Class XII (Theory) - C++

Duration: 3 hours   **Total Marks: 70**

Unit No.	Unit Name	Marks
1.	OBJECT ORIENTED PROGRAMMING IN C++	30
2.	DATA STRUCTURE	14
3.	DATABASE MANAGEMENT SYSTEM AND SQL	8
4.	BOOLEAN ALGEBRA	8
5.	COMMUNICATION TECHNOLOGIES	10
Total		**70**

Unit 1:   **Object Oriented Programming in C++**   **(50 Theory + 40 Practical) Periods**

REVIEW: C++ covered In Class - XI,

Object Oriented Programming: Concept of Object Oriented Programming - Data hiding, Data encapsulation, Class and Object, Abstract class and Concrete class, Polymorphism (Implementation of polymorphism using Function overloading as an example in C++); Inheritance, Advantages of Object Oriented Programming over earlier programming methodologies,

Implementation of Object Oriented Programming concepts in C++: Definition of a class, Member of a class - Data Members and Member Functions (methods), Using Private and Public visibility modes, default visibility mode (private); Member function definition: inside class definition and outside class definition using scope resolution operator (::); Declaration of objects as instances of a class; accessing members from object (s), Objects as function arguments-pass by value and pass by reference;

Constructor and Destructor: Constructor: special characteristics, declaration and definition of a constructor, default constructor, overloaded constructors, copy constructor, constructor with default arguments;

Destructor: Special Characteristics, declaration and definition of destructor;

Inheritance (Extending Classes): Concept of Inheritances, Base Class, Derived classes, protected visibility mode; Single level inheritance, Multilevel inheritance and Multiple inheritance, Privately

derived, publicly derived and Protectedly derived class, accessibility of members from objects and within derived class (es);

Data File Handling: Need for a data file, Types of data files – Text file and Binary file;

Text File: Basic file operations on text file: Creating/Writing text into file, Reading and Manipulation of text from an already existing text File (accessing sequentially).

Binary File: Creation of file, Writing data into file, Searching for required data from file, Appending data to a file, Insertion of data in sorted file, Deletion of data from file, Modification of data in a file;

Implementation of above mentioned data file handling in C++;

Components of C++ to be used with file handling:

Header file: fstream.h; ifstream, ofstream, classes;

Opening a text file in in, out, and app modes;

Using cascading operators (>><<) for writing text to the file and reading text from the file; open (), get (), read () put (), write(), getline() and close() functions; Detecting end-of-file (with or without using eof() function), tellg(), tellp(), seekg().seekp();

Pointers:

Introduction to Pointer, Declaration and Initialization of Pointer; Dynamic memory allocation/de-allocation operators: **new, delete;** Pointers and Arrays: Array of Pointers, Pointer to an array (1 dimensional array), Function returning a pointer, Reference variables and use of alias; Function call by reference. Pointer to structure: De-reference/Deference operator: *, ->; self referencial structure;

Unit 2: Data Structures   (42 Theory + 36 Practical) Periods

Introduction to data structure- array, stack queues primitive and non-primitive data structure, linear and non-linear structure, static and dynamic data structure.

Arrays:

One and two Dimensional arrays: Sequential allocation and address calculation;

One dimensional array: Traversal, Searching (Linear, Binary Search), Insertion of an element in an array, deletion of an element from an array, Sorting (Insertion, Selection, Bubble)

Two-dimensional arrays: Traversal Finding sum/difference of two NxM arrays containing numeric values, Interchanging Row and Column elements in a two dimensional array;

Stack (Array and Linked implementation of Stack):

Introduction to stack (LIFO_Last in First out Operations)

Operations on stack (PUSH and POP) and its Implementation in C++, Converting expressions from INFIX to POSTFIX notation and evaluation of Postfix expression;

Queue: (Array and Linked Implementation)

Introduction to Queue (FIFO – First in First out operations)

Operations on Queue (Insert and Delete and its Implementation in C++, circular queue using array.

Unit 3: Database Management System and SQL

Common to both the options. Refer to unit 3 DATABASE AND SQL mentioned in case of Python for further details.

Unit 4: Boolean Algebra

Common to both the options. Refer to unit 4 mentioned in case of Python for further details.

Unit 5: Networking and Open Source Software

Common to both the options. Refer to unit 5 COMMUNICATION_TECHNOLOGIES mentioned in case of Python for further details.

Class XII (Practical) - C++

Duration: 3 hours   **Total Marks : 30**

1. Programming in C++   **10**

One programming problem in C++ to be developed and tested in Computer during the examination. Marks are allotted on the basis of following:

Logic   :   6 Marks

Documentation/Indentation   :   2 Marks

Output presentation   :   2 Marks

Notes: The types of problem to be given will be of application type from the following topics

- Arrays (One dimensional and two dimensional)
- Class(es) and objects
- Stack using arrays and or linked implementation
- Queue using arrays (circular) and or linked implementation
- Binary File operations (Creation, Displaying, Searching and modification)
- Text File operations (Creation, Displaying and modification)

2. SQL Commands   **05**

Five Query questions based on a particular Table / Relation to be tested practically on Computer during the examination. The command along with the result must be written in the answer sheet.

3. Project Work   **05**

The project has to be developed in C++ language with Object Oriented Technology and also should have use of Data files. (The project is required to be developed in a group of 2-4 students)

- Presentation on the computer
- Project report (Listing, Sample, Outputs, Documentations)
- Viva
  * 1 mark is for innovation while writing programme.

4. **Practical File** 06

Must have minimum 20 programs from the following topics

- Arrays (One dimensional and two dimensional, sorting, searching, merging, deletion' & insertion of elements)
- Class(es) and objects
- Stacks using arrays and linked implementation
- Queue using arrays & linked implementation (circular aslo).
- File (Binary and Text) operations (Creation, Updation, Query)
- Any computational Based problems
- 15 SQL commands along with the output based on any table/relation:

5. **Viva Voce** 04

Viva will be asked from syllabus covered in class XII and the project developed by student.

Guidelines for Projects (Class XI and XII)

1. **Preamble**

   1.1 The academic course in Computer Science includes on Project in each year. The Purpose behind this is to consolidate the concepts and practices imparted during the course and to serve as a record of competence.

   1.2 A group of 2-3 students as team may be allowed to work on one project.

2. **Project content**

   2.1 Project for class XI can be selected from the topics mentioned in the syllabus or domains on the similar lines

   2.2 Project for class XII should ensure the coverage of following areas of curriculum:

   a) Flow of control

   b) Data Structure

   c) Object Oriented Programming C++

   d) Data File Handling

   Theme of the project can be

   - Any subsystem of a System Software or Tool
   - Any Scientific or a fairly complex algorithmic situation
   - School Management, Banking, Library Information System, Hotel or Hospital Management System, Transport query system
   - Quizzes / Games;
   - Tutor, Computer Aided Learning Systems

   2.3 It is suggested to prepare a bilingual (English and other Indian language) user manual part of project file.

   2.4 The aim of the project is to highlight the abilities of algorithmic formulation, modular programming, optimized code preparation, systematic documentation and other associated aspects of Software Development.