Exam.Code:0925
Sub. Code: 6542

2074
B.E. (Information Technology)
Seventh Semester
PCIT-702: Compiler Design

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section.

x-x-x

I. Give short answers of the following:
a. Why the process of compilation is divided into various phases? List various phases in compilation process.
b. Define the terms: token, pattern and lexeme.
c. Differentiate between synthesized attribute and inherited attribute.
d. What is an activation record? List various fields/parts of an activation record.
e. What do you mean by peephole optimization? **(2 marks each)**

Section-A

II.
a. What are translators? List various translators. How is compiler different from other translators?
b. What are tokens? How are they specified? Describe in brief, how tokens are recognized by lexical analyzer? **(5, 5)**

III.
a. What are predictive parsers? Write down the rules to construct predictive parsing table.
b. Consider the grammar:

$$S \rightarrow +SS \mid *SS \mid a$$

Is the grammar LL(1)? If yes, construct the predictive parsing table. Parse the string $+ * aaa$. **(5, 5)**

IV.
a. What is left recursion? What are the problems that arise due to left recursion in the design of top-down parsers? Write an algorithm to remove left recursion from a given grammar.
b. Construct the LALR parsing table for the following grammar:
E→ E+T | T
T→ TF | F
F→ F* | a | b **(5, 5)**

Section-B

V.
a. Describe the common forms of intermediate code representation. Using each of the representation, translate the expression $x * - (y + z)$.
b. What is symbol table? Describe in detail various data structures used for storing symbol table. Compare their performance for different symbol table operations. **(5, 5)**

VI.
a. Define a syntax directed translation that records the maximum number of nested Kleene star operators of a regular expression R in its attribute R.depth. The grammar is given: $R \rightarrow a|b|\varepsilon|R_1 \circ R_2|R_1 + R_2|R_1|(R_1)^*$. For example, the regular expression $(a)^*|((b)^* + a)^*$ has depth 2.
b. Draw DAG for the following expression: a+a*(b-c)+(b-c)*d **(7,3)**

VII.
a. Describe in brief stack allocation strategy along with its merits and demerits.
b. What is code optimization? Describe in detail various code optimization techniques. **(5, 5)**

x-x-x