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Department of computer Science & Engineering
3rd Year 1st Semester B.Sc. Engg. Examination-2014
Course: CSE302 (Compiler Design)

Full Marks: 70   Times: 4 Hours

N.B.:
i. Answer **SIX** questions, taking any **THREE** from each section
ii. All questions are all of equal values
iii. Use **separate answer script** for each section

Section-A

Marks

1. a) What are the difference between compiler and interpreter?   2

   b) Discuss the different phase of compiler.   6

   c) Discuss the action taken by every phase of compiler on the following instruction of source program while compilation. Total= num1+num2*60 $3\frac{2}{3}$

2. a) Consider the context free grammar $5\frac{2}{3}$

   $E \rightarrow E + T | T$
   $T \rightarrow T \times F | F$
   $F \rightarrow (E) | a$

   I) Show how the string $(a + a) \times a$ can be generated by this grammar.
   ii) Construct a parse tree for this string.
   Iii) What language does this grammar generate? Justify your answer.

   b) What do you mean by left recursive and left factoring? Write algorithm to eliminate left recursive and left factoring from a grammar.   6

3. a) What are the problems of top-down parsing?   3

   b) What are the necessary conditions to be carried out before construction of predictive parsing? $2\frac{2}{3}$

   c) Show that the following grammar   6
   S→A
   A→aB|aC|Ad|Ac
   B→bBc
   C→a   is LL(1).

4. a) What is the difference between quadruples and triples? Suppose an statement A: =-B*(C+D), Can you translate it to triple? $4\frac{2}{3}$

   b) Write down the methods of translating Boolean expressions   3

   c) Define symbol table. Write down the contents of a symbol table.   4

5. a) Construct a DFA for the following language {w|w does not contain the substring 0101, where $\sum = 0,1$} . $3\frac{2}{3}$

    b) You have studied DFA and NFA. In your opinion which one is more robust for real time implementations? Explain why?   4

    c) Prove that every NFA can be converted to an equivalent one that has a single accept state.   4

6. a) Write the algorithm to compute FIRST and FOLLOW.   4

    b) Compute FIRST and FOLLOW for the following grammar   4
        E→TE'
        E'→+TE'| ε
        T→FT'
        T'→*FT' |ε
        F→(E)|id

    c) Explain recursive descent parser with appropriate example. $3\frac{2}{3}$

7. a) Explain shift reduce parsing with proper example. $5\frac{2}{3}$

    b) What is polish notation? Write the algorithm to evaluate prefix expression. Apply this algorithm to evaluate the following expression
        $((15 / (7 - (1 + 1))) * 3) - (2 + (1 + 1))$ 6

8. a) Give formal definition of grammar. Discuss the notations of grammar.   5

    b) Distinguish between type – 0 and type – 1 grammar.   2

    c) Show that the following grammar is ambiguous grammar
        S→aSbS|bSaS| ε   2

    d) Write short note on the application of CFG. $2\frac{2}{3}$