

Code No: R22055

**R10**
**SET - 1**
**II B. Tech II Semester Supplementary Examinations, November-2017**
**FORMAL LANGUAGES AND AUTOMATA THEORY**

(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 75

 Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks  
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1. a) What is transition diagram? Explain. (6M)  
 b) What is FA? What are the applications of FA? (5M)  
 c) Define set? What are different types of set? (4M)
2. Define Mealy machine? Construct the Mealy machine equivalent to the Moore machine M defined by table 1. (15M)  
 Table 1:  

|    | a=0 | a=1 | output |
|----|-----|-----|--------|
| q1 | q1  | q2  | 0      |
| q2 | q1  | q3  | 0      |
| q3 | q1  | q3  | 1      |
3. a) Discuss about pumping lemma for regular sets. (6M)  
 b) Explain about the closure properties of regular sets. (5M)  
 c) Explain the rules for simplifying the regular expressions. (4M)
4. a) How to obtain a left linear grammar equivalent to a given right linear grammar? Explain with example. (6M)  
 b) Discuss about derivation tree. (4M)  
 c) Discuss about linear bounded automata. (5M)
5. Define CFG? Construct the CFG for the language (15M)  
 i) All strings with an odd number of a's and even number of b's  
 ii) palindrome  
 iii)  $L = \{ 0^i 1^j 0^k \mid j = i+k \}$   
 iv)  $L = \{ a^m b^n \mid m \leq n \leq 2m \}$
6. Design a PDA to accept the set of all strings of a's and b's that are not of the form ww, that is, not equal to any string repeated. (15M)
7. Construct the Turing machine that accepts all a's and b's such that no of a's is equal to no of b's. (15M)
8. a) Explain about Turing reducibility (5M)  
 b) Discuss about the satisfiability problem (5M)  
 c) Discuss about the Un-decidability of modified post's correspondence problem. (5M)