M.C.A.
(SEM. II) EXAMINATION, 2006-07
PARADIGM OF PROGRAMMING LANGUAGE
(SPECIAL EXAMINATION)

Time : 3 Hours] [Total Marks : 100

Notes : (i) Attempt all questions
         (ii) All questions carry equal marks.

1 Attempt any two parts of the following :
   (a) Draw the block diagram of a translator and explain
       its working. What are the virtual computers? What
       is the difference between emulation and simulation
       of a machine?
   (b) Consider the following language x and y are
       integers. Each statement may have a label as a
       prefix. Statements in this language are as follows
       with their meaning :
          x = y           copy y into x
          x = x + 1       increase x by 1.

Z-1469] 1 [Contd...
x = x*y  
multiply x by y.

if x = then goto L transfer control to L if x is zero
if x > 0 then goto L transfer control to L if x is
positive.

Using these statements write a program to calculate
the factorial of 10.

(c) What are the different factors affecting the evolution
of a programming language? What are desirable
features a language that it should contain?

2 Attempt any two parts of the following:

(a) Differentiate between the specifications of vectors
    and arrays. What are schemes for the construction
    of records? What are the set files?

(b) What are the different parameter passing methods?
    What are the different scope rules for a variable
    and a function or routine?

(c) (i) Derive an expression for calculating the
      address of an element in a two dimensional
      array stored in the column major order. The
      address of first element is α.

(ii) What are the enumerated data object
     variables? How are they different from
     strings? How could they be initialized?
     Explain with one example.

Z-1469] 2 [Contd...
3 Attempt any **two** parts of the following:

(a) Write a program to implement a queue in any object oriented language.

(b) What is encapsulation? What is the difference between early binding and late binding? How the runtime polymorphism is achieved?

(c) What are the different types of inheritance in C++? How the accessibility of base class variables is controlled in these schemes?

4 Attempt any **two** parts of the following:

(a) What is functional programming? Explain the terms referential transparency in it. How the recursive functions differ from non-recursive functions?

(b) How the polymorphic functions are created in functional programming? What are the curried functions? How the un-curried operations are carried out?

(c) What are the lists? How are they created? How user defined data types are created in ML? What are rules applied for their evaluation?

5 Attempt any **two** parts of the following:

(a) Consider the following relations:

   \[ H(x) : x \text{ works hard} \]

   \[ D(x) : x \text{ is dull} \]

   \[ J(x) : x \text{ has got a job.} \]

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**Z-1469** [Contd...]
Convert the following statement to relations using above relations.

(i) Randy Works Hard.
(ii) if Randy works hard then he is a dull boy.
(iii) If Randy is dull boy then he will not get the job.
(iv) Therefore, Randy will not get the job.

(b) Write note on the following:
(i) Abstract Interpreter for logic programs
(ii) SKD Resolution

(c) Write short note on the following:
(i) Negation as failure extension
(ii) Predicate logic, universal and existential queries.