DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

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| Date | 23-01-2025 | Maximum Marks | 50 |
| Course Code | 2 | Duration | 2 hours |
| Sem | V | Improvement CIE | No |
| UG/PG | UG | Faculty: | Naman |
| Course Title | TOC |  |  |

# Part- A

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q. No. | Questions | M | BT | CO |
| 1 | Solve using this formula | 2 | 5 | 2 |
| 2 | Define DPDA. | 2 | 4 | 1 |
| 3 | Convert the given CFG to PDA  Sa |aA | B, AaB | , BAa. | 2 | 1 | 5 |
| 4 | Define left recursion. Eliminate left recursion from the following grammar S(L) | a, LL,S | S | 2 | 4 | 2 |

# Part- B

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| --- | --- | --- | --- | --- |
| Q. No. | Questions | M | BT | CO |
| 1 | Define/Explain in Brief: P, NP Problem, NP, NP complete and NP-Hard problems, Travelling Salesman Problem, Polynomial reduction. | 4 | 3 | 1 |
| 2 | Solve using this formula | 4 | 5 | 2 |
| 3 | Define/Explain in Brief: P, NP Problem, NP, NP complete and NP-Hard problems, Travelling Salesman Problem, Polynomial reduction. | 4 | 3 | 1 |
| 4 | Show that CFL’s are not closed under intersection and complementation | 6 | 4 | 3 |
| 5 | State and prove pumping lemma for context free languages. | 6 | 2 | 3 |
| 6 | Discuss the applications of CFGs | 6 | 1 | 5 |
| 7 | Show that CFL’s are closed under union, concatenation and Kleene closure. | 4 | 4 | 1 |
| 8 | Consider the following undirected weighted graph. Find minimum spanning tree for the same using Kruskal’s algorithm. | 5 | 1 | 3 |

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BT-Blooms Taxonomy, CO-Course Outcomes

Total Marks: 47