Code No: RT22055 **R13** SET - 1

II B. Tech II Semester Supplementary Examinations, June/July– 2022
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 **THREE** Questions from **Part-B**

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PART –A

1. a) What are state diagram and state transition table? (3M)
   b) Present the properties of recursively enumerable languages. (4M)
   c) Construct an NFA accepting the set of all strings over {0,1} whose second symbol from last is 1. (4M)
   d) Construct a regular grammar for L={ $0^n11 | n\geq1$}. (4M)
   e) Give the formal definition of Moore machine. (3M)
   f) Define P and NP classes. (4M)

PART -B

2. a) What is Computation? What are the different models of Computation? Explain. (8M)
   b) Explain the applications of Finite State Machines in real world. (8M)

3. a) What are different types of languages in automata theory? Present the rules for each of these languages and the relationship among these languages. (8M)
   b) Show that the language L ={$a^nb^nc^n$ |n>=0} is not context free. (8M)

4. a) Design an ε-NFA for the regular expression (a*bc)+(ab*)+c*. (8M)
   b) Convert the answer obtained in question 4(a) into an NFA without ε moves. (8M)

5. a) Construct a Finite Automata equivalence to the regular expression (0+1)*(00+11)(0+1)*. (8M)
   b) State and explain Arden's Theorem. (8M)

6. a) With an example, explain the procedure to simplify a CFG. (8M)
   b) What is normalization of a Grammar? Define CNF and GNF. What is the difference between these two normal forms? (8M)

7. Define Turing Machine and design it to recognize the language L = { $0^n1^n0^n$ | $n\geq1$}. Illustrate the action of Turing machine in accepting the word $0^31^30^3$. (16M)
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