



ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)

ORGANISATION OF ISLAMIC COOPERATION (OIC)

Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION

SUMMER SEMESTER, 2021-2022

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 whereas corresponding CO and PO are written within parentheses.

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1. a) A computer program is a set of instructions understandable by human beings. Discuss the steps to convert a computer program into computer understandable format in brief. 5
(CO1)
(PO1)
- b) The process of constructing a compiler can be modularized to improve efficiency. Draw a block diagram showing various construction phases and modules of a compiler and discuss in brief. 10
(CO1)
(PO1)
- c) Discuss the strategies to recover from lexical errors. 10
(CO1)
(PO1)
2. a) Consider the following grammar: 5
 $A \rightarrow aB \mid b$ (CO2)
 $B \rightarrow cC \mid d$ (PO2)
 $C \rightarrow a \mid c$
- What type of phrase-structure grammar can accurately describe the grammar? Justify your answer.
- b) You need to construct a predictive parser for the following grammar: 10
 $A \rightarrow AB \mid AC \mid b$ (CO2)
 $B \rightarrow Bd \mid e \mid d$ (PO2)
 $C \rightarrow a \mid d$
- Preprocess the grammar to make it ready to work with predictive parser.
- c) Show the steps to prove that the string *baedd* is a valid sentence for the grammar given in Question 2.b) using recursive descent parsing method. 10
(CO2)
(PO2)
3. a) A grammar is given below: 5
 $E \rightarrow E + T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid id$
- i. Find the set of FIRST(X) and FOLLOW(X) for each non terminal X. 5
(CO2)
(PO2)
- ii. Generate set of states, i.e., LR(0) items for the grammar to construct SLR parser. 10
(CO2)
(PO2)
- b) Explain how the set of FIRST(X) and FOLLOW(X) helps to take decisions during SLR parsing. 10
(CO2)
(PO1)