III B. TECH I SEMESTER REGULAR EXAMINATIONS, DECEMBER - 2022
AUTOMATA THEORY AND COMPILER DESIGN
(Common to INF, CSO, AID and CSM)

Time: 3 Hours   Max. Marks: 70

Note: Answer **ONE** question from each unit **(5 × 14 = 70 Marks)**
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UNIT-I

1. a) Draw NFA for the regular expression for ab*/ab.   [7M]
    b) Construct a minimal DFA accepting all strings over δ {0,1} that   [7M]
        do not contain 101 as a sub string?

(OR)

2. a) Construct DFA equivalent to the NFA ({p, q, r, s}, {0,1}, δ, p, {s})   [7M]
        where the transition function is given in following table: Initial
        state p and final state s.

States	0	1
p	p, q	p
q	r	r
r	s	-
s	s	s

    b) Construct finite automata that accept a string w, where w is   [7M]
        binary number divisible by 3.

UNIT-II

3. a)   Show that L={a^{2n}|n>0} is Regular.   [7M]
    b)   Define Derivation tree. Explain about LMD and RMD.   [7M]

(OR)

4. a) How to convert a regular expression to NFA? Explain with   [7M]
        example.
    b)   Construct Finite Automata for the regular Expression   [7M]
        1(01+10)*00.

UNIT-III

5. a) Construct the PDA to the following grammar: [7M]
        S→AB
        A→BS/b
        B→SA/a

    b) Write properties of recursive and recursively enumerable   [7M]
        languages.

(OR)

6. a) List out the properties of PDA.   [7M]
    b) Design Turing Machine for the Language L={ **a^n b^n c^n|n≥1** }.   [7M]

UNIT-IV

7. a) Explain in detail about syntax directed translation.   [7M]

    b) What is Left Recursion? Eliminate left recursion from the [7M]
        following grammar:

        A->Ac/Aad/bd/c.

(OR)

8. a) Give a model for LR parser. Write an algorithm for LR parsing.   [7M]

    b) Generate SLR parsing table for the following grammar   [7M]

        S →Aa | bAc | Bc | bBa

        A → d

        B → d

        And parse the sentence "bdc".

UNIT-V

9. a) Explain reducible and non-reducible flow graphs with examples.   [7M]

    b) Explain in detail the procedure that eliminates global common [7M]
        sub expression.

(OR)

10. a) Explain in detail register allocation and assignment.   [7M]

    b) Explain in detail about the garbage collection via Reference [7M]
        Counting.

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