

Roll No

MCA-304

M.C.A. III Semester

Examination, November 2019

Theory of Computation

Time : Three Hours

Maximum Marks : 70

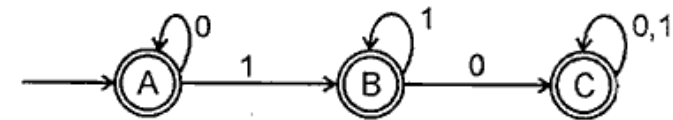
- Note : i) Attempt any five questions.
- ii) All questions carry equal marks.

- Construct a finite state machine that accepts exactly those input strings of 0's and 1's that ends with "11". 7
 - If L is accepted by an NFA with ϵ -transition then show that L is accepted by an NFA without ϵ -transition. 7
- Construct a NFA accepting all string in {a, b} with either two consecutive a "s or two consecutive b "s. 7
 - Construct a DFA equivalent to the NFA $M = (\{a, b, c, d\}, \{0, 1\}, \delta, a, \{b, d\})$ where δ is a defined as: 7

δ	0	1
a	{b, d}	{b}
b	c	{b, c}
c	d	a
d	-	a

- Find a grammar in Chomsky Normal Form equivalent to $S \rightarrow aAD$; $A \rightarrow aB / bAB$; $B \rightarrow b$, $D \rightarrow d$. 7
 - Construct a grammar on GNF which is equivalent to the grammar:
 $S \rightarrow AA / a$, $A \rightarrow SS / b$ 7

- Construct an NFA equivalent to the following regular expression: 01^*+1 7
 - Find the regular expression corresponding to the finite automaton given below: 7



- Give a detailed description of ambiguity in Context free grammar. 7
 - Explain different types of acceptance of a PDA. Are they equivalent in sense of language acceptance? Justify your answer. 7
- Define Deterministic Push Down Automata DPDA. Is it true that DPDA and PDA are equivalent in the sense of language acceptance is concern. Justify your answer. 7
 - Explain in detail about equivalence of Push Down Automata and CFG 7
- Design a Turing Machine to accept the language $L = \{0^n 1^n / n \geq 1\}$. 7
 - Explain in detail notes on Universal Turing Machines with example. 7
- Show that for two recursive language L_1 and L_2 each of the following is recursive 7
 - $L_1 \cup L_2$
 - $L_1 \cap L_2$
 - L_1^*
 - Explain the Halting problem. Is it decidable or undecidable problem. 7

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