SV-192

Total No. of Pages : 3

Seat No.	

S.E. (Computer Science & Engineering) (Semester-IV) Examination, May - 2018
AUTOMATA THEORY
Sub. Code: 63531

Day and Date : Friday, 04 - 05 - 2018 **Total Marks : 50**

Time : 9.30 a.m. to 11.30 p.m.

Instructions :
1) **Question no. 1 and 4 are compulsory.**
2) **Solve any one question out of question no. 2 and 3.**
3) **Solve any one question out of question no. 5 and 6.**
4) **Assume suitable data wherever necessary.**
5) **Figures to the right indicate full marks.**

Q1) Solve any three questions : **[15]**

a) Write a Regular expression for :

i) The strings over {a, b} with an even number of a's?

ii) String over {a, b} in the infinite sequence:

aba, a^5,(aba)a^6,a^{11},aba^{13},a^{17},.....?

b) Design a DFA for strings containing at least two a's and ending with an even number of b's.

c) Find unreachable, dead and useful variables from the grammar.

$S \rightarrow ABC|AC$

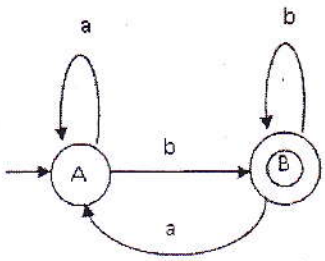
$A \rightarrow aA|a$

$B \rightarrow Bb|Ba$

$C \rightarrow Cc|c$

$D \rightarrow DB|d$

d) Give the regular grammar of the language accepted by following FA:



P.T.O.

Q2) a) Find the context free grammar for the language $L = \{a^n b^n c^m d^m | n, m \geq 1\}$ **[6]**

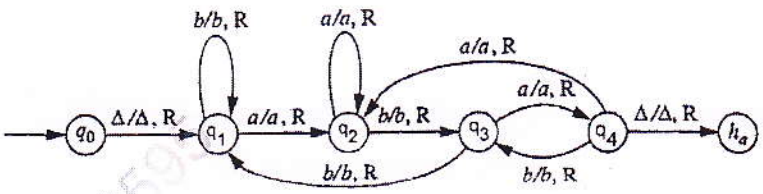
b) Describe nondeterministic finite automata with Λ transition and recursive definition for extended transition function for NFA- Λ . **[4]**

Q3) a) Explain Recursive Descent Parser. **[4]**

b) Prove that any regular language can be accepted by a finite automation. **[6]**

Q4) Solve any three questions : **[15]**

a) For following Turing Machine :



Trace moves made by machine from q_0 state to accept string "bbaaba".

b) Prove Pumping Lemma for Context Free Language.

c) Justify "Design of PDA to accept Language $L=\{a^n b^n | n>0\}$ is possible but not FA".

d) Define following Terms :

i) Configuration of PDA

ii) Transition function of Turing Machine.

Q5) a) Design PDA for following Grammar : **[7]**

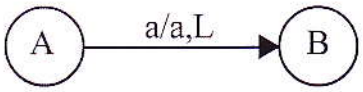
$S \rightarrow (S) \mid [S] \mid SS \mid \Lambda$

b) Define Push Down Automata. **[3]**

Q6) a) Design Turing machine to copy string on the tape and store it after the Δ symbol at end of first string. **[7]**

(Example: If the string on the tape is $\underline{\Delta}$ abbbab Δ then after copying, the string on the tape should be $\underline{\Delta}$ abbbab Δ abbbab.)

b) Give encoding of following transition of a Turing Machine. **[3]**



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