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

MID SEMESTER EXAMINATION **SUMMER SEMESTER, 2020-2021**

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

CSE 4801: Compiler Design

Answer all **3 (three)** quest`ions. Programmable calculators are not allowed.
Marks of each question and corresponding CO, PO are written on the right margin.

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1. A Grammar G is defined as follows:

   S → A
   A → aB / aC/ Ad
   B → b
   C → g

   a) It is needed to design a predictive parser for the grammar G. Considering that in mind, find the set of FIRST(x) and FOLLOW(x) for that purpose (x is a grammar symbol). **12** [CO2, PO3]

   b) Construct a predictive parse table for the grammar G. **10** [CO2, PO3]

   c) Show that the sentence abdddd is a valid sentence for the language represented by grammar G. **3** [CO2, PO1]

2. a) Discuss the impact of left recursion of a grammar during top-down parsing. **6** [CO1, PO2]

   b) Let you have assigned a task to develop a lexical error recovery module for a compiler. Analyze and discuss the possibility to develop such a module which can recover the lexical errors effectively. **7** [CO1, PO2]

   c) Write a Lex program which can count and display different types of tokens from an input. Types of tokens are vowels, consonants, digits, white spaces, special symbols (#, !, {, }, ;) and unknown. Unknown is a type of alphabet not falls in known token types. Sequence of consecutive white spaces will be treated as a single white space. The Lex program should skip newlines from the input. **12** [CO1, PO3]

3. a) Construct an SLR parse table for the following Grammar G:

   S → (S)S
   S → ε

   by fulfilling the steps listed below:

   i. Find canonical collection of LR(0) items. **5** [CO2, PO3]

ii. Draw transition diagram from the canonical collection of LR(0) items. **5** [CO2, PO3]

iii. Build SLR parse table. **8** [CO2, PO3]

b) Explain how the set of FIRST(x) and FOLLOW(x) helps to take decisions during SLR parsing. **7** [CO2, PO2]