Q1. Write a NumPy program to print the NumPy version on your system.

Q2. Write a NumPy program to convert a list of numeric values into a one-dimensional NumPy array.
Expected Output:
Original List: [12.23, 13.32, 100, 36.32]
One-dimensional NumPy array: array([12.23 13.32 100. 36.32])

Q3. Write a NumPy program to convert an array to a floating type.
Sample output:
Original array
[1, 2, 3, 4]
Array converted to a float type:
[1. 2. 3. 4.]

Q4. Write a NumPy program to create a null vector of size 10 and update the sixth value to 11.
[0. 0. 0. 0. 0. 0. 0. 0. 0. 0.]
Update sixth value to 11
[0. 0. 0. 0. 0. 0. 11. 0. 0. 0.]

Q5. Write a NumPy program to create an array with values ranging from 12 to 38.
Expected Output:
[12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37]

Q.6. An ndarray X contains the following data:

[[0 1 2 3]

[4 5 6 7]

[8 9 10 11]

[12 13 14 15]]

What will be returned by the statements:

i) print(X[0:2,0:2]

ii) print(X[2:0,2:0]

iii) print(X[2:0:-1,2:0:-1])

Q.7. Given the following ndarray Ary1 [[1 2 3],

[4 5 6],

[7 8 9]]

Write array slices to print:

a) Hoizontal rows separately

b) Veritcal columns separately

Q.8. Consider the two arrays: ar1=[[0 1 2],

[3 4 5],

[6 7 8]]

ar2=[[10 11 12]

[13 14 15]

[16 17 18]]

i) Write command to concatenate ar1 and ar2- i) rowwise and ii) columnwise

ii) What be the resultant array if the follwing statement is given?

np.hstack([ar1,ar2])

Q.9. Given a list L=[3,4,5] and an ndarray N having elements 3,4,5. What will be the result produced by:

a) L*3 b) N*3 c) L+L d) N+N

Q.10. Write a code to create an ndarray having six zeros in it. Write statements to change 3rd and 5th elements of this array to 15 and 25 respectively

Q.11. Consider the following ndarrays:

A=[10,20,30,40,50,60,70,80,90]

B=[[0,1,2,3],

[4,5,6,7],

[8,9,10,11],

[12,13,14,15]]

What will be the array slices as per the following?

i) B[0:2,1:3]

ii) A[2:6:3]

iii) A[-1:-3]

iv) B[::-1]

v) B[:3,2:]

Q.12. Predict the output of the following code fragements:

a)
```
x=np.array([1,2,3])
y=np.array([3,2,1])
z=np.concatenate([x,y])
print(z)
```

b)
```
grid=np.array([[1,2,3],[4,5,6]])
g2=np.concatenate([grid,grid])
print(g2)
```

c)
```
grid=np.array([[1,2,3],[4,5,6]])
g2=np.concatenate([grid,grid],axis=1)
print(g2)
```

Q.13. Predict the output of the following code fragements:

a)
```
x=np.array([1,2,3])
g=np.array([[9,8,7],[6,5,4]])
r=np.vstack([x,g])
print(r)
```

b)
```
g=np.array([[9,8,7],[6,5,4]])
y=np.array([[99],[99]])
r=np.hstack([g,y])
print(r)
```

Q.14. Write commands to perform following operations on two 4×4 ndarrays namely P and Q:

a) adding 10 to P
b) Multplication of two arrays P and Q
c) Divide all elements of Q by 7
d) Calculate the remainder of all elements of P when divided by 7

Calculate the square root of all elements of Q.

Q.15. Write a program to create a 4×4 ndarray having values ranging 0 to 15(both inclusive)

Q.16. Write a NumPy program to create a 10×10 matrix , in which all the elements on the border will be equal to 1 and inside 0

Q.17. Write a Numpy program to store elements in 3 ×3 2D array and compute:

i) Sum of all elements
ii) Sum of elements in each row
Sum of elements in each column

Q.18. Write a Numpy program to extract all odd numbers from a 1-D array.

Q.19. Write a Numpy program to convert a 1D array into a 2D array with 3 rows.

Q.20. Write a Numpy program to replace all even numbers in an array with -3 and copy the contents to a new array. The original array shouldn't be modified.

Q.21. Find the output of following program.

```
import numpy as np
d=np.array([10,20,30,40,50,60,70])
print(d[-4:])
```

Q.22. Write the output of the following code :

```
import numpy as np
array1=np.array([10,12,14,16,18,20,22])
array2=np.array([10,12,15,16,12,20,12])
a=(np.where(array1==array2)) print(array1[a])
```

Q.23. Write a NumPy program to create a 3x3 identity matrix, i.e. diagonal elements are 1, the rest are 0. Replace all 0 to random number from 10 to 20

Q.24. Write a NumPy program to create a 3x3 identity matrix, i.e. non diagonal elements are 1, the rest are 0. Replace all 0 to random number from 1 to 10

Q.25. Given following ndarray A:

```
( [[2, 4, 6],
[7, 8, 9],
[1, 2, 3]] )
```

Write the python statements to perform the array slices in the way so as to extract
First row(ii) Second Column