**Numerical Python**

**Section 1: Basics of NumPy**

1. **What is NumPy primarily used for in Python?**  
   a) Web Development  
   b) Data Analysis & Scientific Computing  
   c) Game Development  
   d) Mobile App Development
2. **Which command is used to install NumPy?**  
   a) pip install numpy  
   b) install numpy  
   c) python get numpy  
   d) pip numpy
3. **How do you import NumPy in a Python script?**  
   a) import numpy  
   b) import numpy as np  
   c) from numpy import \*  
   d) All of the above
4. **What is the output of**np.array([1, 2, 3])**?**  
   a) [1, 2, 3] (Python list)  
   b) array([1, 2, 3]) (NumPy array)  
   c) (1, 2, 3) (Tuple)  
   d) {1, 2, 3} (Set)
5. **Which function creates an array of zeros?**  
   a) np.zero()  
   b) np.zeros()  
   c) np.empty()  
   d) np.null()

**Section 2: Array Creation & Attributes**

1. **What does**np.arange(5)**produce?**  
   a) [0, 1, 2, 3, 4]  
   b) [1, 2, 3, 4, 5]  
   c) [5, 4, 3, 2, 1]  
   d) [0, 5]
2. **Which function creates a 3x3 identity matrix?**  
   a) np.eye(3)  
   b) np.identity(3)  
   c) Both a and b  
   d) np.matrix(3)
3. **What is the shape of**np.array([[1, 2], [3, 4]])**?**  
   a) (2,)  
   b) (2, 2)  
   c) (4,)  
   d) (1, 4)
4. **What does**arr.ndim**return for a 2D array?**  
   a) 1  
   b) 2  
   c) 0  
   d) None
5. **Which function converts a list into a NumPy array?**  
   a) np.to\_array()  
   b) np.asarray()  
   c) np.convert()  
   d) np.list\_to\_array()

**Section 3: Array Operations**

1. **What is the result of**np.array([1, 2]) + np.array([3, 4])**?**  
   a) [4, 6]  
   b) [1, 2, 3, 4]  
   c) [13, 24]  
   d) Error
2. **Which function computes the dot product?**  
   a) np.dot()  
   b) np.matmul()  
   c) @ operator  
   d) All of the above
3. **What does**np.sum([1, 2, 3])**return?**  
   a) 6  
   b) [1, 2, 3]  
   c) 1  
   d) 3
4. **How do you compute the mean of a NumPy array?**  
   a) np.avg()  
   b) np.mean()  
   c) np.average()  
   d) Both b and c
5. **What is the output of**np.sqrt([4, 9, 16])**?**  
   a) [2, 3, 4]  
   b) [16, 81, 256]  
   c) [0.5, 0.33, 0.25]  
   d) Error

**Section 4: Indexing & Slicing**

1. **What is**arr[1, 2]**for**arr = np.array([[1, 2, 3], [4, 5, 6]])**?**  
   a) 2  
   b) 5  
   c) 6  
   d) 3
2. **How do you select the first row of a 2D array**arr**?**  
   a) arr[0]  
   b) arr[0, :]  
   c) arr[:, 0]  
   d) Both a and b
3. **What does**arr[arr > 5]**do?**  
   a) Returns elements greater than 5  
   b) Returns a boolean mask  
   c) Raises an error  
   d) Returns indices of elements > 5
4. **Which function flattens a multi-dimensional array?**  
   a) arr.flatten()  
   b) arr.ravel()  
   c) Both a and b  
   d) arr.reshape(-1)
5. **What is the output of**np.where(arr > 5)**?**  
   a) A new array with values > 5  
   b) Indices where condition is True  
   c) A boolean array  
   d) None of the above

**Section 5: Advanced NumPy Concepts**

1. **What is broadcasting in NumPy?**  
   a) Sending data over a network  
   b) Performing operations on arrays of different shapes  
   c) Converting arrays to lists  
   d) A type of array slicing
2. **Which function stacks arrays vertically?**  
   a) np.hstack()  
   b) np.vstack()  
   c) np.concatenate(axis=0)  
   d) Both b and c
3. **What does**np.random.seed(42)**do?**  
   a) Creates 42 random numbers  
   b) Ensures reproducibility of random numbers  
   c) Generates a seed value  
   d) None of the above
4. **What is the output of**np.unique([1, 2, 2, 3])**?**  
   a) [1, 2, 3]  
   b) [1, 2, 2, 3]  
   c) {1, 2, 3}  
   d) [3, 2, 1]
5. **Which function splits an array into multiple sub-arrays?**  
   a) np.split()  
   b) np.array\_split()  
   c) Both a and b  
   d) np.slice()

**Section 6: File I/O & Performance**

1. **How do you save a NumPy array to a file?**  
   a) np.save()  
   b) np.savetxt()  
   c) Both a and b  
   d) np.write()
2. **What does**np.load('data.npy')**do?**  
   a) Reads a CSV file  
   b) Loads a saved NumPy array  
   c) Converts a list to an array  
   d) None of the above
3. **Which is faster for numerical operations: Python lists or NumPy arrays?**  
   a) Python lists  
   b) NumPy arrays  
   c) Both are equal  
   d) Depends on the operation
4. **What is vectorization in NumPy?**  
   a) Using loops for computations  
   b) Performing operations on entire arrays without loops  
   c) Converting arrays to vectors  
   d) None of the above
5. **Which function is used to find the index of the maximum value in an array?**  
   a) np.max\_index()  
   b) np.argmax()  
   c) np.findmax()  
   d) np.maxloc()