CSCE-312 QUIZ 6 [25 POINTS]

NAME: Solution **UIN:**

Question 1. [5 points] List and describe in 1-2 sentences the 5 basic steps involved in compiling a program written in a high level language.

① Lexical Analysis: recognize words and tokenize the input string.

② Parsing: diagraming the sentence to the syntax rules of the language.

③ Semantic Analysis: understand the meaning of the sentence structure.

④ Code optimization: modify codes for more efficient execution.

⑤ Code generation: Translate to target language (VM code or assembly or machine language)

Question 2. [5 points] Circle TRUE or FALSE for the following statements

(T) F **An Interpreter directly executes instructions written in a high-level programming language without previously compiling them into a machine language.**

T (F) **Lex is a standard tool used for syntax analysis in a compiler.** Lexical

T (F) **Optimizing compilers only look for optimizing lines of code in a program.**

(T) F **Early compilers had pretty sizable coding/complexity in all phases with the exception of semantic analysis.**

(T) F **Tokenizing is an important step during program syntax analysis phase of a compiler.**

Question 3a. [5 points] How many tokens are in the following high-level language construct: if (id == 5) {let student_last_name = "Smith";}.

13 tokens

Question 3b. [5 points] Categorize the tokens for the construct above in the following lexical elements: keyword, stringConstant, integerConstant, identifier, symbol.

```
if                  // keyword
(                   // symbol
id                  // identifier
==                  // symbol
5                   // integerConstant
)                   // symbol
{                   // symbol
let                 // keyword
student_last_name   // identifier
=                   // symbol
"Smith"             // stringConstant
;                   // symbol
}                   // symbol
```

Question 4. [5 points] Draw a parse tree for the following high level language construct: ((x+25)/(y-z))*(4^3).