



10IS662

Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Compiler Design

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Explain with a neat diagram, the phases of a compiler. (10 Marks)
b. Construct the transition diagram to recognize the tokens given below:
(i) Identifier (ii) Relational operator (iii) Unsigned number. (06 Marks)
c. Explain the concept of input buffering in the lexical analyser. (04 Marks)
- 2 a. What is left recursion? Eliminate left recursion from the following grammar
 $E \rightarrow E + T \mid T, T \rightarrow T * F \mid F, F \rightarrow (E) \mid id.$ (06 Marks)
b. Given the grammar $S \rightarrow a \mid (L), L \rightarrow L, S \mid S$
(i) Do the necessary changes to make it suitable for LL(1) Parser. (08 Marks)
(ii) Check whether the resultant grammar is LL(1) or not. (06 Marks)
c. Briefly explain the problem associated with top-down parsers. (06 Marks)
- 3 a. Obtain the LR(0) items for the following grammar $S \rightarrow L = R \mid R; L \rightarrow *R \mid id; R \rightarrow L.$ (08 Marks)
b. Write the SLR parsing algorithm. Find SLR item and table for the following grammar.
 $A \rightarrow (A) \mid a.$ Verify for the string ((a)). (12 Marks)
- 4 a. Write an algorithm for constructing the canonical LR(1) parsing table. Construct canonical LR(1) parsing table for $S \rightarrow CC, C \rightarrow cC \mid d.$ (14 Marks)
b. Construct the LALR parsing table for the grammar shown in 4(a) using LR(1) items. (06 Marks)

PART – B

- 5 a. Explain the concept of syntax-directed definition with example. (06 Marks)
b. Assuming suitable syntax directed definition, construct a syntax tree for the expression $a - 4 + e.$ (10 Marks)
c. Write the annotated parse tree for $3 * 5 + 4n.$ (04 Marks)
- 6 a. Draw the DAG for the arithmetic expression,
 $a + a * (b - c) + (b - c) * d.$
Show the steps for constructing the DAG. (10 Marks)
b. What are three address codes? Explain different ways of representing three address codes with example. (10 Marks)
- 7 a. What is an activation record? Explain the purpose of each item in the activation record with example. (10 Marks)
b. Distinguish between static scope and dynamic scope? Briefly explain access to non-local names in static scope. (10 Marks)
- 8 a. Explain the code generation algorithm and generate code for the following expression,
 $X = (a - b) + (a + c).$ (10 Marks)
b. What are the basic blocks and how do you partition a three address code in the basic block. (05 Marks)
c. Discuss the issue in the design of code generator. (05 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, $42+8=50$, will be treated as malpractice.