T.E. (Computer) (Semester – II) Examination, 2010
PRINCIPLES OF PROGRAMMING LANGUAGES
(2003 Course)

Time : 3 Hours   Max. Marks : 100

Instructions : *1) Answer **any three** questions from **each** Section.*
*2) Answers to these Sections should be written in **separate** books.*
*3) **Neat** diagram must be drawn **whenever** necessary.*
*4) Figures to the **right** indicate **full** marks.*
5) Assume suitable data if necessary.

SECTION – 1

1. A) State and explain various challenges in Programming Language design. What do you mean by Static and Dynamic Properties of a Programming Language ?   **10**

   b) State the key features of following Programming Paradigms.   **8**
      1) Procedural
      2) Object Oriented
      3) Logic
      4) Functional.

OR

2. A) Consider following sample instruction set in a hypothetical programming language with meaning of instruction.

   1) a = b   assign value of variable b to variable a
   2) a = a + 1   add 1 to a
   3) a = a – 1   subtract 1 from a
   4) If a = 0 then goto L   if a = 0, transfer control to statement L
   5) If a > 0 then goto L   if a > 0, transfer control to statement L
   6) Goto L   unconditionally transfer control to statement L
   7) Halt   stop execution

   Write equivalent instructions to carry out following operations using above instructions only (x, a, b are variables)

   1) x = a + b
   2) x = a * b.   **8**

B) Explain the significance of following **10**

1) Compile time checking

2) Run time checking

3) Strongly typed language

4) Implicit data type conversion

5) Explicit data type conversion.

3. A) What do you mean by abstractions ? Describe data abstraction and control abstraction with respect to programming language. **8**

B) With suitable examples, Demonstrate the significance of following terms related to variables.

1) Static

2) Stack-dynamic

3) Explicit heap-dynamic

4) Implicit heap dynamic. **8**

OR

4. A) Write short note on "Generic Subprogram". **4**

B) Explain difference between recursive call and ordinary call of a program. How recursive subprogram call acts as an important sequence control structure in Programming ? **6**

C) What do you mean by Exceptions ? Explain use of exceptions with respect to programs. **6**

5. A) Describe various stages of program execution written in procedural language. For each of the Stage describe input, output and kind of processing done by a stage. **8**

B) What are significant characteristics of Procedural Programming paradigm ? **4**

C) Write a short note on Block Oriented Structured Programming. **4**

OR

6. A) What are Dangling Pointers ? Why these pointers are dangerous ? Explain sequence of operations creating Dangling reference.   6

B) Explain following structured data types of PASCAL   6

  1) Records

  2) Sets

  3) Files and Input Output.

C) Explain Block Oriented program structure of PASCAL program.   4

SECTION – 2

7. A) Draw and Explain Typical.NET framework architecture. What are different product groups supported by .NET platform ?   8

B) Describe the following significant features supported by C# language   10

  1) Generics

  2) Strong Data Typing

  3) Distinct Value and Reference Type

  4) Attributes

  5) Name Spaces.

OR

8. A) Compare Java Applications and Java Applets. Draw a typical Applet life cycle.   6

B) What are advantages of providing automatic garbage collection with respect to JAVA ? How size of the usable memory and total memory capacity can be acquired ?   6

C) What is Interface and Event handler ? How these are designed ?   6

9. A) Explain Depth-First Search Mechanism and Backtracking for Prolog Control System.   8

B) What is importance of Resolution and Unification with respect to Predicate Calculus ?   8

OR

10. A) Consider the following relationships
   - Father (x, y).
   - Mother (x, y).
   - Male (x).
   - Female (x).
   - Parent (x, y).
   - Different (x, y).

   Write PROLLOG clauses to define the following relationships.   7
   1) is_mother (x)   2) is_father (x)
   3) is_son (x)   4) sister_of (x, y)
   5) granpa_of (x, y)   6) sibling (x, y)
   7) aunt (x, y).

   B) State and explain applications of PROLOG with respect to Production Systems.   5

   C) What is use of CUT operator with PROLOG ?   4

11. A) Write a short note on :   8
   1) LAMBDA Calculus
   2) Applications of Functional Programming Languages.

   B) Consider List L = (A B C)   4
   Write output of
   1) (caar L)
   2) (cddr L)
   3) (car (cdr (cdr L)))
   4) (quote a).

   C) Write a LISP program for SUM of vector of numbers.   4

                OR

12. A) Write a short note on :   8
   1) Concurrent Programming
   2) Type Checking with respect to Functional Programming languages.

   B) Write a LISP program for BINARY Search.   4

   C) State and Explain key features and design goals of LISP.   4