Code No: R1622055 **R16** SET - 1

II B. Tech II Semester Supplementary Examinations, November - 2019
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 about transition and extended transition functions. (2M)
   b) Relate regular grammars and regular expressions. (2M)
   c) Specify the reason for eliminating useless symbols? How to identify them? (2M)
   d) Write about the model of Push Down Automata. (3M)
   e) What is Turing machine halting problem? (3M)
   f) Prove that integer linear programming is NP-Hard. (2M)

PART –B

2. a) Explain the procedure to test the equivalence of two finite state machines over set of strings 'S' with an example. (7M)
   b) **(0/1)*011** for this regular expression draw the NFA with ϵ-closures and convert it into NFA. (7M)

3. a) Construct DFA equivalent to regular expression **(0+1)*(00+11)(0+1)*** and also find the reduced DFA (7M)
   b) Explain the Pumping Lemma for regular sets. Show that L={$\mathbf{a^p}$**\| p is a prime**} is not regular. (7M)

4. a) Describe the closure properties of context free grammars. How to simplify the context free grammars? Explain. (7M)
   b) Find GNF equivalent to the given CFG: E→E+T|T, T→T*F|F, F→(E)|id (7M)

5. a) What is Deterministic PDA? Differentiate acceptance by final state and acceptance by empty state. (7M)
   b) S→aABB|aAA, A→aBB|a, B→bBB|A, construct the PDA that accepts the language generated by given grammar. (7M)

6. a) Design Turing machine and its transition diagram to accept the language $L = \{a^n\ b^n \mid n >= 1\}$ (7M)
   b) Write about Churches hypothesis and Computable function in Turing Machines with an example. (7M)

7. a) Write the general working principle of post correspondence theorem? How it is modified? Explain. (7M)
   b) Find whether post correspondence problem P={(10,101),(011,11),(101,011)} has match? Give the solution. (7M)
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