Sort Questions:

1. How many basic data types are there in Python?

2. How do you create a list in Python? Provide an example.

3. How do you create a variable in Python and assign the value 15 to it?

4. What is the difference between '=' and '==' in Python?

5. How do you access the first element of a list named 'my_list'?

6. What does the 'len()' function do in Python?

7. How do you write a docstring in Python?

8. What is the difference between a list and a tuple?

9. How do you cast an integer to a string in Python?

10. What is the difference between '=' and '==' in Python?

11. Print the output of the following code:

```
s = "Introduction to python"
print(s[:8:2])
print(s[::-1]
print(s[1::2]
```

12. What is the purpose of the %timeit magic command?

13. What is the purpose of a Python comment, and how do you write a single-line comment in Python?

14. What is the difference between %time and %timeit in IPython?

15. What is the difference between **List** and **Tuple** in Python?

16. How do you access the last element of a list named 'my_list'?

17. What do you mean by data type? Give examples.

18. What is the difference between an Array and Dictionary?

19. What is the difference between / and // in Python?

20. How do you define a function in Python? Write an example.

21. How do you create a NumPy array named numbers from a list of integers

[1, 2, 3, 4, 5, 6, 7, 8] and print the elements using slicing with the notation numbers[1::2]?

22. Explain split() and join() functions in Python?

23. How do you create a Python dictionary with the keys 'name', 'age', 'Course', and corresponding values 'Alice', 25, and 'PDS'?

24. What is the difference between List and Tuple?

25. How do you print the summation of all the numbers from 1 to 101?

26. In Python, what is docstrings?

27. What is the output of **print(2 * 2 ** 5)**?

28. How would you run a cell of code from a different file using IPython magic commands?

29. What is the output of the following code?

print(bool(3!=4))

30. How do you create a Dictionary in Python? Provide an example.

31. How do you create a Third Party function in Python?

32. Which one is Mutable - **List** or **Tuple** in Python?

33. What does the %timeit magic command do in IPython?

34. What does the %timeit magic command do in IPython?

35. How do you create a NumPy array in Python? Give an example.

36. Explain the difference between "is" and "==" in Python.

37. Explain the difference between mutable and immutable objects in Python.

38. What is a function in Python, and why are functions used? Give an example.

MCQ:

1. Which of the following is the correct way to create a list in Python?

a) list = [1, 2, 3]

b) list = (1, 2, 3)

c) list = {1, 2, 3}

d) list = "1, 2, 3"

2. What is the output of print(2 ** 3) in Python?

a) 6

b) 8

c) 9

d) 10

3. Which of the following data types is immutable in Python?

a) List

b) Dictionary

c) Set

d) Tuple

4. What does the len() function do?

a) Finds the length of a string

b) Finds the length of a list

c) Finds the length of a tuple

d) All

5. Which of the following is used to define a function in Python?

a) function

b) def

c) define

d) lambda

6. What will be the output of the following code?

       x = [1, 2, 3] x.append([4, 5])

       print(len(x))

a) 3

b) 4

c) 5

d) 6

7. Which of the following is a valid variable name in Python?

 a) 1_variable

b) variable_1

c) variable-1

d) variable.1

8. What is the correct syntax to output "Hello World" in Python?

a) echo("Hello World")

b) p("Hello World")

c) print("Hello World")

d) echo 'Hello World'

9. Which of the following methods can be used to remove an item from a list?

a) remove()

b) pop()

c) del

d) All of the above

10. What is the output of print(5 // 2)?

a) 2.5

b) 2

c) 3

d) 1

11. What is the purpose of the pass statement in Python?

a) To stop the loop

b) To continue to the next iteration

c) To do nothing and move to the next line of code

d) To return a value

12. Which keyword is used for conditional branching in Python?

a) switch

b) case

c) if

d) when

13. What will be the output of the following code?

```
for i in range(0, -5, -1):
        print(i, end=", ")
```

a) 0, -1, -2, -3, -4,

b) -1, -2, -3, -4, -5,

c) -1, -2, -3, -4,

d) No output

14. What does the break statement do in a loop?

a) Terminates the loop

b) Skips to the next iteration

c) Ignores the condition

d) Restarts the loop

15. How do you start a comment in Python?

a) //

b) /*

c) #

d) --

16. What is the output of print(bool(0))?

a) True

b) False

c) 0

d) None

17. Which function is used to get input from the user in Python?

a) input()

b) raw_input()

c) get()

d) scanf()

