**NumPy Test**

**Section A: Multiple Choice Questions** (1x10=10)

1. **Which of the following is a correct way to import NumPy?**  
   a) import numericpy as npy  
   b) import numpython  
   c) import numpy as np  
   d) import nump
2. **Given the array arr = np.array([[10, 20, 30], [40, 50, 60], [70, 80, 90]]), what is the output of arr[1:, :2]?**
   1. [[40, 50], [70, 80]]
   2. [[10, 20], [40, 50]]
   3. [[20, 30], [50, 60]]
   4. [[50, 60], [80, 90]]
3. **Which function is used to create an array of zeros?**  
   a) np.zeros()  
   b) np.zeros\_like()  
   c) np.ones()  
   d) np.empty()
4. **What is the output shape of the following code?**

arr = np.array([[1, 2], [3, 4], [5, 6]])

print(arr.shape)

a) (2, 3)  
b) (3, 2)  
c) (1, 6)  
d) (6,)

1. **Which method is used to reshape a NumPy array?**  
   a) np.resize()  
   b) np.reshape()  
   c) np.change\_shape()  
   d) np.modify\_shape()
2. **Which of the following will create an array of integers from 0 to 9?**  
   a) np.inrange(10)  
   b) np.linspace(0, 9)  
   c) np.arange(10)  
   d) np.array(10)
3. **What will np.ones((2, 3)) \* 5 output?**  
   a) A 2x3 matrix filled with 1s  
   b) A 2x3 matrix filled with 5s  
   c) A 2x3 matrix filled with random values  
   d) Error
4. **Which of the following commands will return the number of elements in a NumPy array arr?**  
   a) arr.shape  
   b) arr.size  
   c) len(arr)  
   d) np.count(arr)
5. **What is the difference between np.linspace() and np.arange()?**

a) np.arange() creates arrays with a specified number of elements, np.linspace() creates arrays with a specified step size.

b) np.linspace() creates arrays with a specified number of evenly spaced elements, np.arange() creates arrays with a specified step size.

c) np.linspace() only creates arrays of integers, while np.arange() creates arrays of floats.

d) Both are the same.

1. **What does the axis argument in np.sum(arr, axis=0) control?**  
   a) The type of summation to perform  
   b) The axis along which the summation happens  
   c) The axis that will be eliminated  
   d) The shape of the array after summation

**Section B: Short Answer Questions** (5x4=20)

1. **Explain the difference between NumPy arrays and Python lists. List advantages of Numpy.**
2. **How can you access the second column of a 2D NumPy array arr? Provide an example.**
3. **Describe the steps to create a 3D array in NumPy. How can you reshape a 1D array into a 3D array?**
4. **What is the use of the axis parameter in NumPy functions like sum(), mean(), and min()? Explain with examples.**

**Section C: Programming Questions** (10x3=30)

1. **Given two 1D NumPy arrays:**

arr1 = np.array([1, 2, 3, 4, 5])

arr2 = np.array([10, 20, 30, 40, 50])

Write a program to compute the element-wise product of arr1 and arr2. Then, find the sum of the resulting array.

1. **Array Manipulation:**
   * Create a 1D array of 20 integers.
   * Reshape it into a 4x5 matrix.
   * Find the mean, standard deviation, and median of the matrix.
   * Replace all values greater than the mean with 1 and all values less than or equal to the mean with 0.
2. **Data Aggregation and Filtering:**
   * Given an array of random numbers with size 1000 between 0 and 1, perform the following:
     1. Print all numbers greater than 0.5.
     2. Count how many numbers are greater than 0.7.
     3. Sort the array in ascending order.