T.E. (Comp.) (Sem. – II) (2003 Course) Examination, 2009
PRINCIPLES OF PROGRAMMING LANGUAGES

Time : 3 Hours Max. Marks : 100

Instructions: *i) Answer **any three** questions from **each** Section.*
*ii) Answers to the **two** Sections should be written in **separate** books.*
*iii) **Neat** diagrams must be drawn **wherever** necessary.*
*iv) Black figures to the **right** indicate **full** marks.*
*v) Assume **suitable** data, **if necessary**.*

SECTION – 1

1. a) Briefly discuss Role of Programming Languages for following areas of applications with the help of common data structure and control structure supported, special features/characteristics needed, suitable high level language. **8**

   i) System level programming

   ii) Scripting kind of applications.

   b) For the following binding examples identify corresponding binding times **6**

   i) Star sign (*) bound to multiplication.

   iii) int bound to $[-2^{k}, \ldots, 2^{k} - 1]$

   iii) Variable bound to type.

   iv) Call to subprogram bound to subprogram address.

   v) Variable bound to storage cell.

   vi) Variable bound to value.

   c) Identify error with following declaration. **2**

```
{ int i, j;
  String s;
  i = j * s;    }
```

OR

2. a) What is significance / importance of language evaluation criteria ? List the most common language evaluation criteria. **4**

   b) Assume a language allows a function or procedure to return results of some types but not all types. Which language evaluation criteria is violated ? **2**

   c) What do you mean by Type Checking ? Explain static and dynamic type checking. **6**

   d) List advantages and disadvantages of functional (Declarative) and object oriented programming paradigm. **4**

3. a) Explain in brief significance of following attributes of a variable. **6**

   i) Name ii) Address iii) Value

   iv) Type v) Lifetime vi) Scope

   b) What do you mean by checked Exceptions ? What are Pros and Cons of the same ? **6**

   c) List and explain in brief different run time elements of a program that needs storage at run time. **6**

OR

4 a) Justify the statement "Scope of Variable ≠ Lifetime of Variable". **4**

   b) Define Lexical scope and Dynamic scope. What are advantages and disadvantages of the same ? **6**

   c) What do you mean by Activation record ? How system stack is used to store activation records ? **4**

   d) What are the advantages of breaking a program into subprograms ? **4**

5. a) What are the features of procedural programming ? How procedures and modularity
   makes procedural programming as a better choice for programs ? **8**

   b) What are different data types supported by PASCAL ? How sub-ranges and set acts as a data structures with respect to PASCAL. **8**

OR

6. a) With suitable example demonstrate the use of pointer in PASCAL. **4**

b) What is a Variant record ? How variant records are implemented in PASCAL ? **6**

c) What are typical features of statement oriented structured programming language. **6**

SECTION – 2

7. a) Answer the following questions with respect to Arrays in Java. **8**

1) What kind of arrays does Java implement regarding binding times of subscription range and memory ?

2) What options for array initialization does Java offer ?

3) Can we use multi-dimensional arrays in Java ?

4) Can programmer use subscript ranges other than 0 ...N for Java arrays ? Can programmer use enumeration types for subscription ?

b) For following sample JAVA code what will be output ? **2**

```
public class test {
public static void main (String [] args) {
        signed int x = 10;
        for (int y = 0; y < 5; y++, x --)
        System.out.print(" " + x);
    }
}
```

c) Explain in brief for types of access specifiers associated with JAVA. **4**

d) What is role of framework class library with respect to. Net framework. **4**

OR

8. a) What is difference between Abstraction, Encapsulation and Data Hiding ? **6**

b) Comment on "C# is strongly typed language". **4**

c) Explain in brief following constructs with respect to .NET framework. **8**

i) Arrays ii) Interfaces

iii) Assemblies iv) Event handler.

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9. a) What are different searching techniques supported by logic programming ? **8**

b) With suitable examples explain following terminologies in PROLOG **8**

i) Facts ii) Rules iii) Queries.

OR

10. a) Draw and explain typical program structure of PROLOG. **4**

b) Explain control structure and variable declaration uses in PROLOG. **8**

c) Why recursions are so naturally applies to defining relations in PROLOG ? Justify with suitable example. **4**

11. a) Write a LISP functions **6**

i) To identify last element of Non-Null list

ii) To calculate factorial of a given number.

b) What is output of following LISP functions **6**

I) (EXPT 4 3) II) (RECIP 5)

III) (> 6 6) IV) (ONE P 1.0)

V) (SETQ X' (1 2 3)) VI) (SETQ Y X)

c) What do you mean by association list with respect to LISP ? **4**

OR

12. a) Write equivalents LISP function for following Ackermann's function **6**

$$Ack(0, n) = n + 1$$

$$Ack(m, 0) = Ack(m-1, 1)$$

$$Ack(m, n) = Ack(m-1, Ack(m, n-1)))$$

b) Explain in brief functions for reading and writing from files in LISP. **6**

c) Write simple DO LOOP in LISP to count down from N to 0. **4**
