DEPARTMENT OF

**INFORMATION SCIENCE & ENGINEERING**

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| Date | 17th July 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 CFG below to its equivalent PDA by empty stack. Show that string a + (a \* b) is generated by the grammar and the same is accepted by the equivalent PDA. | 05 | L3 | CO3 |
| 1.b | Design a DPDA to accept strings over Σ = {a, b} with more a’s than b’s i.e., L={ x {a , b}\* | na (x) != nb (x)}. Trace the machine on aba. | 05 | L6 | CO1 |
| 2 | Design a Turing machine to perform the string reverse operation. The string is constructed overΣ = {a, b}. Trace the machine for the string baba. | 10 | L5 | CO1 |
| 3.a | Construct a PDA by final state for the below language:  L = {anbn | n>=1} U {anb2n | n>=1} | 06 | L4 | CO1 |
| 3.b | Discuss the halting problem of Turing machine. | 04 | L2 | CO1 |
| 4.a | Define PDA and instantaneous description (ID). Construct PDA to accept set of all odd length palindromes over {a, b}. Show by Id’s the string aababaa is acceptable by the PDA. | 08 | L4 | CO1 |
| 4.b | Obtain Turing machine to accept the language over Σ ={0, 1}.  L={w | w {0 , 1}\* , w ends with 011} | 02 | L3 | CO1 |
| 5.a | Write short notes on the following:   1. Chomsky Hierarchy 2. Turing Machine with Stay Option | 06 | L1 | CO3 |
| 5.b | Define DPDA. Construct DPDA equivalent to the DFA whose transition table is as below. Here A is Start state and B is final state.   |  |  |  | | --- | --- | --- | | **δ** | **a** | **b** | | **A** | **A** | **B** | | **B** | **C** | **A** | | **C** | **A** | **B** | | 04 | L4 | 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 | 7 | 18 | 10 | 5 |

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