QUIZ 1

Date: 23rd January 2002 Max. Marks 30

1. Consider the following Lex-like specification of three distinct tokens:

$(aba)+$	Token 1
$(a(b) * a)$	Token 2
$a(a\|b)$	Token 3

   (a) Draw an appropriate syntax tree for the specification which can be directly converted to a DFA. Be careful, because the resulting DFA has to distinguish between lexemes corresponding to the three tokens.

   (b) Number the leaves of the syntax tree from left to right. Now construct the DFA labeling each state with sets of positions.

   (c) Indicate the token(s) found against each accepting state. Are there any clashes? If yes, why? (10 Marks)

2. Show that the following grammar, intended to remove the *if-then-else* ambiguity, is still ambiguous.

   stmt $\rightarrow$ `if expr then` *stmt* | *matched_statement*
   matched_statement $\rightarrow$ `if expr then` *matched_statement* `else` *stmt*
   | `other` (7 Marks)

3. Consider the grammar show below:

   $E \rightarrow E{+}T \mid T$
   $T \rightarrow -T \mid (E) \mid id$

   (a) Remove left recursion from the grammar.

   (b) Write a predictive recursive descent parser for the grammar.

4. Construct the LL(1) parsing table for the grammar shown below. (6 Marks)

   $S \rightarrow a\ X\ Y\ b$
   $X \rightarrow X\ c \mid d$
   $Y \rightarrow Z\ W$
   $Z \rightarrow b \mid \epsilon$
   $W \rightarrow e \mid \epsilon$ (7 Marks)

   For what value n is the grammar LL(n)? Explain your answer.