

Code No: R22055

R10

SET - 1

II B. Tech II Semester Supplementary Examinations, April/May-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. What is DFA? Design the DFA for the following (15M)
  - i)  $L = \{w/w \text{ has both an even number of 0's and an even number of 1's}\}$
  - ii) That accepts the word only aa over  $\Sigma = \{a, b\}$ .
  - iii)  $(a+b)(a+b)^*$
  - iv)  $L1 = \{x/x \text{ ends with } 01\}$
  - v) The number of b's are divisible by 3.
2. a) What is NFA with  $\epsilon$  moves? Explain with example. (8M)  
 b) Explain about the minimization of the finite automata with example. (7M)
3. a) What is regular expression? what are the operations of regular expressions? (7M)  
 b) Write the regular expression for the following (8M)
  - i) The set of strings of 0's and 1's whose tenth symbol from the right end is 1.
  - ii) The set of string of 0's and 1's with at most one pair of consecutive 1's.
  - iii) Language of 0's and 1's that has odd length.
  - iv) L be the set of length 6.
4. a) How to obtain a right linear grammar equivalent to a given left linear grammar? (6M)  
 Explain with example.  
 b) What are different types of grammars? Discuss (5M)  
 c) Write short note on sentential forms. (4M)
5. What is CNF? Find an equivalent grammar in CNF of the following grammar. (15M)
 
$$S \rightarrow bA / aB$$

$$A \rightarrow bAA / aS / a$$

$$B \rightarrow aBB / bS / b$$
6. Design a PDA to accept the following language (15M)
 
$$L = \{a^i b^j c^k / i \neq j \text{ or } j \neq k\}.$$
7. a) What is Church's hypothesis? Discuss. (8M)  
 b) Discuss about the restricted grammar. (7M)
8. a) Explain about Halting problem (5M)  
 b) Discuss about un-decidable problem. (5M)  
 c) Define class P and NP problems (5M)