



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. <table border="1" style="margin-left: 100px;"> <tr> <td></td> <td>0</td> <td>1</td> </tr> <tr> <td>$\rightarrow q_0$</td> <td>$\{q_0\}$</td> <td>$\{q_0, q_1\}$</td> </tr> <tr> <td>q_1</td> <td>$\{q_2\}$</td> <td>\emptyset</td> </tr> <tr> <td>$*q_2$</td> <td>\emptyset</td> <td>\emptyset</td> </tr> </table>			0	1	$\rightarrow q_0$	$\{q_0\}$	$\{q_0, q_1\}$	q_1	$\{q_2\}$	\emptyset	$*q_2$	\emptyset	\emptyset	[2]
	0	1														
$\rightarrow q_0$	$\{q_0\}$	$\{q_0, q_1\}$														
q_1	$\{q_2\}$	\emptyset														
$*q_2$	\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 $\{a,b\}$ <ol style="list-style-type: none"> The set of all Strings containing <u>aba</u> anywhere in the string The set of all Strings ending with <u>bba</u> ending with <u>bbb</u> 	[3]	CO2												
	b)	Apply the knowledge of DFA to Design DFA's accepting the following languages over the alphabet $\{0,1\}$ <ol style="list-style-type: none"> The set of strings containing <u>010</u> at the end in the string 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)	<u>Construct the Regular Expression</u> for the language consisting of all the strings of 0' and 1's that have the following condition: <ol style="list-style-type: none"> Containing 110 anywhere in the string Containing 1 either two or three possible position from the beginning. Containing 101 at the end of the string 	[3]	CO2												
	b)	Convert the following Regular expression (RE) into NFA with ϵ transition. <ol style="list-style-type: none"> $1(1+0)^*0$ $(a b)^*(abb a^*b)$ 	[3]													
	c)	Convert the following NFA into equivalent RE	[4]													
<pre> graph LR start(()) --> 0((0)) 0 -- "a,b" --> 0 0 -- "a" --> 1((1)) 1 -- "a,b" --> 2(((2))) 2 -- "a,b" --> 3(((3))) </pre>																

