Total No. of Questions: 3

Enrollment No. EN21CS301664

Faculty of Engineering

Mid Sem I Examination March - 2023

CS3CO38 Theory of Computation

Programme: B.Tech. Branch/Specialisation: CSE

Duration: 1.5 Hrs. **Maximum Marks: 30**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	CO	PO	PSO
Q.1	i.	Which of the following is false (a) $\Sigma^*\cup\Sigma'=\Sigma^*$ (b) $\Sigma'\subseteq\Sigma^*$ (c) $\Sigma^*\cap\Sigma'=\Sigma^*$ (d) $\Sigma'.\Sigma'=\Sigma'-\Sigma'$	1	BL_{01}	CO_{03}	PO_{01}	
	ii.	Choose the correct statement from the following (a) Every non RL is infinite (b) Every non RL is finite (c) Every RL is infinite (d) Every RL is finite	1	BL_{01}	CO_{01}	PO_{01}	
	iii.	Which two of the following out of four regular expressions(RE) are equivalent (I) $(00)^*(\varepsilon+0)$ (II) $(00)^*$ (III) 0^* (IV) $0(00)^*$ (a) I & II (b) II & III (c) III & IV (d) I & III	1	BL_{01}	CO_{03}	PO_{01}	
	iv.	If we convert from NFA to DFA then number of states always: (a) Increase (b) Decrease (c) Dependance on Automata (d) None of these	1	BL_{01}	CO_{01}	PO_{02}	
	v.	Myhill-Nerode theorem is used for: (a) Providing regular or non-regular (b) Minimization of FA (d) Finding equivalent classes (d) All of these	1	BL_{02}	CO_{01}	PO_{01}	

	vi.	Which of the following statement is correct (I) NFA is more powerful than DFA (II) NFA and DFA are equivalent in power (III) NFA can accept more no of Languages compared to DFA (a) Only I is correct (b) Only II is correct (c) Only IIII is correct (d) Above all are correct	1	BL_{01}	CO_{01}	PO_{01}
Q.2	i.	What is Finite Automata with tuples?	2	BL_{01}	CO_{01}	PO_{01}
	ii.	Explain regular expression with example.	2	BL_{01}	CO_{02}	PO_{02}
	iii.	Construct FSA for the following language over $\Sigma=\{a,b\}$ (a) $L=\{(ab^*)^*\}$ (b) $L=\{b^*a+b^*\}$	3	BL_{03}	CO_{03}	PO_{03}
	iv.	Explain different closure properties of regular language.	5	BL_{01}	CO_{03}	PO_{01}
OR	v.	Write Difference between Mealy and Moore machine.	5	BL_{02}	CO_{01}	PO_{03}
Q.3	i.	What is Arden's theorem?	2	BL_{01}	CO_{01}	PO_{01}
	ii.	Explain (ε) - NDFA.	4	BL_{01}	CO_{02}	PO_{04}
	iii.	What are the difference between DFA & NFA	6	BL_{01}	CO_{04}	PO_{02}
OR	iv.	State pumping lemma for regular languages. Also proof that $L=\{a^n/n$ is a prime number$\}$ is not regular language.	6	BL_{03}	CO_{01}	PO_{03}

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