

S.E. (COMP.) (Semester - III) (RC) Examination, Nov. / Dec. - 2011

**BASICS OF C++**

Duration : 3 Hours

Total Marks : 100

Instructions : 1) Attempt any five questions by selecting at least one question from each Module.  
 2) Make suitable assumptions if required.

**MODULE - I**

- Q1)** a) List the pros and cons of object oriented programming over structured programming. [4]
- b) For the following C++ features write a fragment of code that illustrates the syntax involved. In each case explain very briefly what your example achieves.
- i) Preprocessor macros.
  - ii) Typecasts that convert from one data type to another.
  - iii) Conditional operator.
  - iv) Switch statement, including a default label. [8]
- c) Write a program in C++ to construct the following pyramid of digits. [8]

```

      1
    2 3 2
  3 4 5 4 3
4 5 6 7 6 5 4
5 6 7 8 9 8 7 6 5
  
```

- Q2)** a) What is the difference between using a break in a for loop and using a continue in a for loop? [2]
- b) Compare how the if statement and the switch statement are alike (give at least two ways). Explain how they are not alike (give at least two ways). [4]
- c) Write a program to read a set of numbers and find
- i) sum of all odd integers.
  - ii) smallest of them
  - iii) range i.e. difference between the smallest and the largest number.
- Do not use arrays. [9]
- d) List and explain the categories of operators supported by C++. [5]

**MODULE - II**

- Q3)** a) Explain the differences between pointers and references. [2]  
b) Explain the following by providing relevant code segments. [10]  
i) Local, global and static variables.  
ii) Call by reference using pointers.  
iii) Passing a two dimensional array to a function.  
iv) Returning an array from a function.  
c) Write a function to take an integer number as an argument and return 1 if it is a prime number and 0 otherwise. Use the function to display all prime numbers less than 1000. [8]
- Q4)** a) Explain the array out of bounds situation. Explain the ways to handle this situation. [4]  
b) Show how the elements of one-and-two dimensional arrays can be manipulated by means of pointer variables, or, interchangeably, by using the index. [4]  
c) Write a function in C++ which, given two 3 x 3 float arrays representing matrices as arguments, calculates their matrix product. [6]  
d) What are strings? Are they standard or derived data type? Write an interactive program to compute the length of a given string. What happens, if the end-of-string character is missing? [6]

**MODULE - III**

- Q5)** a) Differentiate a class and a structure. [3]  
b) Mr. Raj has written a class with an operator + which is not a member function, but the operator + implementation does access the private member variables of objects in the class. Explain the technique used by Mr. Raj. [3]  
c) What do you understand by enumerated data type? Explain with examples. [4]  
d) Define a structure called Book with data members Book name, author name, publisher, year of publication and cost. Define functions to add, delete and modify the information of a Book in an array of Book structure. Display all the book information ordered according to their year of publication. [10]
- Q6)** a) Write a program in C++ which defines two classes and then calculate the product of the first class private data with the second class private data. [6]  
b) Define a class to represent a bank account. Include the following data members : Account holder's name, Account number, and Balance. Define functions to Initialize values, deposit an amount and withdraw an amount after verifying the balance. Write a main function also. [8]

- c) What is an automatic default constructor, and what does it do? [2]
- d) List the operators that cannot be overloaded and justify why they cannot be overloaded. [4]

### MODULE - IV

- Q7)**
- a) What are the virtual functions and pure virtual functions? [3]
  - b) What is inheritance? Explain the need of inheritance with suitable examples. [4]
  - c) Can base class access members in a derived class? Give reasons. [3]
  - d) Write a program to define a class Student with data members student name, age and Roll Number. The Student class should inherit Person class and Exam class. The data members of Person class are height, weight and age. Whereas, the data members of Exam class are Roll no, subject and marks. Define constructors and destructors for all the classes. Define function showdata() at each class. Write a main program to display the values of data members. [10]
- Q8)**
- a) Discuss the schemes to allocate memory for 2-D and 3-D arrays. Give relevant code segments. [6]
  - b) Under what circumstances is it useful to catch exceptions by reference or pointer? [3]
  - c) Write a program to compute a ratio of two integers. Include exception handling features to guard against division by zero error. [8]
  - d) What is late binding? How is it useful for development of class libraries? [3]

