Here is the Python code to answer the questions step by step:

**Q1. Difference in Data Type Between list\_ and array\_list**

import numpy as np

list\_ = ['1', '2', '3', '4', '5']

array\_list = np.array(object=list\_)

# Printing data types

print("Data type of list\_:", type(list\_))

print("Data type of array\_list:", type(array\_list))

**Q2. Data Type of Each Element in list\_ and array\_list**

# Data type of elements in list\_

print("Data types of elements in list\_:")

for elem in list\_:

print(type(elem))

# Data type of elements in array\_list

print("\nData types of elements in array\_list:")

for elem in array\_list:

print(type(elem))

**Q3. After Changing array\_list Data Type to int**

array\_list = np.array(object=list\_, dtype=int)

# Data types of elements in list\_

print("Data types of elements in list\_:")

for elem in list\_:

print(type(elem))

# Data types of elements in array\_list

print("\nData types of elements in array\_list after conversion to int:")

for elem in array\_list:

print(type(elem))

**Q4. Characteristics of num\_array**

num\_list = [[1, 2, 3], [4, 5, 6]]

num\_array = np.array(object=num\_list)

# Shape of num\_array

print("Shape of num\_array:", num\_array.shape)

# Size of num\_array

print("Size of num\_array:", num\_array.size)

**Q5. Create a 3×33 \times 3 Matrix Containing Zeros**

zero\_matrix = np.zeros((3, 3))

print("3x3 matrix containing zeros:")

print(zero\_matrix)

**Q6. Create a 5×55 \times 5 Identity Matrix**

identity\_matrix = np.eye(5)

print("5x5 identity matrix:")

print(identity\_matrix)