JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, November - 2015
AUTOMATA AND COMPILER DESIGN
(Information Technology)

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) Define finite automata.   [2]
 b) Give a brief note on Lex tool.   [3]
 c) What is an ambiguous grammar? Give an example.   [2]
 d) Write 3rules for computing FOLLOW SET.   [3]
 e) Discuss the overloading of operations.   [2]
 f) What is unification?   [3]
 g) Write short notes on calling sequences.   [2]
 h) How to deal with aliases in optimization?   [3]
 i) Discuss the Object code forms.   [2]
 j) Draw a diagram to show the position of code generator.   [3]

PART-B (50 Marks)

2.a) Construct finite automata that accept a string w, where w is binary number divisible by 3.
 b) Define ambiguity. Is the following grammar ambiguous?   [5+5]
   $E \rightarrow E + E$
   $E \rightarrow E - E / id$

OR

3.a) Draw a NFA that accept the languages that have 'a' as third symbol from right hand side.
 b) How to convert a regular expression to NFA? Explain with example.   [5+5]

4.a) Explain syntax directed definitions. Define syntax directed definition for simple desk calculator.
 b) Briefly give a note on L-attributed grammars.   [5+5]

OR

5.a) Give a model for LR parser. Write an algorithm for LR parsing.
 b) Define Intermediate code generation. Explain abstract syntax tree with an example.

[5+5]

6.a) Define type checking. Explain the static checking and dynamic checking.
 b) Explain the context free and context sensitive languages with their recognizers.   [5+5]

OR

7. Give an algorithm to test c Types. Which among the following expressions are equivalents, Justify.
   a) e1=integer → e1
   b) e2=integer → (integer → e2)
   c) e3=integer → (integer → e1)   [10]

8.a) What is natural loop? Write an algorithm for constructing natural loop.
  b) Explain the term Run Time Support and Storage Organization.   [5+5]

OR

9. Define code optimization. Explain in detail about the Principal sources of optimization and optimization techniques.   [10]

10. Explain the code generation algorithm and generate code for the following Expression:
    X = (a – b) + (a + c)   [10]

OR

11.a) State the issues in code generation process? Explain in detail.
   b) What is a basic block? With suitable example – discuss various transformations on the basic block.   [5+5]

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