COMP 3 – 2 (RC)

S.E. (Computer) (Semester – III) (RC) Examination, May/June 2012
BASICS OF C++

Duration: 3 Hours | Total Marks: 100

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

MODULE – I

1. a) Write brief notes on the following aspects of the language C++. 8
   i) Format of C++ program
   ii) Operators
   iii) Data types
   iv) Declaration.

   b) Compare the features of structured programming and object oriented programming. 3

   c) Write a program to find S defined as 6

$$S = 1 + \frac{nx}{1!} + \frac{n(n-1)x^2}{2!} + \ldots$$

   d) The following for-loop is written to print 32 Hello's, but it's not working as intended. Why ? 3

```
unsigned int i;
for (i = 31; i >= 0;– – i)
    cout << "Hello!" << end1;
```

2. a) What are qualifiers used with data types ? Illustrate them with examples. 4

   b) Point out the errors if any in the following : 3

```
#include<iostream>
int main()
{float x; y = + 8.0;
 cout << x << and << y values;
}
```

P.T.O.

c) What are the differences between break and continue statements ? Develop a program to show differences. 5

d) Write an interactive program to compute the cosine of a number using the series. Compare the result with one obtained using the library function. 8

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

MODULE – II

3. a) A function has a parameter x, and the body of the function changes the value of x. When should x be a value parameter ? When should it be a reference parameter ? With this function, could x ever be a const reference parameter ? 3

b) Explain the syntax for defining pointer variables. Explain the different arithmetic operations that can be performed on pointer variables with help of a code segment. 5

c) Discuss the advantages and disadvantages of the static and global variables. 4

d) Write an interactive program to read a set of integers and find their :

i) average

ii) the difference between the maximum and the minimum number and

iii) the sum of difference between each number and the average value. Use pointers to access the array elements. 8

4. a) Consider the following declarations : 5

int data [100];

Write a small segment of C++ code that will shift data[51]... data[99] to the locations data[50]...data[98]. The value of data[99] remains unchanged.

b) Write C++ program to check whether the given input string is a palindrome. 5

c) Explain then concept of inline functions. 2

d) Explain the following with relevant code segments : 8

i) Default parameters

ii) Call by value

iii) Call by reference using reference variables

iv) Call by reference using pointer variables.

MODULE – III

5. a) Explain why it is almost always a bad idea to declare the data members of a class to be public. 2

   b) Explain the following C++ features. Use a short fragment of code to compliment your explanation. 10

      i) The use of a destructor

      ii) Overloading an operator

      iii) Array of structures

      iv) Enumerated data types.

   c) Define a class in C++ Called complex which manipulates complex numbers. It should include the overloaded operators +, – and the functions get_data() and display(). Write a short main function to show how this class would be used. 8

6. a) What are unions ? Write a program to illustrate the use of the union. 5

   b) Define a structure called students with data members Roll_no, Name, Branch, Year of admission and merit number. Write a program to read the information of 10 students and display their information on ascending order of their merit number. Also display the name of the first student who selected computer branch as per the merit number. 10

   c) What are the constructors and destructors ? Explain how they differ from the normal functions. 3

   d) Can a function be declared static ? Explain with examples. 2

MODULE – IV

7. a) List and explain the different types of inheritance available in C++ with the help of an example each. 5

   b) What is meant by a purely virtual function ? Explain using relevant code segments. 3

   c) Describe the order of function execution for base and derived constructor functions and for destructor functions. 2

d) Define a class to store the following information about an element :

i) Symbol

ii) Atomic number

iii) Atomic weight.

Create a derived class to store the following additional information :

i) Number of protons

ii) Number of neutrons.

Define constructors and destructors for both the classes. Define member functions to read and display the information for both the classes. 10

8. a) Describe different methods of realizing polymorphism in C++. 4

b) What are the virtual destructors ? How do they differ from normal destructors ? Can constructor be declared as virtual constructors ? Justify your answers. 4

c) Write a program to dynamically construct a matrix with size n X m. Write functions to multiply and to add any two given matrices. 8

d) Under what circumstances is it useful to catch exceptions by value ? 4