18. What is the output of print(2 * 3 ** 2)?

a) 18

b) 12

c) 36

d) 9

19. Which of the following is not a valid Python data type?

a) str

b) int

c) float

d) real

20. How do you check the data type of a variable in Python?

a) typeOf(var)

b) checkType(var)

c) dataType(var)

d) type(var)

21. What does the %timeit magic command do in IPython?

a) Measures the execution time of the code

b) Compiles the code

c) Profiles memory usage

d) Returns the version of Python

22. Which magic command is used to run code with the line-by-line profiler in IPython?

a) %memit

b) %prun

c) %mprun

d) %lprun

23. Which magic command is used to measure the memory usage of a Python object in IPython?

a) %memit

b) %who

c) %memory

d) %info

24. What is the correct way to create a NumPy array from a list [1, 2, 3, 4]?

a) np.array([1, 2, 3, 4])

b) np.create([1, 2, 3, 4])

c) np.make([1, 2, 3, 4])

d) np.build([1, 2, 3, 4])

25. What will be the output of the following code?

```
import numpy as np
a = np.array([1, 2, 3, 4])
print(a[1:3])
```

a) [1, 2]

b) [2, 3]

c) [2, 3, 4]

d) [3, 4]

Broad Question:

1. Write a Python program to find the factorial of a number using recursion.

2. Write a Python program to find Anagram Check.

3. Write a Python program using a **for** loop that:

   i. Prints the multiplication table for a given number 'n'.

   ii. Calculates the factorial of a given number.

4. You are given a list of positive integers containing all numbers from 1 to n except one missing value x. Write a Python program to find the missing value x in the list.

5. Write a Python program to Count Words in a Sentence.

6. i. Define a function **check_odd_even(n)** that takes n as input and checks if it is even or odd.

   ii. Define a function **fibonacci(n)** that takes n as input and prints the n-th Fibonacci number.

7. Write a program using the **ternary operator** where,

   i. Given an age, determine the category of the age (i.e., child, teenager, adult).

   ii. Check if a given number is positive, negative, or zero.

8. Given a dictionary of product prices:

prices = { 'apple': 30, 'banana': 10, 'orange': 60, 'grape': 55, 'mango': 20}

Write a Python program to

i. Change the pricing of a product.

ii. Add a new product to the inventory with its price.

iii. Determine and print whether each product is "Expensive" or "Affordable".

9. Write a Python program to check if a given number is a perfect number. A perfect number is a positive integer that is equal to the sum of its proper divisors (excluding itself)..

10. Write a Python program to find the maximum difference between two elements in a given list.

11. write a Python program using list comprehension to create a new list that contains the squares of the numbers that are divisible by 3 but not by 5. Then, print the resulting list.

12. Write Python code for the following tasks:

 i. Create a 3x3 NumPy array filled with random integers. Compute the mean of all the elements in the array and print it.

 ii. Create a 2D NumPy array with shape (4,4). Split the array into 2 equal- sized horizontal slices.

13. Define a function **factorial(n)** that takes an integer **n** as input and returns the factorial of **n**.

14. You are provided with the following Python code that is supposed to compute the sum of all positive integers up to a given number **n**. However, the code has an error that prevents it from running correctly.

```python
def sum_up_to(n):
    total = 0
    for i in range(n):
        total += i
    return total

print(sum_up_to(5))
```

Your task is to:
i. Use **%xmode** to display detailed error messages.
ii. Debug and correct the code accordingly.
iii. Provide a brief explanation of the error and your fix using Python Comments.

15. Write a Python function that generates a list of numbers from **1** to **n** (inclusive) and returns a new list where each number is replaced by its classification:

         i. "Even" if the number is even.
         ii. "Odd" if the number is odd.
         iii. "Multiple of 2" if the number is a multiple of 2.
         iv. "Even and Multiple of 5" if the number is both even and a multiple of 5.

16. Write a Python function that performs the following operations on a given list of mixed data types:

         i. Convert all elements of the list to strings.
         ii. Convert the list into a tuple.
         iii. Create a dictionary where the keys are the indices of the tuple elements and

the values are the corresponding elements.

Instructions:

Implement the function to perform these tasks. Your function should return the list of strings, tuple and dictionary.

Test your function with a sample list: [1, 4.56, "Python",False].

