DEPARTMENT OF

**INFORMATION SCIENCE & ENGINEERING**

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| Date | 4th June 2021 | Maximum Marks | 50 |
| Course Code | 18IS46 | Duration | 120 Min |
| Sem | IV Semester | Closed Book Online Test-1 | |
| **THEORY OF COMPUTATION** | | | |

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| **Sl. No.** | **Questions** | **M** | **BT** | **CO** |
| 1.a | Convert the below grammar to CNF form:  S → ASB | **ε**  A → aAS | a  B → SbS | A | bb | 06 | L3 | CO3 |
| 1.b | Write regular expressions for the following languages: Σ ={a,b}   1. L1 = {W | W has exactly 2 number of a’s} 2. L2 = { W | W has starting and ending with the same symbol} | 04 | L4 | CO1 |
| 2.a | Given ∑ = {a, b}, Construct NFA where second symbol from RHS is ‘a’. Convert the NFA to its equivalent DFA using subset construction method. | 06 | L4 | CO1 |
| 2.b | Find CFG’s to generate the following languages:  i)  **ii)** | 04 | L5 | CO3 |
| 3.a | State and prove pumping lemma for regular languages. | 05 | L3 | CO1 |
| 3.b | Obtain Regular Expression for the given Finite Automata using State Elimination Method. | 05 | L3 | CO1 |

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| 4.a | Convert the following ε-NFA to its equivalent DFA | 06 | L3 | CO1 |
| 4.b | Eliminate left recursion from the following grammar:  i)  S → A  A → Ad / Ae / aB / ac  B → bBc / f | 04 | L3 | CO3 |
|  | ii)   E → E + T / T  T → T \* F / F  F → id |  |  |  |
| 5.a | Show that class of regular languages are closed under Kleene star and difference. | 04 | L2 | CO1 |
| 5.b | Define the following:   1. DFA 2. Yield of a tree 3. Ambiguous grammar 4. Linear grammar and its types 5. Greibach Normal Form 6. ε-CLOSURE | 06 | L1 | CO1 |

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

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| Marks Distribution | Particulars | | CO1 | CO2 | CO3 | CO4 | L1 | L2 | L3 | L4 | L5 | L6 |
| Test | Max Marks | 36 | -- | 14 | -- | 6 | 4 | 26 | 10 | 4 | -- |

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