**Data Science question Bank**

1. Write a Python program to create a NumPy array of shape (3,4) filled with random integers between 1 and 100.

2.Implement a Python program that performs the following NumPy operations:

* Joins two arrays
* Splits an array into three parts and Sorts an array in ascending order

3.Given two NumPy arrays, A = np.array([1, 2, 3]) and B = np.array([4, 5, 6]), perform the following operations:

* Element-wise addition
* Element-wise multiplication
* Dot product

4. Write a Pandas program that:

* Reads a dataset and Selects specific columns
* Filters rows based on a condition
* Sorts the DataFrame based on a column

5.Write a program to sort a NumPy array along **both rows and columns**.

6. Describe about array slicing and do the following: (1 mark)

a)Given the array arr = np.array([10, 20, 30, 40, 50, 60, 70, 80]), extract elements from index

2 to 5

b) Negative Slicing: extract elements from index -2 to -5

7.Create a Pandas **Series** with custom index labels ['A', 'B', 'C', 'D', 'E'] and values [10, 20, 30, 40, 50]. Retrieve the element at index "C".

8. Illustrate on column operations in pandas data frame with an example

9. Discuss in detail about stacking and its types. Justify how it is differentiated with an example

10.Create a multi-index DataFrame where the first level of the index represents **Departments** (IT, HR, Finance) and the second level represents **Employee IDs** (101, 102, 103). Assign random salaries and display the DataFrame.

#### 11.(a) Create a DataFrame with the following data and display it. (2 Marks)

| **Name** | **Age** | **Score** |
| --- | --- | --- |
| David | 21 | 78 |
| Emma | 25 | 92 |
| Frank | 22 | 85 |

**(b) Select and display the "Score" column and retrieve the row where the Name is "Emma". (2 Marks)**

**(c) From the DataFrame, filter students who scored more than 80 and sort them by Age in descending order. (2 Marks)**

**(d) Assign performance levels based on the scores using the following criteria: (4 Marks)**

* **Score ≥ 90** → "Excellent"
* **Score ≥ 80 and < 90** → "Good"
* **Score < 80** → "Needs Improvement"

12. What is the difference between vstack() and hstack()?

13. Given an array of shape (4,4), split it into two equal halves and then stack them back together.

14. Explain about Stacking and Unstacking in DataFrames.