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## III/IV B.Tech (Supplementary) DEGREE EXAMINATION

April, 2018

Fifth Semester

Time: Three Hours

Common to CSE/IT

Automata Theory And Formal Languages

Maximum : 60 Marks

Answer Question No.1 compulsorily.

(1X12 = 12 Marks)

Answer ONE question from each unit.

(4X12=48 Marks)

(1X12=12 Marks)

1. Answer all questions

- What is meant by concatenation of strings?
- Write the basic limitation of an FSM.
- Define deterministic Finite Automata.
- Define regular set.
- Write the language for the given regular expression  $r = a^*b^*b$ .
- What is meant by ambiguity of a grammar?
- State pumping lemma.
- Define Parse tree.
- Define PDA.
- Give an example on context free languages.
- Define Turing machine.
- What is meant by post's correspondence problem?

## UNIT I

- Give DFA accepting the set of all strings containing 1101 as a substring over the alphabet  $\{0, 1\}$ . 6M
- Define NFA .Explain the process of converting an NFA to DFA 6M

(OR)

- Define Finite Automata .Why is an FA with  $\epsilon$  transition called NFA? What is the necessity of an NFA with  $\epsilon$  transition? 6M
- Find an equivalent NFA without  $\epsilon$  transitions for the FA with  $\epsilon$  transitions shown below Give also the transition table. 6M

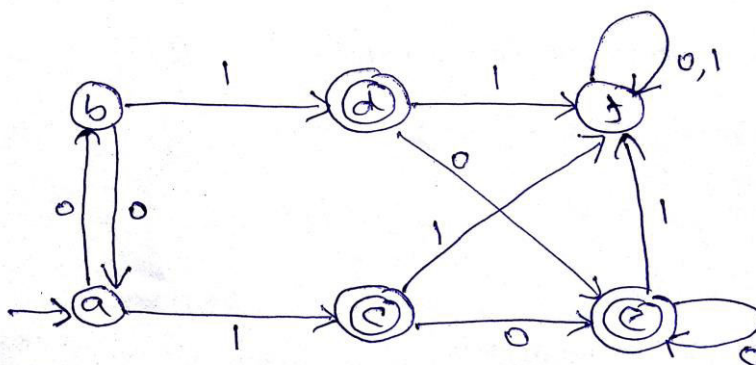


## UNIT II

- Show that  $L = \{a^p/p \text{ is a prime}\}$  is not regular using pumping lemma. 6M
- Construct the Finite Automata equivalent to the regular expression  $r = ab(aa+bb)(a+b)^*b$  6M

(OR)

- If L and M are languages prove that  $L \cap M$  is regular 6M
- Reduce the following DFA 6M



**UNIT III**

6. a) Explain context free grammars. Describe derivation trees with examples. 6M  
b) Prove that the following grammar is ambiguous.  
 $S \rightarrow a/abSb/aAb$   
 $A \rightarrow bS/aAAb$  6M

**(OR)**

7. a) Design a PDA which accepts an odd palindrome. 6M  
b) Construct a PDA equivalent to the following grammar.  
 $S \rightarrow aAA$   
 $A \rightarrow aS/bS/a$  6M

**UNIT IV**

8. a) Show that CFL's are not closed under intersection. 6M  
b) What are move and instantaneous description of a Turing machine? 6M
- (OR)**
9. a) Prove that if  $L$  is a recursive language so is  $\bar{L}$  6M  
b) Explain about the programming techniques for Turing machine. 6M