8. Write short notes on any *two* : 5 × 2

(*i*) Local Binding

(*ii*) Abstraction Boundaries

(*iii*) Inheritance.

2015

(Set-Q_1)

MCA-1st

Principles of Programming Languages

Full Marks : 70

Time : 3 hours

Answer any **six** questions including **Q.No.1** which is compulsory

The figures in the right-hand margin indicate marks

1. Answer *all* questions : 2 × 10

(*a*) What do you mean by mutually recursive procedures ?

(*b*) Draw an abstract syntax tree for the *lamda* calculus expression
((*lamba* (*a*) (*a b*)) *c*)

(*c*) Differentiate between cal-by-value and call-by-reference parameter passing mechanisms.

(*d*) What is the need of type inference ?

(*e*) What are the limitations of multiple inheritance ?

(*f*) Write an expression in BNF for floating point numbers.

(*g*) Compare elementary data with structured data.

(*h*) Show the steps of computing the recursive function fact (4) to compute the factorial of 4.

(*i*) What do you mean by scope of variable ?

(*j*) What are the characteristics of a strongly typed language ?

2. Prove : Let $S \in$ <*bintree* >, where <*bintree*> is defined by

<*bintree* > ::= < *number* >

(< *symbol* > < *bintree* > <*bintree*>)

then *S* contains an odd number of nodes. 10

3. Consider a stack data type with procedures empty-stack, push, pop, top and full-stack. Write a procedural representation of the above operations. 10

4. Why type checking is required ? What are the two alternatives of type checking ? Explain and compare the same. 2 + 2 + 6

5. (*a*) Explain how exception are raised ? 4

(*b*) How exception are propagated ? Explain. 6

6. Explain : 5 × 2

(*a*) Multithreading

(*b*) Logic programming.

7. For each expression *E*, below, find the expression $[E] \cdot [k]$. 3 + 4 + 3

(*a*) add1 ((*f* (*g* × *y*) + (*u*, *v*)))

(*b*) zero ? (if (*f a*) then (*p x*) else (*p y*))

(*c*) let x = let y = 8 in (*p y*) in x.