This question paper contains **4+2** printed pages]

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B.Sc. (H) COMPUTER SCIENCE IV Sem.   J

Paper — 403 . PROGRAMMING PARADIGMS

(Admissions of 2001 and onwards)

Time   3 Hours   *Maximum Marks   75*

(Write your Roll No   on the top immediately on receipt of this question paper)

Attempt *All* questions

Parts of a question must be answered together

1.   Differentiate between the following   3×3=9

  (a)   Static type checking and dynamic type checking

  (b)   Type conversion and type coercion

  (c)   Direct and indirect encapsulation

2.   Describe briefly the programming environment of a

  language   2

3. Discuss *two* methods to get programs in the high level language executed on the actual computer   4

4   What are the various semantic analysis functions performed during

   (a)   Symbol table maintenance

   (b)   Insertion of implicit information

   (c)   Error detection

   (d)   Macroprocessing and compile time operations. 6

5   What are lambda expressions ? What are the operations defined in lambda calculus ?

   Using lambda calculus prove :

      (not T) = F

      (not F) = T   4

6   For elementary data type Boolean discuss the following :   1+2+2=5

   (a)   Specification

(*b*) Storage representation

(*c*) Set of operations defined

7. How are direct access files different from indexed sequential files ? 2

8 (*a*) What is virtual origin ? 2

(*b*) Given the description of a 4 × 3 array A as follows :

V_0	α
LB_1	1
UB_1	4
Multiplier 1	3
LB_2	1
UB_2	3
Multiplier 2	1

Give the descriptor for slice A (*, 2) based on the above descriptor 2

9. What is abstraction ? Explain various methods of abstraction.   4

10. Give the jump table implementation of a CASE statement.   4

11 Discuss the implementation of simple call-return sub programs using current instruction pointer and current environment pointer.   4

12. What are various program and data elements that require storage during program execution.   3

13. (i) Define a record in ML.

   (ii) With the use of an example, give the ML operation for merging of two lists.

   (iii) What is the property list of an atom in LISP ?   1+1+2=4

14. Write a program in prolog to :

   (a) add an element to a list

   (b) delete an element from the list

   (c) reverse the list.   6

15. Define the predicate : 4

maxlist (List, Max)

so that Max is the greatest number in the list of number List.

16. Let a program be .

P(1)

P(2) · − !

P(3).

Write all prolog's answers to the following questions :

(a) ? − p(x)

(b) ? − p(x), p(y)

(c) ? − p(x), ', p(y). 3

17. Give the output of the following :

(i) ? − T = . [rectangle, 3, 5]

(ii) ? − functor (t (f(x), x, t), Fun, Arity)

(iii) g(2) @ > = f(3). 3

18. Given the grammar · 4

$$S \longrightarrow OB \mid 1A$$

$$A \longrightarrow O \mid OS \mid 1AA$$

$$B \longrightarrow 1 \mid 1S \mid OBB$$

For the string 00110101, find the following :

(i) Left most derivation

(ii) Parse tree.