Reg No.										

MANIPAL INSTITUTE OF TECHNOLOGY
(Constituent Institute of Manipal University)
MANIPAL-576104

FIFTH SEMESTER B.E(CSE)
End semester exam
Principles Of Programming Languages(CSE-303)
25-11-2008

TIME : 3 HOUR MAX. MARKS : 50

Instructions to Candidates

- Answer any five full questions
- Answer should be clear and concise in point form
- Missing data can be suitably assumed

1a) In C++, in presence of side effects the function evaluates to different results on same datasets which design principle does it violate? define that design principle.(3marks).
1b) The syntax of a language is cryptic which design principle does this aid? Define that design principle. (3marks).
1c) Write down while statement equivalent of the following statement.
If(e) s1 else s2 //where "e" evaluates to either zero or one. (2marks).
1d) List the subdivisions of efficiency design principle. (2marks).

2a) "Any expression can be used within the conditional statement".Which design principle the language supporting? Define that design principle. (3marks).
2b)Using the following grammar
E→E+T | E * T | T
T→0|1|2|3|4|5|6|7|8|9|(E)
Draw a parse tree & abstract syntax tree for each of the following
i)5+4*3 ii)5*4+3 (5marks).
2c)Given the following Java declaration
short i=2;
the java compiler generates an error for the statement
i=i+i;
why? (2marks).

3a) Disambiguate the following grammar also give EBNF notation for the disambiguous grammar.

E→ E+E | E-E | E*E | E%E | E^E | (E) | num
num → num digit | digit
digit → 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Priority & associativity of the operators are as in language C++. (5marks).

3b)Draw the symbol table structure at point1 for the following code.

```
#include<stdio.h>
struct
 {  int a;
    char b;
    double c;
 }x={8,'b',2.5};
 void p(void)
  {struct
     {
        double a;
         int b;
         char c;
      }x={1.2,5,'e'};
   /*point1*/ printf ("%f %d %c\n",x.a,x.b,x.c);
   }
 main( )
 {
   p( );
    return 0;
 }
```

(5marks).

4a) Write an exception handler to handle division by zero error in C++ or Java. (3marks).
4b)Write iterative versions of quicksort and merge sort. (7marks).

5a)Write complete algebraic specification for Boolean data type. Identify the constructors, selectors & predicates. Find out total number of axioms possible. (7marks).

5b)prove that

if-statement→if(expression)statement [else statement]

is ambiguous. Disambiguate the above grammar. (3marks).

6a)A tautology is a statement that is always true, no matter what the truth values of its components. Use the truth table to show that false→p is a tautology for any statement p. (2marks).

6b)Write Scheme procedures to

i)find factorial of a number.
ii)find whether element is present in a list.
iii)find the sum of two lists. ((2+3+3)marks).