**Assignment 3 (Theory and Practical)**

1. What is an object in C++?

Ans

2. What is a class in C++ and how does it differ from an object?

3. Explain the concept of encapsulation with an example.

4. How do you define a class in C++?

5. Describe the syntax for creating an object of a class.

6. What are private members in a class and how are they accessed?

7. What are public members in a class and how are they accessed?

8. Explain the significance of access specifiers in a class.

9. Provide an example of a class with both private and public members.

10. How does data hiding work in C++?

11. What is a static data member in C++?

12. How do you declare and initialize a static data member?

13. What is a static function member in C++?

14. How do static function members differ from regular function members?

15. Provide an example of a class with static data and function members.

16. What is a constructor in C++ and why is it important?

17. Explain the different types of constructors in C++.

18. What is a default constructor and when is it used?

19. How do parameterized constructors work?

20. What is a copy constructor and what is its purpose?

21. Explain the concept of constructor overloading.

22. How does a constructor initializer list work?

23. What is a destructor in C++ and what is its purpose?

24. How is a destructor declared and defined?

25. What happens if a destructor is not explicitly defined in a class?

26. Explain the concept of automatic and dynamic storage duration in relation to destructors.

27. How do destructors differ from constructors?

28. What is operator overloading in C++ and why is it useful?

29. Describe the syntax for overloading an operator.

30. Which operators can and cannot be overloaded in C++?

31. Provide an example of overloading the "+" operator for a custom class.

32. Explain the concept of friend functions in the context of operator overloading.

33. What is a friend function in C++ and how is it declared?

34. How do friend functions differ from member functions?

35. Explain the benefits and potential drawbacks of using friend functions.

36. What is inheritance in C++ and why is it important?

37. Explain the different types of inheritance in C++.

38. How do you implement single inheritance in C++?

39. What is multiple inheritance and how does it differ from single inheritance?

40. Describe hierarchical inheritance with an example.

41. What is multilevel inheritance and how is it implemented in C++?

42. Explain the concept of hybrid inheritance.

43. What are access modifiers in C++ and what are the different types?

44. How do public, private, and protected access modifiers affect inheritance?

45. Explain how access modifiers control member accessibility in derived classes.

46. What is function overriding in the context of inheritance?

47. How do you override a base class function in a derived class?

48. Explain the use of the "virtual" keyword in function overriding.

49. What is the significance of the "override" specifier in C++11 and later?

50. What is a virtual base class in C++ and why is it used?

51. How do you declare and implement a virtual base class?

52. Explain the role of virtual base classes in resolving ambiguity in multiple inheritance.

53. Provide an example of using a virtual base class to avoid the diamond problem in inheritance.