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

MID SEMESTER EXAMINATION **SUMMER SEMESTER, 2019-2020**

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

CSE 4801: Compiler Design

There are **3 (three)** questions. Answer all of them. Figures in the right margin indicate marks.

[Write your ***Name, ID, Course Code, Semester, Session*** *and* ***Date*** on top of your answer script and number the pages sequentially. Submit your script as pdf with the naming format '**ID-CSE4801-Mid.pdf**' i.e '**160041001-CSE4801-Mid.pdf'**. You must preserve hardcopy of your answer script and submit it to the department later.]

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1. a) Discuss various types of translator used in the field of computer science. 5

   b) A compiler is a program that can translate texts from one language to another language. Assume three languages L1, L2 and L3. You need to translate texts from each language to all other languages.

      i. How many different compilers do you need to do these translations? 1

      ii. How can you increase the efficiency and portability to construct all of these compilers? – discuss in detail. 10

   c) Discuss the uses of *yywrap()* function in Lex. 3

   d) Write a Lex program which can detect floating point constants (supported in C) from input text. Floating point number formats supported in C language are given below: 6

```
15
15.75
-15.75
+15.75
1.575E1   /* = 15.75   */
1.575e1   /* = 15.75   */
1575e-2   /* = 15.75   */
-2.5e-3   /* = -0.0025 */
25E-4     /* =  0.0025 */
10.0F     /* type float; possible suffices f, l, F, L or none */
.0075e2   /* integer portion may be omitted */
```

2. a) Discuss the weaknesses associated with Top-Down Parsing. 5

   b) Consider the following grammar:

$S \rightarrow Aa \mid bAc \mid Bc \mid bBa$
$A \rightarrow d$
$B \rightarrow d$

      i. Find the set of FIRST and FOLLOW for each of the non-terminal. 5

      ii. Find the Canonical LR(0) items and draw the transition diagram. 10

      iii. Build SLR parse table for the grammar. 5

3. a) What are the importance of input buffering? Discuss various techniques to implement input buffering. 8

b) Let G be a Context Free Grammar for which the production Rules are given below:

$S \rightarrow aB \mid bA$
$A \rightarrow a \mid aS \mid bAA$
$B \rightarrow b \mid bS \mid aBB$

Now, derive the string *aaabbabbba* from *S* using:

i. Leftmost derivation 3

ii. Rightmost derivation. 3

c) Consider the following grammar:

$S \rightarrow aSbS \mid bSaS \mid \varepsilon$

i. Show that the grammar is ambiguous (you may try with sentence *abab*). 3

ii. What language does the grammar generate? 3

d) What is the *configuration* of a table driven parser? What are it's uses? 5