Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

V SEMESTER B.TECH (COMPUTER SCIENCE AND ENGINEERING)

END SEMESTER EXAMINATIONS, DEC 2015/JAN 2016

SUBJECT: DESIGN AND IMPLEMENTATION OF PROGRAMMING LANGUAGES [CSE 301]

REVISED CREDIT SYSTEM

Time: 3 Hours Date: 29-12-2015 MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data, if any, may be suitably assumed.

1A. Explain Control Unit abstraction and Data Unit abstraction giving an example for each. Also explain the reusability property of unit data abstraction. 3M

1B. Justify the statement " Languages that satisfy the criterion of regularity are said to adhere to a principle of least astonishment". Explain with example, the three concepts of regularity which are considered as the language design criteria. 4M

1C. Explain the scanning and parsing phases of a translator. List the different categories of tokens, giving two examples for each. 3M

2A. Write the syntax diagram for the following grammar

expr → expr + term | term
term → term * factor | factor
factor → (expr) | number
number → number digit | digit
digit → 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 5M

2B. For the following C program, write the static symbol table at line number 7, 13, 17 and dynamic symbol table at the beginning of line 17, 12. 6 . Also write the output for the same using lexical and dynamic scoping. 5M

```
(1) #include <stdio.h>
(2) int x = 1;
(3) char y = 'a';
(4) void p(){
(5) double x = 2.5;
(6) printf("%c\n",y);
(7) { int y[10];
(8) }
(10) void q(){
(11) int y = 42;
(12) printf("%d\n",x);
(13) p();
(14) }
(15) main(){
(16) char x = 'b';
(17) q();
(18) return 0;
(19) }
```

3A. With proper diagram, explain assignment by copying, assignment by sharing and assignment by cloning. 3M

3B. Define type checking and type inference. Explain Subset type constructor with an example. 3M

3C. List any two benefits of short circuit evaluation. Write the syntax of Guarded-If statements and write the semantic for the same. 4M

4A. Explain how Java programs achieve "write once, run anywhere". Write a Java program to read set of names as strings from the user and sort those names in alphabetical order. 5M

4B. Define partial function and total function. Explain the standard evaluation rule for scheme expression. 3M

4C. Write a Tail recursive Scheme program to find the factorial of a number. 2M

5A. Write the following statement in First Order Predicate Calculus and Horn Clause.
"John is a grandparent of David if John is the parent of someone who is the parent of David" 2M

5B. Write the axioms to find the GCD of two numbers using Euclid's algorithm. Use those axioms to find the GCD of 10 and 15 by applying Resolution and Unification. 3M

5C. Define Granularity of processes. Explain the different choices of constructs for parallel execution giving example for each. 5M

6A. With neat diagram, explain in detail the different processor architectures used in parallel processing. 5M

6B. With the general form and syntax, explain how the inference rules in logic are written. 2M

6C. Explain the three principles methods to describe the semantics formally. 3M