B.Tech Third Year Mid-Semester Examination

Department: Computer Science and Engineering

Course Name: Compilers **Code: CS 346**

Full Marks-60 **Time: 2 hours**

Answer ALL the questions

Make reasonable assumption whenever necessary. The notations carry the usual meanings. You can answer the question in any sequence. However the answers of all the components of any particular question should appear together

1. Covert the regular expression $(a \mid \varepsilon) b c^{*} \#$ to deterministic finite automaton (DFA). What are the problems with SLR parser and how can these be eliminated?

10+5

2. (a). Compute *firstpos* and *followpos* for the regular expression $(a \mid b)^{*}a \#$ (*show the steps clearly*).

(b). Explain, why many grammars that are left-factorable are not LL(1). Give an example of a grammar that is left-factorable but is still LL(1). Make sure to explain why your grammar is LL(1).

7+8

3. (a). Consider the following grammar

$S \rightarrow X, X \rightarrow Yb \mid aa, Y \rightarrow a \mid bYa$

(i). Construct the LR (0) automaton.

(ii). Why is this grammar not SLR(1)? (***hint***: *Prove by showing the corresponding parsing table*).

(b). Is the following grammar ambiguous? Explain with necessary example(s).

$S \rightarrow a \mid bSC$
$C \rightarrow cS \mid \epsilon$

(7+4)+4

4. Consider the following grammar: S → L=R, S → R, L→ *R, L → id, R → L. Can we build a SLR parser for the grammar? (***explain your answer***). Construct the canonical LR (1) parser for the above grammar (*show all the LR(1) items and parsing table*).

3+12