17. Write Python code for the following tasks:

i. Create a 4x5 array filled with 'Python'.

ii. Create a 3x3 array of random integers in the interval [5, 10).

iii. You have a 4x3 NumPy array. Use the reshape method to change its shape to 3x4.

iv. Create a 2D NumPy array with shape (3, 3). Split this array into 2 equal-sized vertical slices.

v. Given two NumPy arrays, a = np.array([4, 5, 6]) and b = np.array([7,8,9]), perform the following operations and provide the results:

Element-wise: addition of a and b, subtraction of a from b, multiplication of a and b and division of b by a.

18. Given the following NumPy array:

```
arr = np.array([[3, 2, 4, 1],
        [6, 8, 5, 7],
        [11, 10, 12, 9]])
```

Perform the following tasks:

i. Create a boolean mask to identify elements greater than 6. Use this mask to extract the elements from the array.

ii. Extract the second and third rows from the array using fancy indexing.

iii. Sort the entire array along the rows and print the sorted array.

19. i. Write a program that will take user input of cost price and selling price and determine whether its a loss or a profit.

ii. Write a program that will check whether the number is an *Armstrong* number or not.
   (The user will provide the integer input)

20. i. Write a loop in Python that prints the numbers from 1 to 100.
ii. How do you create a List in Python? Provide an example.

21. Write a Python function that performs the following operations on a given list of integers:

i. Remove all duplicate elements from the list while preserving the order of the first occurrence of each element.

ii. Sort the remaining elements in ascending order.

iii. Create a new list where each element is the square of the elements from the sorted list.

22. Write a function "min_max_range" that performs the following operations on a 2D NumPy array:

i. Find the minimum and maximum values in the entire array.

ii. Find the minimum and maximum values for each row.

iii. difference between maximum and minimum values for each row.

23. You are given a 2D NumPy array. Write a function "simple_indexing" that:

i. Extracts the element at position (0, 0) from the array.

ii. Extracts the entire second row of the array.

iii. Extracts the first two elements from the second row of the array

24. You are given a list of integers. Write a Python function process_list that performs the following operations:

i. Remove all duplicate integers from the list.

ii. Sort the remaining integers in ascending order.

iii. Replace each integer with its square.

25. Write a Python program that asks the user(students) for their name, Id and age, then prints a greeting

message.

26. Write a loop in Python that prints the even numbers from 10 to 100.

27. Write a Python program to calculate the length of a given string.

28. Write a python program to calculate the sum of digits of a given number.

30. Write a program that can create a new list from a given list where each item in the new list is square of the item of the old list.

31. Write a python program that uses a for loop to iterate over a range of numbers. Start from 10 and decrease by 3 each time until you reach a number less than 0. For each number in the range, print whether it is a positive number or not.

32. Write a python program to print the following pattern.

1
1 1
1 1 1
1 1 1 1
1 1 1 1 1

33. Write a Python program that accepts user inputs.

34. Write a loop in Python that prints only the even numbers from 1 to 10.

35. Write a Python function to calculate the average of two integers.

36. Write a Python program that keeps on accepting a number from the user until the user enters '-1. Display the sum and average of all the numbers.

37. Write a Python program that reverses a given list without using the built-in reverse() method. Print the reversed list.

38. Write a Python program that finds and prints the common elements between two lists.

39. Write a Python program that uses a loop to iterate over a range of numbers. The range should start from 0 and decrease by 2 each time until it reaches a number less than -10. For each number in the range, print whether it is an even number or an odd number.

41. Write a loop in Python that prints the numbers from 1 to 10.

42. How do you create a dictionary in Python? Provide an example.

43. Write a Python code snippet that checks if a number is even or odd. The number will be provided

by the user. So you have to take a number as input then check if the number is even or odd.

44. Write a Python program that prints the multiplication from 1 to 10.

45. Write a Python code snippet that checks if a number is even or odd.

46. What is the output of the following code?

```python
for num in range(10):
        if num % 2 == 0:
        continue
print(num)
```

47. What is the output of the following code?

```python
s = "Welcome"
print(s)
s = s + " to"
print(s)
s += " Python!"
print(s)
s = s[:16]
print(s)
s = s.replace("Welcome", "introduction")
print(s)
```

48. What is the output of the following code?

```python
x = "introduction to Python"
movie = "Inception"
book = "Sherlock Holmes"
poem = "the sun rises over the quiet town"

print(x.islower())
print(x.isupper())
print(movie.startswith("inception"))
print(movie.endswith("Journey"))
print(book.istitle())
print(poem.istitle())
print(book[-11:-4])
```