1. User-Defined Function (5 Questions)

1. Write a function to calculate the factorial of a number (without recursion).
2. Write a function to check if a number is Armstrong or not.
3. Write a function that takes a list of numbers and returns only even numbers.
4. Write a function that takes a string and returns the reverse of the string.
5. Write a recursive function to calculate Fibonacci series up to n terms.

🔹 **2. Lambda Function (5 Questions)**

6. Write a lambda function to find the maximum of two numbers.
7. Write a lambda function to count vowels in a given string.
8. Use a lambda with map() to convert a list of integers into their cubes.
9. Use a lambda with filter() to find numbers divisible by 5 from a list.
10. Use reduce() with lambda to find the product of all numbers in a list.

🔹 **3. List Comprehension (5 Questions)**

11. Create a list of squares of numbers from 1 to 20 using list comprehension.
12. Extract all words starting with vowel from a list of words.
13. Generate a list of tuples (x, x^2) for numbers from 1 to 10.
14. Flatten a 2D list using list comprehension.
15. Create a list of prime numbers between 1 and 50 using list comprehension.

🔹 **4. Class (5 Questions)**

16. Create a class Student with attributes name and marks, and a method to display details.
17. Create a class BankAccount with deposit and withdraw methods.
18. Create a class Circle with a method to calculate area and circumference.
19. Create a class Employee that increases salary by 10%.
20. Create a class Car with methods to start, stop, and display status.

🔹 **5. Inheritance (5 Questions)**

21. Create a base class Animal and a derived class Dog that overrides a method.

22. Create a base class Shape with method area(). Inherit Rectangle and Circle classes to implement area calculation.
23. Create a Person class and inherit Student and Teacher from it with additional attributes.
24. Create a Vehicle class and inherit Car and Bike with their specific features.
25. Demonstrate multiple inheritance with a StudentAthlete class (inheriting from Student and Athlete).

- **6. Polymorphism (5 Questions)**

26. Create two classes Cat and Dog with the same method speak(). Demonstrate polymorphism.
27. Demonstrate operator overloading by implementing addition of two Vector objects.
28. Demonstrate method overloading using default parameters.
29. Create a base class Shape with draw() method and override it in derived classes.
30. Demonstrate duck typing with classes having the same method name.

- **7. Encapsulation (5 Questions)**

31. Create a class Account with private balance attribute and provide methods to deposit and withdraw.
32. Create a class with private attributes and use getter and setter methods to access them.
33. Demonstrate name mangling with private variables.
34. Create a class Bank with encapsulated methods to show account details securely.
35. Demonstrate encapsulation by restricting access to class attributes.

- **8. Datetime Module (5 Questions)**

36. Write a program to display the current date and time.
37. Write a program to calculate a person's age from their date of birth.
38. Write a program to find the difference in days between two given dates.
39. Write a program to print the date 30 days from today.
40. Write a program to format today's date as "DD/MM/YYYY" and "YYYY-MM-DD".

- **9. Math Module (5 Questions)**

41. Write a program to calculate factorial using math.factorial().

42. Write a program to find the greatest common divisor (GCD) of two numbers.
43. Write a program to calculate square root, power, and logarithm using math module.
44. Write a program to generate random numbers between 1 and 100 (using math and random).
45. Write a program to convert radians to degrees and vice versa.

- **10. Regular Expression Module (5 Questions)**

46. Write a regex to check if a string is a valid email address.
47. Write a regex to extract all numbers from a string.
48. Write a regex to validate if a string is a valid Indian mobile number (10 digits).
49. Write a regex to find all words starting with a capital letter in a sentence.
50. Write a regex to replace all spaces in a string with a hyphen.