BHARATHIAR UNIVERSITY: COIMBATORE 641046

CENTRE FOR COLLABORATION OF INDUSTRY AND INSTITUTIONS(CCII)

CERTIFICATE IN ADVANCED PROGRAMMING – C++ LANGUAGE

SCHEME OF EXAMINATION

PAPER	TOTAL MARKS	DURATION
PAPER – I THEORY EXAMINATION (60- Objective type of questions only)	100	2 HOURS
PAPER – II PRACTICAL EXAMINATION	100	2 HOURS
PAPER – III PROJECT ACTIVITY (One- Project submission only)	100	-
TOTAL	**300**	**-**

Applicable to Students in class 9 and above

Unit I

Introduction - Why object oriented programming is needed? - Advantages of object oriented programming - Comparison between procedure oriented programming and Object Oriented programming - Various OOP languages - Applications of OOP - Concepts of OOP - Objects - Classes - Data Abstraction - Encapsulation - Inheritance - Polymorphism - Code Reusability - Dynamic binding - Message communication - Difference between C & C++ - Introduction to C++ - Terminologies - Program - Programmer - Source Code - Object Code - Bug - Debug - Syntax error - Logical Error - Character set of C++ - Tokens - Keyword - Identifiers - Rules - Constants - Integer constants - Rules - Floating point constant - Rules - Character Constant - Escape sequence characters - String constants - Operators - Arithmetical - Relational - Logical - Assignment - Compound Assignment - Unary operator - Pre fix - Post fix - Ternary operator - Bitwise operators - Punctuators.

Unit II

Expression - Data type - Various data types with their range and memory size - User defined data type - typedef - enum - storage classes - void data type - variable declaration - Assigning values to a variable - const - Pointer variable - Initialization of pointer variable - Mixed mode expression and type conversion - rules for type conversion - type casting - I/O Statements - Role of header file - Extraction and Insertion operator - Single character I/O functions - Structure of a C++ program - Typing, Compiling, Saving and running a C++ program - Selection structure - Conditional statement - simple 'if' statement - if..else statement - if..elseif..else statement - nested if statement - switch…case statement - break and continue statement - loops - entry check loop - exit check loop - for loop - working principle of for loop - nested for statement.

Unit III

Arrays - Introduction - types of arrays - rules for array subscripts - single dimension array - declaration - memory allocation - Calculating the memory requirement of single dimension array - String array - Initializing character array - double dimension array - memory representation of 2D array - row major order - column major order - initialization of 2D array - Intro. To functions - types of functions - advantages of functions - steps in writing functions - function prototype - return statement - difference between function definition and declaration - actual and formal parameters - void function - call by value method - call by reference method - inline function - scope of the variable - function, local, file and class scope - library functions.

Unit IV

Intro. To Classes and Objects - Difference between structure and class - specifying a class - points to be observed while defining a class - Data abstraction - creating objects - accessing class members - defining member functions - inside the class and outside the class - features of member functions - static data members - array of objects - Polymorphism - function overloading - how are functions invoked in function overloading - integral data promotion - rules for function overloading - operator overloading - operators that cannot be overloaded - process of operator overloading - rules for operator overloading.

Unit V

Constructors and Destructors - Introduction - Functions of a constructor - types of constructor - Destructor - Features of a destructor - rules for constructor definition and usage - rules for destructor definition and usage - Difference between constructor and destructor - similarities between constructor and destructor - Inheritance - Definition - Advantages - Types of inheritance - Abstract class - derived class and base class - visibility mode.

CONTENTS

Paper II - Practical I - C++ Programming

1. Write a C++ program to generate Fibonacci series for 'n' terms.

2. Write a C++ program to find the factorial of a given number using functions.

3. Write a C++ program to find the sum of the series $1 + 2 + 4 + \ldots\ldots +n$.

4. Write a C++ program using functions, to check whether the given number is prime or not.

5. Write a C++ program to multiply two 3x3 matrices.

6. Write a C++ program to check whether the given string is palindrome or not.

7. Write a C++ program to find the volume of a cube with default argument l, b and h set to 2.

8. Write a C++ program to accept and print the transpose of a 3x3 matrix.

9. Define a class student with the following specification.

   private members of the class student

   > stuname - 25 characters
   >
   > regno - integer total -
   >
   > integer
   >
   > mark1, mark2, mark3, mark4, mark5 - integer.
   >
   > calculate( ) - a function to find the mark1 + mark2 + mark3 + mark4 + mark5 with integer return type.

   public member functions of class student

   > havedata( ) - a function to accept values for regno, stuname, mark1, mark2, mark3, mark4, mark5 and call calculate( ) to compute the total.
   >
   > dispdata( ) - a function to display all the data members on the screen.

10. Write a C++ program using function overloading and find the sum of 2 numbers and 3 numbers.

GUIDELINES FOR PROJECT ACTIVITY

Students shall be formed in groups. Out of 10 programs given, students are expected to solve any 5 programs, by choosing at least 2 programs from Question nos. 1 to 5 and 2 programs from Question nos. 6 to 10.

Following shall be featured in the project report:

- Introduction of the problem

- Objective of the Project

- Algorithm

- Flowchart

- Software / Hardware requirements

- Source Code

- Input & Output

- Result

- Reference

- Scope for further study

Project report shall be submitted with proper design and layout.

Paper III - Project / Assignment
Project Questions / Assignment Questions

1. Write a C++ program to create an electricity bill.

Fixed charges	Rs. 80
Upto 50 units	Rs. 2.25 per unit Rs.
51 - 100	2.75 per unit Rs.
101 - 200	3.00 per unit Rs.
201 - 300	3.50 per unit Rs.
301 - 400	4.25 per unit Rs.
Above 400	6.00 per unit

2. Write a C++ program to count the number of vowels in a given string.

3. Write a C++ program to read a set of 'n' integers and display the same in reverse order.

4. Write a C++ program to find the sum of two 3x3 matrices.

5. Write a C++ program to calculate simple interest for a given principal and rate of interest. Calculate and tabulate the same for 15 years.

6. Define a class to represent a library card with data members as
   a. Title   b. author   c. no. of copies and member functions
   1. To store book information
   2. To display the information

   Write a C++ program to implement the above requirements.

7. Write a C++ program to illustrate inheritance (single or multilevel).

8. Write a C++ program to create a base class Geometry. Derive two classes rectangle and square. Both the derived classes should contain the functions getdata( ), compute( ) and display( ). Choose the data members.

9. Write a C++ program to find the greatest of two numbers and three numbers using function overloading concept.

10. Write a C++ program to add two strings using binary operator overloading.