DEPARTMENT OF

**INFORMATION SCIENCE & ENGINEERING**

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| Date | 7th August 2021 | Maximum Marks | 50 |
| Course Code | 18IS46 | Duration | 120 Min |
| Sem | IV Semester | Closed Book Online Test-3 | |
| **THEORY OF COMPUTATION** | | | |

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| **Sl. No.** | **Questions** | **M** | **BT** | **CO** |
| 1.a | Compare and write about tractable and intractable problems with an example. | 6 | L2 | CO4 |
| 1.b | Define the terms:   * NP Problem * Polynomial time reduction | 4 | L1 | CO4 |
| 2.a | Prove that intersection of two recursive languages is recursive and union of two recursively enumerable languages is recursively enumerable. | 6 | L5 | CO4 |
| 2.b | Write short notes on:   * Counter Machine * Polynomial Time Verifiability | 4 | L2 | CO1 |
| 3.a | Show that vertex – cover problem is NP-Complete. Assume that clique problem is NP-complete. | 8 | L5 | CO4 |
| 3.b | Prove that CFL’s are not closed under intersection. | 2 | L4 | CO3 |
| 4.a | Prove that if N is a non-deterministic Turing Machine, then there is a deterministic Turing Machine D such that L(N) = L(D). | 6 | L3 | CO1 |
| 4.b | Define PCP. Given ∑ = {0 , 1}, Find whether the following lists have a PC solution.   |  |  |  | | --- | --- | --- | |  | A | B | | i | Wi | Xi | | 1 | 10 | 101 | | 2 | 01 | 100 | | 3 | 0 | 10 | | 4 | 100 | 0 | | 5 | 1 | 010 | | 4 | L3 | CO4 |
| 5.a | State pumping lemma for CFLs. Show that the language  is not CFL. | 6 | L5 | CO3 |
| 5.b | Explain about Universal Turing machine with a neat diagram. | 4 | L2 | 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 | 14 | -- | 8 | 28 | 4 | 14 | 10 | 2 | 20 | -- |

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