

**R13**

Code No: 115AP

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech III Year I Semester Examinations, May/June - 2019****COMPILER DESIGN****(Computer Science and Engineering)****Time: 3 hours****Max. Marks: 75****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART - A****(25 Marks)**

- 1.a) Why lexical and syntax analyzers are separated? [2]
- b) List the various error recovery strategies for a lexical analysis. [3]
- c) Mention the types of LR parser. [2]
- d) Define LR(0) items with examples. [3]
- e) What are the benefits of intermediate code generation? [2]
- f) Explain about hashing. [3]
- g) What is a basic block? [2]
- h) Discuss about common sub expression elimination. [3]
- i) How do you calculate the cost of an instruction? [2]
- j) List out the common issues in the design of code generator. [3]

**PART - B****(50 Marks)**

2. Explain the various phases of a compiler in detail. Also write down the output for the following expression after each phase a:  $=b*cd$ . [10]
- OR**
3. What is FIRST and FOLLOW? Explain the steps to compute FIRST and FOLLOW with an example. [10]
4. Check whether the following grammar is SLR (1) or not. Explain your answer with Reasons. [10]  
 $S \rightarrow L=R \quad S \rightarrow R \quad L \rightarrow *R \quad L \rightarrow id \quad R \rightarrow L$ .
- OR**
5. Consider the grammar.  
 $E \rightarrow E + T \quad E \rightarrow T \quad T \rightarrow T * F \quad T \rightarrow F \quad F \rightarrow (E) / id$   
Construct CLR parsing table for the above grammar. Give the moves of the CLR parser on  $id * id + id$ . [10]
6. What is a three address code? Mention its types. How would you implement the three address statements? Explain with examples. [10]
- OR**
7. Describe in detail the syntax directed translation of case statements. [10]

8. What are steps needed to compute the next use information? [10]  
**OR**
9. Discuss about the following:  
a) Copy Propagation  
b) Dead code Elimination and  
c) Code motion. [10]
10. Write the code generation for the  $d := (a-b) + (a-c) + (a-c)$ . [10]  
**OR**
11. Write a code generation algorithm. Explain about the descriptor and function `getreg()`.  
Give an example. [10]

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