Roll No. ....

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PRINCIPLES OF PROGRAMMING LANGUAGES
ES-227A

Time : Three Hours]　　　　　　[Maximum Marks : 75

Note : All questions in Part A and Part B are compulsory. Attempt any *four* questions from Part C, by selecting at least *one* question from each Unit.

Part A (15 marks)   5×3=15

Answer the following questions :

(i) Recognize the role of using assignment and initialization in programming languages. **3**

(ii) Identify the basic nature of generic subprogram with the help of suitable example. **3**

(iii) Interpret the role of using synchronization through semaphores. **3**

(iv) What are the problem implications which may arise during evaluation of tree representation of an arithmetic expression ? **3**

(v) Discuss the function of major run time elements which require storage. **3**

Part B (20 marks)

Unit I

2. Discuss the role of persistence for defining variables, constants and literals.   **5**

Unit II

3. Identify the factors which influence the evolution of data types in the programming languages.   **5**

Unit III

4. In what way subprogram level concurrency can be achieved to control the sequence of a program ?   **5**

Unit IV

5. Briefly explain the perspective of functional programming.   **5**

Part C (40 marks)

Unit I

6. (a) Identify and explain the general problems of describing syntax. Also elaborate the concept of dynamic semantics in programming languages.   **5**

    (b) Define type checking and type conversion. Explain both of them using suitable programs or algorithms.   **5**

7. (a) With the help of diagrams, explain and compare the translation, compilation and interpretation. **5**

   (b) Why the breakpoints and assertions are useful components in programming languages ? **5**

Unit II

8. (a) Give the accessing formula for computing the location of component A[I, J] of a matrix A declared as : V : array $[LB_1..UB_1, LB_2..UB_2]$ where A is stored in column-major order. **5**

   (b) Investigate the logic of using type definitions in programming languages. Give the justification by using Name equivalence and Structural equivalence with examples. **5**

9. Explain the following :

   (i) Type conversion and coercion

   (ii) Packed storage representation and whole vector operations. **10**

Unit III

10. (a) Explain the following by using suitable programs or algorithms : **6**

   (i) Call by address

   (ii) Call by Name

   (b) Differentiate between recursive subprograms and routines. **4**

11. (a) How the synchronization through semaphores is achieved ? Mention its advantages and disadvantages. **6**

(b) Differentiate between explicit and explicit sequence control. **4**

Unit IV

12. Explain the following :

(i) Heap storage management

(ii) Stack based storage management. **10**

13. Identify and explain various functional definitions and types of standard functions available in the functional programming language of LISP. **10**