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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Mid term Examination, Fall 2025

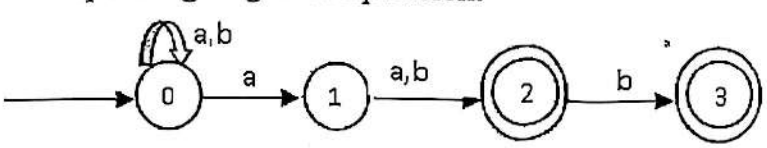
Course Code: CSE228, Course Title: Theory of Computation

Level: L2 Term: T2 Batch: 66

Time: 01.5 Hrs **Marks:25**

Answer ALL Questions

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

Q1	**a)**	**Summarize** the difference between $\sum^*$ and $\sum^+$. Let the Alphabet $\sum$={a, b, c}, so compute $\sum^2$	[2]	CO1
	b)	**Evaluate** the string 1001101 using the extended transition function for the following transition table. → q0 | {q0} | {q0, q1} q1 | {q2} | Ø q2 | Ø | {q3} *q3 | Ø | Ø	[3]	
Q2	**a)**	**Apply** the knowledge of NFA to Design NFA's accepting the following words: Batch66, CSE228, Dept, CSE, TOC	[3]	CO2
	b)	**Apply** the knowledge of DFA to Design DFA's for the following: **i)** Design a DFA that recognizes valid product identifiers formatted as PRD-2XX (where XX ranges from 01–99), ensuring automated validation and rejection of invalid codes within an inventory management system. **ii)** The set of strings containing 010 at the end in the string over alphabet {0,1} **iii)** Language L={W/ W has odd number of 1's and odd number of 0's} over alphabet {0,1}	[4]	
	c)	**Apply** the knowledge of conversion of NFA to DFA, convert the NFA given in **Q1 b**, to DFA	[3]	
Q3	**a)**	**Construct** the Regular Expression for the languages **i)** Containing aba or bab anywhere in the string over the alphabet **{a,b}** **ii)** Containing **d** either two or three possible positions from the beginning over the alphabet **{b,d}.** **iii)** Containing **101** or **010** at the end of the string over the alphabet **{0,1}**	[3]	CO2
	b)	**Convert** the following Regular expression (RE) into NFA with ϵ transition. **i.** (a|b)*(ab|a*b) **ii.** (ba*)*+bab	[3]	
	c)	Using the **State elimination approach**, **Convert** the given NFA into its corresponding Regular Expression. 	[4]	