[Total No. of Questions : 8]

S.E. (Comp.) (Semester - IV) (RC) Examination, Nov. - 2011
OBJECT ORIENTED PROGRAMMING AND DESIGN USING C++

Duration : 3 Hours Total Marks : 100

Instructions : *1)* *Assume suitable data if necessary.*

2) *Answer any five questions, attempt at least one question from each module.*

3) *Draw neat diagrams if required.*

4) *Write question numbers legibly while answering.*

5) *Only concentrate on main logic required in the program rather than completeness of the program.*

MODULE - I

Q1) a) Define two classes Polar (r, a) and Rectangle (x, y) to represent points the polar and rectangle systems. Use conversion routines to convert from one system to the other. Make use of the following conversion formulas

$$x = r * cos(a)$$

$$y = r * sin(a)$$

$$a = atan (x / y); // arc tangent$$

$$r = sqrt (x* x + y* y)$$ **[10]**

b) Write a program to read a list containing item name, item code and cost interactively and produce a three column output as shown below.

```
--------------------------------------------
Name            Code     Cost
--------------------------------------------
Turboc C++      1001     250.95
C primer        905      95.70
....            ......   ... .....
..........      ......   ..........
```

Note that the name and code are left-justified with a precision of two digits. Trailing zeros are shown. **[10]**

Q2) a) Design and implement a class 'string' using an array, with a maximum size of 20 characters. The class should contain the necessary constructors, destructor, overloaded assignment operator and a friend function for concatenation of two strings. Make suitable assumptions if required. Also write main ( ) for the above. **[10]**

b) What is the need of a virtual function? Describe this with the help of a suitable example using C++. What is a pure virtual function? **[10]**

MODULE - II

Q3) a) Write a program that reads a text file and creates another file that is identical except that every sequence of consecutive blank spaces is replaced by a single space. [8]

b) Assume that file already created contains such as name and telephone number in the following format

John	23456
Amar	76899
....	....

Write an interactive menu driven program that will access the file created above and implement the following tasks. [12]

i) Determine the telephone number of the specified person.

ii) Determine the name if a telephone number is known.

iii) Update the telephone number, whenever there is a change.

Q4) a) How is a exception handling performed in C++? Write a program that throws an arithmetic exception as and when a number input is greater than 9999. [8]

b) Write a C++ template function, called exchange ( ) that accepts two arguments of generic type and swaps their contents. [6]

c) Explain the concept of Stack Unwinding incase of exception handling with appropriate example program. [6]

MODULE - III

Q5) a) Using standard library string class, implement a program to check whether the given string is palindrome or not. (palindrome is word that is read same forward and backwards). [8]

b) Illustrate with example, purpose of the string class functions supported by C++ standard library

i) substr ()

ii) capacity ()

iii) find ()

iv) insert ()   [6]

c) Describe how iterators used with string class with example program. [6]

Q6) a) Define using STL, a vector v with a maximum size of 10. **[10]**

- Sets the first element to of v to 100
- Sets the last element of to 200
- Sets the other elements to 10
- Displays the contents of v.

b) Explain the purpose of the following functions with reference to the list container with example program with expected output. **[10]**

➤ push_front()

➤ push_back()

➤ splice()

➤ sort()

➤ merge()

MODULE - IV

Q7) a) How do you represent composition and aggregation is in class diagram with appropriate example. Also explain how they are different. **[10]**

b) What are USE CASE diagrams? Explain the significance of these diagrams in software development process. **[10]**

Q8) a) Describe the need for sequence diagram in UML. Draw the sequence diagram for ATM application. in which the user (customer) session with ATM system represented. **[10]**

b) Describe the advantages and disadvantages of water fall model over iterative model. **[10]**