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B.Sc. Engg. CSE 8th Semester — 26 August 2019 (Morning)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION — **SUMMER SEMESTER, 2018-2019**

DURATION: 1 Hour 30 Minutes — **FULL MARKS: 75**

CSE 4801: Compiler Design

Programmable calculators are not allowed. Do not write anything on the question paper.

There are **4 (four)** questions. Answer any **3 (three)** of them.

Figures in the right margin indicate marks.

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1. a) What is a translator? What is the difference between compiler and interpreter? 3
   b) What are the various phases of compilation process? 10
   c) Discuss the roll of lexical analyzer in a compiler. What are the benefits of implementing lexical analyzer as a separate layer? 7
   d) Show that the following grammar is ambiguous: 5

      S → **if** (E) **then** S **else** S
      S → **if** (E) **then** S
      S → **x**
      E → **true**
      E → **false**

2. a) A grammar is given below:

      G → L
      L → E ; L
      L → E
      E → E + T
      E → T
      T → **id**
      T → **id** ( )
      T → **id** (L)

      i. Derive a leftmost derivation for the string x + y ; z (y ( )) and show the corresponding parse tree. 10
      ii. Modify the grammar (if necessary) to implement predictive parsing. 5
      iii. Find the set of FIRST and FOLLOW for each of the non-terminal. 10

3. a) Discuss in brief about Left Recursion, elimination of Left Recursion and Left Factoring with examples. 8
   b) Consider the following grammar G:
      S → Ea | bEc |dc | bda
      E → d

      i. Find the canonical collection of LR(0) items (transition diagram for SLR parsing). 9
      ii. Build SLR parse table and discuss your observations. 8

4. a) You need to generate a calculator program using both lex and yacc. The calculator should support division, multiplication, addition, subtraction, and power operations in proper precedence and associativity. The calculator should also support first bracket within the expression. 15

   Write down the lex and yacc file. Afterwards explain how to build the calculator program from the lex and yacc source file. Use block diagram if necessary.

   b) Write short notes on the followings- 10
   yytext, yylex(), yyparse(), yywrap(), yyleng, yylval.