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J.C BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY, YMCA FARIDABAD
2nd SESSIONAL EXAMINATION, Nov 2025

B.Tech Semester: CE51

Subject: Formal Languages, Automata and compiler Design

Paper Code: PCC-CS-502

Note: Attempt any three questions.

Time: 1 hr 30 min

Maximum Marks: 30

CO2 Q1 a) Design a pushdown automata for $L = \{ a^n b^{2n} \text{ such that } n \geq 1 \}$ (5)
b) Design a turing machine that inputs the binary string by 1. (5)

CO1 Q2 a) State and explain pumping lemma for Context Free languages. (5)
b) Design the Context Free Grammar for $L = \{ a^n b^n c^m d^m \text{ such that } n \geq 0 \}$ (5)

CO3 Q3 a) Explain syntax analysis (parsing). What is the difference between top-down and bottom-up parsing? (5)
b) Explain the concept of code optimization and why it is important. (5)

CO4 Q4 Explain three-address code (TAC). (10)
Generate three-address code for the expression and represent them in quadruples, triples, and indirect triples representation :
$$x = (a + b) * (c - d)$$