

## BCA-301

B.C.A. Third Year Examination, 2013

Paper - I

OBJECT-ORIENTED PROGRAMMING USING C++

Time : Three Hours

Maximum Marks : 100

### SECTION-A

This section consists of *one* question with *ten* sub-questions of 2 marks each.

Answer each sub-question in maximum 20 (Twenty) words.

### SECTION-B

This section consists of *ten* questions (*two* questions in each unit) of 16 (sixteen) marks each.

Attempt *one* question from each unit. Answer each question in about 400 words.

### SECTION-A

1. Answer all the following :

- (a) What is Object-Oriented Programming ?
- (b) Name Dynamic memory allocation and deallocation operators in C++.
- (c) What is the use of Default constructors ?
- (d) What is 'this' pointer ?
- (e) What are Pure Virtual functions ?
- (f) What do you mean by the term Polymorphism ?
- (g) What are Templates ?
- (h) How can you catch all types of exceptions ?
- (i) What is STL ?
- (j) How is ios::app mode different from ios::ate mode in file handling ?

## SECTION-B

### Unit-I

2. (a) Explain the main concepts of Object-Oriented Programming by taking suitable examples.  
(b) What are Default arguments ? Explain the implementation of default arguments by taking an example.
3. (a) What is an Inline function ? In which situations would you make a function inline ? Differentiate between Macros and Inline functions.  
(b) Differentiate between Procedural Programming and Object-Oriented Programming.

### Unit-II

4. (a) What are Constructors and Destructors ? Explain various features of Constructors and Destructors.  
(b) Write an overloaded function 'area' to calculate the area of a circle, rectangle and square.
5. (a) What do you mean by Operator overloading ? Explain various rules for overloading operators.  
(b) Write a C++ program to find the sum of two complex numbers using an overloaded + operator.

### Unit-III

6. (a) What do you mean by Inheritance ? Explain various types of inheritances available in C++.  
(b) Create a class publication that stores the title and price of a publication. From this class derive two classes "BOOK", which adds a page count and "TAPE", which adds a length count. Each of these three classes should have a getdata() and putdata() functions. Write a main() program to instantiate the book and tape classes and call appropriate getdata() and putdata() functions.
7. (a) Explain how base class member functions can be invoked in a derived class if the derived class also has a member function with the same name.  
(b) Apply the concept of polymorphism to the Vehicle hierarchy. Develop an abstract base class "Vehicle" that includes the vehicle's name and colour. Add a member function name horn() that displays the sound made by the Vehicle's horn. The horn member function should be a pure virtual function. Derive two classes "Taxi" and "Truck" from Vehicle and add appropriate functions to these classes. Write a main program to test the class hierarchy.

**Unit-IV**

8. (a) What are Templates ? Explain the use and advantages of class templates and function templates. Write the syntax for the declaration of a template in C++.
- (b) Design and implement a stack as a class template. Write the main() function to show the use of stack template for data types, integer and float.
9. (a) How is Exception handling performed in C++ ? Explain the use of try and catch blocks in Exception handling.
- (b) Write an Exception handler that catches an exception if a user attempts to divide a number by zero. Test your solution using the main program.

**Unit-V**

10. (a) What is STL ? Explain various components of STL.
- (b) What are containers in STL ? Explain various types of containers in STL.
11. (a) What do you mean by Sequential and Random access to files ? Explain various functions used for reading and writing to a file.
- (b) Write a program in C++ that maintains the list of students containing their personal details in a file. Write code for creating, reading and updating this file.