Chapter 1 :

Principles of Object-Oriented Programming

Reference : E. Balaguruswamy Object Oriented Programming With C++; chapter-1.

Topics:

- **Topic 1: Basics of procedure oriented programming & object oriented programming**
- **Topic 2: Basic concept of object oriented programming**

Questions:

Topic 1: Basics of procedure oriented programming & object oriented programming

1. What is procedure(or structured) oriented programming(POP)? What is object oriented programming(OOP)? How does the POP(or structured oriented programming) differ from OOP? Write down the features of object oriented programming?
2. Write down the benefits of OOP.
3. Write down the application of OOP.
4. Basic organization of data and function in an OOP or,describe OOP paradigm.
5. Difference between object based and object oriented programming.
6. Explain system design. Explain briefly the steps involved in the OOP design approach.

Topic 2: Basic concept of object oriented programming

7. Write down the basic concepts related to OOP.
8. What is class and object? Differentiate between object and class.
9. What is encapsulation(data binding/data hiding)? Encapsulation reduces the complexity-justify your answer.
10. What is data abstraction? Or, what is abstract data types(ADT)?
11. Differentiate between data abstraction and encapsulation.
12. What is inheritance? What is reusability? How do you achieve reusability in C++?
13. What is polymorphism? Differentiate between polymorphism and inheritance.
14. What is dynamic binding(or late binding)? How is it useful in OOP?
15. What is message passing?
16. Describe the major part of C++ programming language.

Chapter 3 :

Token ,Expression and Control Structure

Reference : E. Balaguruswamy Object Oriented Programming With C++; chapter-3.

Topics:

- **Topic 1: Data type,Variable,Operator.**
- **Topic 2: Dynamic memory allocation**

Questions:

Topic 1: Data type,Variable,Operator.

1. What is bool data type?Why array is called derived data type?
2. Describe different types of operators used in C++ and state their purpose.
3. Explain the use of unary and ternary operator.
4. Explain the role of scope resolution operator in C++ with an example.
5. What is the reference variable? What is its major use?
6. How does the following statement differ:

   i) char *const p; ii) char const *p;

Topic 2: Dynamic memory allocation

7. What is dynamic memory allocation? Describe dynamic memory allocation and deallocation operator. Or, How can memory be allocated using “new” and release it using “delete”? Or, Describe the memory management operator used in C++. Or, What is dynamic initialization of a variable? Give an example.
8. Difference between the process of dynamic memory allocation used in C and C++. or, What are the advantages of new operator over malloc() function?

Chapter 4 :

Function in C++

Reference : E. Balaguruswamy Object Oriented Programming With C++; chapter-4.

Topics:

- **Topic 1: Basic of function**
- **Topic 2: Inline function**
- **Topic 3: Function overloading**
- **Topic 4: Basic C++ program using function**

Questions:

Topic 1: Basic of function

1. What is normal function? What is volatile function?
2. Describe different styles of prototyping.Write the advantages of function prototyping in C++.
3. What do you mean by default argument? When do we need to use default arguments in a function.Explain with an example.
4. Describe the ambiguity in case of default argument with an example.
5. Write down the difference between “call by value” and “call by reference”.

Topic 2: Inline function

6. What is inline function? When will you make a function inline? Situation where inline function does not work?
7. Write the advantages and disadvantages of inline function.
8. How does inline function differ from preprocessor macro?

Topic 3: Function overloading

9. What do you mean by function overloading? When do we need function overloading-explain with an example.
   Or,write a program in C++ that finds the area of different shapes using function overloading.
10. Differentiate between function overloading and function overriding.

Topic 4: Basic C++ program using function

11. Write a c++ program that inputs a string from the keyboard and determine the length of that string.
12. Write a c++ program that evaluate the following function to 0.0001% accuracy :

$$sum = 1 + (1/2)^2 + (1/3)^2 + (1/4)^2 + \ldots\ldots\ldots\ldots$$

13. Write a c++ program that evaluate the following function to 0.0001% accuracy :

$$sum = 1 + (1/2)^2 + (1/3)^3 + (1/4)^4 + \ldots\ldots + (1/n)^n$$

14. Write a c++ program that evaluate the following function to 0.0001% accuracy :

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots$$

15. Write a c++ program that evaluate the following function to 0.0001% accuracy :

$$\cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \ldots\ldots$$

16. Write a simple C++ program to manipulate a stack where push and pop functions are used to help this manipulation.

Chapter 2+5 :

(Beginning with C++) & (Class and object)

Reference : E. Balaguruswamy Object Oriented Programming With C++; chapter-2,5.

Topics:

- **Topic 1: Basics of class and object**
- **Topic 2: Static data member & static function**
- **Topic 3: Friend function**

Questions:

Topic 1: Basics of class and object

1. What is class and object?how objects are created?Describe the relation between class and object.
2. Describe the memory allocation of object .
3. How does a class accomplish data hiding?
4. Describe the mechanism of accessing member and member function:
    a) Inside the main program
    b) Inside the member function of same class
    c) Inside the member function of another class
5. How to access private member function of a class?
6. What are the characteristics of the member function?
7. What are the various function that can have access the private and protected member of a class?
8. What is local class? explain with example.
9. Write a class to represent the the time that includes the member function to perform the following:
    - Take inputs for time in hours and minutes

- Multiply time by scalar value
- Add two times
- Display the time in hours : minutes

10. Write a class to represent the the time that includes the member function to perform the following:
    - Take two separate times input in hours and minutes
    - Add two times
    - Display the time in hours : minutes

Topic 2: Static data member & static function

11. What is static data member?Mention the properties of static data member.
12. What is static member function?Mention the properties of static member function.
13. When you declare a member of a class static- explain with an example .
    or, Write a c++ program that introduces the use of static data member and member function.

Topic 3: Friend function

14. What is friend function?When you declare a function as a friend function?Write down the characteristics of friend function.
15. What is forward declaration? Why do we use forward declaration? “Forward declaration is needed in case of friend function”- justify your answer in case of suitable program. Or, Show with suitable code segment how friend function can be defined?
16. Write down the advantages(merits) and disadvantages(demerits/drawbacks) of friend function.
17. Write a program that performs swapping private data of classes using the friend function.