No. of Printed Pages : **2**

Sl. No.

B5.2-R4 : AUTOMATA THEORY AND COMPILER DESIGN

NOTE :

1. **Answer question 1 and any FOUR from questions 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time : 3 Hours **Total Marks : 100**

1. (a) Draw DFA for given regular expression.
$(1+10+110)^*\ 0$

(b) What is the role of lexical analyzer ?

(c) Differentiate between Compiler and Interpreter.

(d) Let G be the grammar $S \rightarrow 0B|1A$, $A \rightarrow 0|0S|1AA$, $B \rightarrow 1|1S|0BB$.
For the string 00110101, find
(i) the left most derivation,
(ii) the right most derivation, and
(iii) the derivation tree

(e) Generate the First() and Follow() set of the following grammar :
$A \rightarrow B \mid C$
$C \rightarrow (D)$
$B \rightarrow n \mid i$
$D \rightarrow DA \mid A$

(f) Explain Peephole optimization.

(g) Which layer is responsible for generating three address code ? Why the name is given Three Address code ? Generate three address code for following statement.
x = (5 + a * (b – c / d)) / e.

(7x4)

2. (a) Construct a minimum state automaton equivalent to an automaton whose transition table is defined as below.

State \ input →	a	b
→ q0	q1	q2
q1	q1	q3
q2	q3	q4
q3	q1	q5
q4	q4	q2
(q5)	q6	q6

(b) Prepare SLR (1) parsing table for given grammar.
$S \rightarrow dA|aB$, $A \rightarrow bA|c$, $B \rightarrow bB|c$ **(9+9)**

3. (a) Convert the following grammar into CNF.

$S \rightarrow aAbB$,

$A \rightarrow aA \mid a$, $B \rightarrow bB \mid b$

(b) Construct a PDA accepting the set of all strings over {a, b} with equal number of a's and b's.

(9+9)

4. (a) Design a Turing machine M to recognize the language.
$\{1^n 2^n 3^n \mid n>=1\}$.

(b) Describe the storage allocation strategies.

(9+9)

5. (a) Prepare LALR (1) parsing table for given grammar.
$S \rightarrow Aa \mid bAc \mid dc \mid bda$, $Ad \rightarrow$

(b) How Basic Blocks are optimized ?

(10+8)

6. (a) Which are the design issues of code generation ? Explain in detail.

(b) Describe the terms with example : basic blocks and flow graphs.

(12+6)

7. Solve **any three** of the following :

(a) Eliminate Left recursion from following grammar.
$S \rightarrow (L) \mid x$, $L \rightarrow L, S \mid S$

(b) Describe the Syntax directed definition, and Syntax directed Translation, taking an example.

(c) Explain S-attributed definitions and L-attributed definitions.

(d) Choose the correct way to simplify the given grammar and simplify it
$S \rightarrow AB$, $A \rightarrow a$, $B \rightarrow b$, $C \rightarrow d$

(3x6)

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