Roll No........................

Total No. of Questions : 13]   [Total No. of Pages : 02

J-3094[S-94]   **[2037]**

M.Sc. (IT) (Semester - 1ˢᵗ)
C++ & DATA STRUCTURES (M.Sc. (IT) - 103)

Time : 03 Hours   **Maximum Marks : 75**

Instruction to Candidates:

1) Section-A is **compulsory**.

2) Attempt any **Nine** questions from Section-B

Section - A

(15 x 2 = 30)

Q1)

a) Differentiate between keyword and identifier?

b) Find the values of x >> 2 and x & y using the following declaration :
   unsigned char x ='\011', y ='\027';

c) Determine the value of *min*:
   int m = 1, n = 2;
   int min = (m < n ? m-- : n++);

d) When will you use *break* statement?

e) Show a use of *extern* storage class specifier.

f) Write a recursive function for $f(x) = \begin{cases} 1 & x = 1 \\ f(x) = 2f(x-1) & x > 1 \end{cases}$

g) How will you initialize an array to *n* strings?

h) When will you declare pointer to a function?

i) What is the role of a constructor?

j) What is meant by indirect classes?

k) Differentiate between overloading and overriding.

l) What is late binding?

P.T.O.

m) How will you define an output stream?

n) Give a binary tree representation.

o) Give an example of pure virtual function.

Section - B

(9 x 5 = 45)

Q2) Write the advantages & disadvantages of C++.

Q3) What are the different operators in C++. Differentiate between associativity and hierarchy.

Q4) Write a program to print numbers divisible by 2, 3 & 5 from *m* through *n*.

Q5) Write a recursive program to calculate $^nC_{r-1}$.

Q6) How will you sort names in reverse lexical order using arrays?

Q7) Define a class named complex for representing complex numbers. A complex number has the general form *a* +*ib*, where *a* is real part and *b* the imaginary part (i stands for imaginary). Complex arithmetic rules are as follows:

$(a + ib) + (c + id) = (a + c) + i(b + d)$
$(a + ib) - (c + id) = (a - c) + i(b - d)$
$(a + ib) * (c + id) = (ac - bd) + i(bc + ad)$

Define these functions as member functions of *complex*. $\left(i^2 = \sqrt{-1}\right)$.

Q8) How does C++ support Inheritance?

Q9) Write overloaded versions of function *Min* which compares two integers, reals, or two strings, and returns the 'smaller' one.

Q10) When do we use virtual base class? Explain with an example.

Q11) Write a C++ program for the implementation of *stack* data structure.

Q12) Write a program that copies a user-specified binary file to another user-specified file.

Q13) How does C++ support dynamic memory allocation?