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) Given an arbitrary Non-deterministic Finite Automation (NFA) with N states. Find the maximum number of states in an equivalent minimized DFA.
b) State and justify whether the following statement is true of false:
    "If a language is context free it can always be accepted by a deterministic push down automation."
c) Give one method of resolving collision in symbol tables.
d) Prove that the class of context free languages is closed under union.
e) Design a DFA which accepts all strings which are ending with 101 over an Alphabet {0,1}.
f) What is Syntax directed definitions.
g) Explain the different type of Intermediate code generation.

(7x4)

2.
a) Reduce the Grammar G given by
    S->aAa
    A->Sb/bcc/DaA
    C->abb/DD
    E->ac
    D->aDA
    into an equivalent grammar by removing useless symbols and useless productions from it.
b) Convert the following grammar into CNF.
    S->aAD
    A->aB/bAB
    B->b
    D->d.

(9+9)

3.
a) Give a regular expression for the set of all strings over {a, b} accepting all strings which have number of a's divisible by 6 and number of b's divisible by 8.
b) What do you mean by ambiguity? Show that grammar
    S->S/S,
    S->a
    is ambiguous.

(10+8)

4.
a) What is the role of lexical analyzer in compiler? Discuss in detail.
b) Discuss the design issues of code generation.

(9+9)

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5. Construct an LL(1) parsing table for the following grammar. Also write the predictive parsing algorithm € is used as Epsilen
S->aBDh
B->Cc
C->bC|€
D->EF
E->g|€
F->f|€

(18)

6.
a) Explain in detail optimization of basic blocks with example.
b) Write about Data flow analysis of structural programs.

(9+9)

7. Write short notes on any **three** of the following:
a) Kleen's theorem
b) Bacos Naur Form
c) Compiler Construction tools
d) Non-Deterministic Turing machine

(3x6)