



Daffodil International University
Faculty of Science & Information Technology
Department of Computer Science & Engineering
 Mid Semester Examination, Fall 2024
 Course Code: CSE228, Course Title: Theory of Computation
 Level: L2 Term: T2 Batch: 64

Time: 01.5 Hrs

Marks:25

Answer ALL Questions
 [All portions of each question must be answered sequentially.]

Q1	a) Summarize the difference between \emptyset and ϵ . Given the Alphabet $\Sigma = \{y, z, 0\}$, so compute Σ^2	[2]	CO1												
	b) Evaluate the string 00110 using extended transition function for the following transition table. <div style="text-align: center; margin: 10px 0;"> <table style="border-collapse: collapse; margin: auto;"> <tr> <td style="border-right: 1px solid black; padding: 5px;"></td> <td style="padding: 5px; text-align: center;">0</td> <td style="padding: 5px; text-align: center;">1</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">→ q0</td> <td style="padding: 5px; text-align: center;">{q0}</td> <td style="padding: 5px; text-align: center;">{q0,q1}</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">q1</td> <td style="padding: 5px; text-align: center;">{q2}</td> <td style="padding: 5px; text-align: center;">\emptyset</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">*q2</td> <td style="padding: 5px; text-align: center;">\emptyset</td> <td style="padding: 5px; text-align: center;">\emptyset</td> </tr> </table> </div>			0	1	→ q0	{q0}	{q0,q1}	q1	{q2}	\emptyset	*q2	\emptyset	\emptyset	[2]
		0		1											
→ q0	{q0}	{q0,q1}													
q1	{q2}	\emptyset													
*q2	\emptyset	\emptyset													
c) Summarize the meaning of “a*b+b*a”.	[1]														
Q2	a) Apply the knowledge of NFA to Design NFA's accepting the following languages over the alphabet {a,b} i) The set of all Strings containing aba anywhere in the string ii) The set of all Strings ending with bba iii) ending with bbb	[3]	CO2												
	b) Apply the knowledge of DFA to Design DFA's accepting the following languages over the alphabet {0,1} i) The set of strings containing 010 at the end in the string ii) Design DFA to accept the following language, $L = \{W / W \text{ has odd number of 1's and even number of 0's}\}$	[3]													
	c) Considering the transition table from the Q1 b. If the mentioned Automata is NFA, then convert to DFA.	[4]													
Q3	a) Construct the Regular Expression for the language consisting of all the strings of 0' and 1's that have the following condition: i) Containing 110 anywhere in the string ii) Containing 1 either two or three possible position from the beginning. iii) Containing 101 at the end of the string	[3]	CO2												
	b) Convert the following Regular expression (RE) into NFA with ϵ transition. i) $1(1+0)^*0$ ii) $(a b)^*(abb a^*b)$	[3]													
	c) Convert the following NFA into equivalent RE	[4]													