

Code No: 155FG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, January/February - 2023

FINITE AUTOMATA AND COMPILER DESIGN

(Common to CSE(IOT), CSE(N))

Time: 3 Hours

Max. Marks: 75

- Note:** i) Question paper consists of Part A, Part B.
 ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
 iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A**(25 Marks)**

- 1.a) Define a Context Free Grammar. [2]
- b) Define Token, Pattern and Lexeme. [3]
- c) Define 'Handle' in shift reduce parser. [2]
- d) List out the rules for computing FIRST SET. [3]
- e) What is the difference between type conversion and type checking? [2]
- f) Define Regular Grammar. [3]
- g) How to define the Leader in a Basic Block? [2]
- h) What is dynamic storage allocation? [3]
- i) What do you mean by machine dependent code generation? [2]
- j) Construct a DAG for the expression $a=b*c + b*c$. [3]

PART – B**(50 Marks)**

2. Consider the following grammar
 $lexp \rightarrow atom \mid list$
 $atom \rightarrow number \mid identifier$
 $list \rightarrow (lexp_seq)$
 $lexp_seq \rightarrow lexp_seq \ lexp \mid lexp$
 Answer the following:
 a) Remove left recursion from the above CFG.
 b) Compute FIRST and FOLLOW set for the non-terminals of the resulting grammar.
 c) Show that the resulting grammar is LL(1). [3+4+3]
- OR**
3. Design FA for the following Regular Expression over $\Sigma\{0, 1\}$
 a) $01(1+0)^*10$
 b) $11(0+1)^*101(0+1)^*\{0\ 1\}$ [5+5]
 4. What is LR parser? Compare and contrast the different types of LR parsers. [10]
- OR**
- 5.a) How are ambiguities resolved in YACC?
 b) What are L-attributed definitions? Explain with an example. [5+5]

6. Explain in detail about Chomsky hierarchy of grammars. [10]

OR

7. Distinguish static and dynamic Type checking. [10]

8. Explain the machine dependent and machine independent code optimization? What are their advantages? How to represent the dummy blocks with no statements indicated in global dataflow analysis? [10]

OR

9. Give the block diagram of organization of code optimizer. What are the advantages of the organization of code optimizer? [10]

10. Explain about Generic code generation algorithm. [10]

OR

11.a) Define a Directed Acyclic Graph. Construct a DAG and write the sequence of instructions for the expression $a + a * (b - c) + (b - c) * d$.

b) Give the sequence of three-address code instructions corresponding to the following fragment using the above attribute grammar

for i= 1 to n step m+k do
s:= s+i.

[5+5]

---ooOoo---