Q1. What are the benefits of the built-in array package, if any?

Ans: Arrays use a single name to represent multiple data items of the same type. Arrays allow random access to elements via index numbers. An array allocates storage in contiguous locations for all its elements. Therefore, arrays have no possibility of allocating additional storage. This avoids memory overflows and memory exhaustion in arrays.

Q2. What are some of the array package's limitations?

Ans: The number of elements to store in the array must be known in advance. Arrays are static structures (that is, they have a fixed size). Once declared, the array cannot be resized. The memory allocated to it cannot be increased or decreased.

Inserting and removing from arrays is very difficult because elements are stored in contiguous memory locations and move operations are expensive. Allocating more memory than you need wastes storage space and allocating less memory will cause problems

Q3. Describe the main differences between the array and numpy packages.

Ans: The array package doesn't offer any help in doing math on the elements inside in numerical form, but NumPy offers a wide variety of math operations.

Arrays are one-dimensional entities that contain numeric data, but numpy can have multiple dimensions.

For arrays, elements can be accessed by their index position, which is a trivial task, but in numpy accessing elements by column and row index is time consuming. The same applies to append operations.

For arrays it doesn't form a tabular structure, but in numpy it forms a tabular structure

Q4. Explain the distinctions between the empty, ones, and zeros functions.

Ans: The distinctions between the empty, ones, and zero functions are as follows :

* Empty function: An empty function is a function that does not contain any statement within its body. If you try to write a function definition without any statement in python ,it will return an error. To avoid this, we use pass statement. pass is a special statement in Python that does nothing. It only works as a dummy statement.
* Ones: This function returns a new array of given shape and data type, where the element’s value is 1.
* Zeros: This function returns a new array of given shape and data type, where the element’s value is 0.

Q5. In the fromfunction function, which is used to construct new arrays, what is the role of the callable argument?

Ans: Its function is to run a function on each coordinate and the resulting array. The function is called with N parameters. where N is the rank of the form. Each parameter represents an array coordinate that varies along a particular axis.

Q6. What happens when a numpy array is combined with a single-value operand (a scalar, such as an int or a floating-point value) through addition, as in the expression A + n?

Ans: If any scaler value such as integer is added to the numpy array then all the elements inside the array will add that value in it.

Q7. Can array-to-scalar operations use combined operation-assign operators (such as += or \*=)? What is the outcome?

Ans: It will carry out provided operation on all elements of array.

Q8. Does a numpy array contain fixed-length strings? What happens if you allocate a longer string to one of these arrays?

Ans: Yes, you can have fixed length strings in numpy arrays. The dtype of a numpy array containing string values ​​is the maximum length of the strings present in the array. Once set, only new strings whose length does not exceed the maximum length at creation can be stored. If you try to reassign another string value whose length exceeds the maximum length of an existing element, all values ​​exceeding the maximum length are simply discarded, up to values ​​below the limit.

Q9. What happens when you combine two numpy arrays using an operation like addition (+) or multiplication (\*)? What are the conditions for combining two numpy arrays?

Ans: It will simply add or multiply element to element at the same position.

Q10. What is the best way to use a Boolean array to mask another array?

Ans: The best way to use a Boolean array to mask another array is by Using masked\_where of numpy package

Q11. What are three different ways to get the standard deviation of a wide collection of data using both standard Python and its packages? Sort the three of them by how quickly they execute.

Ans: np.std and math package can be used individually.

12. What is the dimensionality of a Boolean mask-generated array?

Ans: It will have the same dimensionality as the input array.