataFrame.
34. Rename columns in a DataFrame.
35. Delete a column and a row from a DataFrame.

🟧 **Section D – Pandas Data Cleaning (36–45)**

36. Detect missing values in a DataFrame.
37. Remove rows with missing values.
38. Fill missing values using mean, median, and mode.
39. Convert a column's data type.
40. Remove duplicate rows from a DataFrame.
41. Filter rows based on a condition.
42. Sort a DataFrame by one and multiple columns.
43. Apply a custom function to a column.
44. Replace specific values in a column.
45. Convert categorical data into numeric format.

🟥 **Section E – Pandas Advanced & Integration (46–50)**

46. Group data using groupby and calculate mean and sum.
47. Merge two DataFrames using inner and left join.
48. Concatenate multiple DataFrames.
49. Export a DataFrame to CSV and Excel formats.
50. Use NumPy with Pandas to perform column-wise calculations.