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B. E. (Computer Engg.) VIIth Semester Examination

LOGIC AND FUNCTIONAL PROGRAMMING

Paper–CSE–405-C

Time allowed : 3 hours *Maximum Marks : 100*

Note : *Attempt five questions, taking at least two questions from each part.*

Part–A

1. (a) What do you mean by lexical scoping ? Explain with the help of some examples. 8

    (b) Explain the following :

    (i) Atom (ii) CAR (iii) Cdr (iv) Flat list. 12

2. (a) Write a LISP equipment of following boolean functions :

    NOT, AND, XOR, XNOR, OR. 10

    (b) Write a recursive function to compute x^n. 10

3. (a) Write a function in LISP which returns sum of cubes of first n natural numbers given value n. 10

    (b) Write a function in LISP to compute binomial coefficient ^nC_r , using recursive formulas

    $$c(0, r) = 1$$
    $$c(n, n) = 1$$
    $$c(n, r) = c(n-1, r) + c(n-1, r-1).$$ 10

4. (a) Write a function in LISP which lists all the multiples of its argument lying between 1 and 100. Also define all functions which you use in this definition. 10

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(b) Explain the following in context of LISP :

    (i)   Multi-valued function

    (ii) Macros and their definition and expansion.

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Part–B

5. (a) What are the requirements of paradigm shifting from procedural to non-procedural language ?   10

   (b) Describe at least two real world problems to which Prolog is best suited language.   10

6. Explain progressive substitution with the help of some suitable examples.   20

7. (a) Define set. Write procedures in Prolog to find union and intersection of two sets.   15

   (b) Taking suitable predicates, define the following relations :

    (i)   Aunt

    (ii) Cousin.   5

8. (a) What do you mean by meta-programming ? Discuss in brief.   5

   (b) Write a program in Prolog which converts the lower-case-letter in input file to upper-case-letter in the output file.   15

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