

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

MID SEMESTER EXAMINATION

DURATION: 1 Hour 30 Minutes

SUMMER SEMESTER, 2014-2015

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.

1. a) You are needed to design a programming language. Define various types of operators that you want to support for the language. Then draw a transition diagram to recognize those tokens. 6+6
- b) Discuss on *lexical error*, *lexical error handler* and *lexical error recovery strategies*. 4+3+6
2. a) Develop a predictive parser for the language specified by the grammar below: 2+10+4

$$\begin{aligned} S &\rightarrow SA \\ S &\rightarrow aB \\ B &\rightarrow bC \\ B &\rightarrow bD \\ C &\rightarrow dD \\ D &\rightarrow e \end{aligned}$$

Is it necessary to perform any operation(s) on the above grammar on the way to develop the predictive parser? If so, then explain the necessity of that/those operation(s) and rewrite the grammar accordingly. 9

- b) Find canonical LR(0) set of items for the following grammar:

$$E \rightarrow E - T \mid T$$

$$T \rightarrow T / F \mid F$$

$$F \rightarrow (E) \mid id$$

3. a) Explain the reasons for separating the analysis phase of compiling into lexical and syntax analysis. 10
- b) Show that the following grammar is ambiguous: 6

$$\begin{aligned} R &\rightarrow R \mid R \\ R &\rightarrow RR \\ R &\rightarrow R^* \\ R &\rightarrow (R) \\ R &\rightarrow a \\ R &\rightarrow b \end{aligned}$$
- c) Define set of FIRST and FOLLOW. Explain how the set of FIRST and FOLLOW will help to take a decision during parsing. 9

4. a) Write short notes on the followings:

Preprocessor, symbol table manager, ambiguous grammar

b) List five words for each group of noun, pronoun, verb and adverb. Write a Lex program to recognize words from those lists. The program should support adding new words to each of the groups dynamically during runtime.