ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)

ORGANISATION OF ISLAMIC COOPERATION (OIC)

Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION SUMMER SEMESTER, 2022-2023

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.
Answer **all 3 (three)** questions. Figures in the right margin indicate full marks of questions with corresponding COs and POs in parentheses.

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1. a) Draw the block diagram of a standard compiler showing various modules with input-output. Discuss the functions of any three modules from the diagram. 10 (CO1) (PO1)

   b) The communication between lexical analyzer and syntax analyzer can be implemented by **batch** process or **on-demand** process. Explain both of the processes. 10 (CO1) (PO1)

   c) Input-buffering is a technique used in compilers to read input characters from a source file and store them in a buffer before parsing them. Explain *buffer-pair* technique to implement input-buffering. 5 (CO1) (PO1)

2. a) Discuss about various syntax errors and their recovery strategies. 9 (CO2) (PO1)

   b) Which type of parsing method can not process left recursive grammar? Explain briefly. 3 (CO2) (PO2)

   c) Predictive parsing is a special type of top-down parsing where no backtracking is required. Show the construction steps of a predictive parse table for the grammar shown in Table 1. 13 (CO2) (PO1)

Table 1: A context free grammar for Question 2.c

$$G \rightarrow G + H$$
$$G \rightarrow H$$
$$H \rightarrow H * I$$
$$H \rightarrow I$$
$$I \rightarrow \textbf{\textit{id}}$$
$$I \rightarrow (G)$$

3. a) Write short notes on *handle pruning*. 5 (CO2) (PO1)

   b) Construct a shift-reduce parser for the grammar shown in Table 2. First, find the LR(0) collection of items for the grammar and then construct the parse table. 12 (CO2) (PO1)

Table 2: A context free grammar for Question 3.b

$$S \rightarrow AA$$
$$A \rightarrow aA$$
$$A \rightarrow b$$

c) Code Snippet 1 shows a list of predefined *Lex* variables and functions. Describe their functionalities. 8 (CO1) (PO1)

```
1 int yylex(void)
2 char *yytext
3 yyleng
4 yylval
5 int yywrap(void)
6 FILE *yyout
7 FILE *yyin
8 ECHO
```

Code Snippet 1: A list of Lex predefined variables and functions for Question 3.c