R16

SET - 1

II B. Tech II Semester Supplementary Examinations, April - 2021
FORMAL LANGUAGES AND AUTOMATA THEORY
(Computer Science and Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**
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PART –A

1. a) Write short notes on 5-tuple notation of finite automata.   (2M)

    b) Write the regular expression for arithmetic expressions   (2M)

    c) Construct a CFG generating all integers with sign   (3M)

    d) Relate push down automata and instantaneous description languages   (2M)

    e) Define Turing Machine and explain its model.   (2M)

    f) Differentiate decidable and un decidable problems.   (3M)

PART –B

2. a) Explain the procedure for constructing minimum state DFA with an example.   (7M)

    b) Design DFA which accepts language L={0,000,00000…….} over {0}   (7M)

3. a) What is regular expression? Write the regular expression for the following   (7M)
        languages over {0, 1}*
        i)   The set of all strings such that number of 0's is odd
        ii)   The set of all strings that contain exactly three 1's
        iii)   The set of all strings that do not contain 1101

    b) Explain pumping lemma for regular languages with the applications of   (7M)
        pumping lemma.

4. a) is ambiguous grammar? Explain how to eliminate the ambiguity from the   (7M)
        grammar? Consider the example grammar from E$\rightarrow$E+E/E-E/E*E
        E$\rightarrow$E/E E$\rightarrow$(E)/id

    b) Eliminate unit productions and ε-production from the grammar   (7M)
        S$\rightarrow$Aa/B,   B$\rightarrow$A|bb,   A$\rightarrow$a|bc|B

5. a) Design a non deterministic push down automata for the following languages   (7M)
        L1={a^{n}b^n|n>=0}, L2={ww^R |w in (0+1)*}

    b) Construct the PDA for the given grammar S$\rightarrow$AA|a, A$\rightarrow$SA|b   (7M)

6. a) Design Turing machine over{a,b} which can compute concatenation function   (7M)
        over Σ={1}

    b) Explain the following i)Language of Turing machine   ii) Types of Turing   (7M)
        machine

7. a) What is satisfiability problem? How Cook's theorem helps in deciding the NP   (7M)
        completeness of problem.

    b) What is NP Problem? Explain with Travelling Sales person problem.   (7M)

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