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DECEMBER 2021 - ENDSEM EXAM
T. Y. B. TECH. (INFORMATION TECHNOLOGY) (SEMESTER - I)
COURSE NAME: THEORY OF COMPUTATION
COURSE CODE: ITUA31183
(PATTERN 2018)

Time: [1 Hour]

[Max. Marks: 30]

- 1) Answer Q.1 OR Q.2, Q.3 OR Q.4, Q.5 OR Q.6.
- 2) Figures to the right indicate full marks.
- 3) Use of scientific calculator is allowed
- 4) Use suitable data where ever required

- Q.1 a) Define PDA i) through final state ii) through empty stack [4]
 b) Design a PDA for $L = \{ a^n b^n \mid n \geq 0 \}$ [6]

OR

- Q.2 a) What is deterministic and nondeterministic PDA? [4]
 b) Design a post machine for $L = \{ a^n b^n c^n \mid n \geq 0 \}$ [6]

- Q.3 a) Discuss applications of TM [4]
 b) Design a Turing machine which replaces occurrences of 111 by 101 [6]

OR

- Q.4 a) What is halting problem of Turing machine? [4]
 b) Design a Turing machine to recognize palindrome strings over input a, b [6]

- Q.5 a) Prove that NFA accepts a word or not is recursive [4]
 b) Explain Post correspondence problem with example [6]

OR

- Q.6 a) Explain with example decidable and non-decidable language? [4]
 b) Explain computational complexity with example [6]