

Name \_\_\_\_\_

**CISC 458\* Programming Language Compilers  
J.R. Cordy - March 1998**

**Quiz #2**

Time: 15 minutes

**Instructions:** Total 10 marks. Closed Book. Answer all questions in the space provided.

1. (4 Marks) Give a **brief** (one sentence) definition for each of the following terms.

a.  $L(G)$  (the language generated by a grammar  $G$ )

b. ambiguous grammar

2. Consider the following BNF grammar G :

1.  $S \rightarrow (A)$
2.  $\quad \quad \quad | \quad S S$
  
3.  $A \rightarrow a b$
4.  $\quad \quad \quad | \quad b a$
5.  $\quad \quad \quad | \quad A A$

2.a. (3 marks) Show the parse tree according to G for the input string:

( a b b a a b ) ( b a )

2.b. (3 marks) Give an ordered list of the productions (i.e. matched handles) that would be used in a bottom up left-to-right shift-reduce parse of the same input string ( a b b a a b ) ( b a ) . Use the production numbers shown on the left of the grammar given above to refer to the productions (i.e., your answer will be a list of production numbers in the order that the productions would be used in a bottom-up left-right shift-reduce parse of the input string).