Name of the Student: _____

5 questions in 120 minutes

Question 1 (10%)

Give the sequences of car's and cdr's needed to get `x` in the following expressions; for convenience name the list under discussion as `lst` – the first one is answered to clarify the question:

(a) `(a x b d)`
`(car (cdr lst))`

(b) `(a b x d)`

(c) `(a (b (x d)))`

(d) `(a (b (d) x))`

(e) `(((a (b (x) d))))`

Question 2 (20%)

Evaluate the following expressions as if they were entered in top-level. If you think an expression should result in error, just write "error".

(a) `(cons NIL NIL)`

(b) `(cons (1 2) NIL)`

(c) `(cons ('A 'B) NIL)`

(d) `(cons '(A B) '(C D))`

(e) `(cons (list 'A 'B) (append '(C D) NIL))`

(f) `(listp (if (list nil) nil t))`

(g) `(list (append (list nil) nil))`

(h) `(cons '(cons (list 1 2)) (list 1 2))`

(i) `(if (if '(nil) nil 'knew)  nil 'a)`

(j) `(* (or 2 4) (and 3 5))`

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Question 3 (20%)

Define a function `isect` that takes two lists as arguments and returns the list of items that belong to both lists. Do not use `INTERSECT`, use iteration with `DOLIST`.

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Question 4 (25%)

Define a function `nthcdr` that takes an integer *n* and a list, and returns the *n*th cdr of the list. Use iteration with `DOLIST`.

Name of the Student: _____

Question 5 (25%)

Define a function `ROTATE-LEFT` that takes a list and moves the first element to the end of the list. For instance, `(ROTATE-LEFT '(1 2 3))` should give `(2 3 1)`, `(ROTATE-LEFT '(1 2))` should give `(2 1)`, etc. Apart from `DEFUN`, you are allowed to use `LET`, `LIST`, `APPEND`, `CAR`, `DOLIST`, `SETF` and `IF`. No other function is available for use.