

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2026

B.Tech-V/Semester (CSE/IT)

COURSE CODE (CREDITS): 18B11CI513 (3)

MAX MARKS: 35

COURSE NAME: FORMAL LANGUAGES & AUTOMATA THEORY

COURSE INSTRUCTOR:Dr. Rakesh Kanji

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is not allowed

Q.No	Question	CO	Marks
Q1	a. Find the minimized Deterministic Finite Automata for the given below DFA? <pre> graph LR a((a)) -- 0 --> b((b)) a -- 1 --> c(((c))) b -- 1 --> d(((d))) b -- 0 --> a c -- 0 --> e(((e))) c -- 1 --> f(((f))) d -- 1 --> f d -- 0 --> e e -- 0 --> e f -- "0,1" --> f style a fill:#fff,stroke:#000 style b fill:#fff,stroke:#000 style c fill:#fff,stroke:#000,stroke-width:2px style d fill:#fff,stroke:#000,stroke-width:2px style e fill:#fff,stroke:#000,stroke-width:2px style f fill:#fff,stroke:#000,stroke-width:2px </pre> b. Design a DFA for the strings over $\Sigma(0,1)$ where $L = \{w: w \bmod 4 \neq 0\}$? Consider w to be binary string.	3	4+3
Q2	a. Describe the construction procedure for PDA from a Context free grammar. b. Apply the methodology for production $S \rightarrow 0S1 \mid 01T$, $T \rightarrow 0T1 \mid \epsilon$ to convert into PDA.	7	3+4
Q3	a. Consider CYK algorithm to verify $w=baaba$ belongs to below production. $S \rightarrow AB \mid BC$ $A \rightarrow BA \mid a$ $B \rightarrow CC \mid b$ $C \rightarrow AB \mid a$ b. Verify the applicability of Greibach normal form in CYK algorithm.	7	5+2
Q4	a. Design a Turing machine $\Sigma a, b, c$ for language $L = \{a^n b^n c^n \mid n \geq 1\}$ b. Write down the transition for all type of Turing machines.	8 9	5+2
Q5	a. Identify the decidability and undecidability for following problems by true or False? (i) acceptance of w in a Deterministic Finite Automata. (ii) Checking regularity.	10	4+3

	(iii) acceptance of w in a Context free grammar. (iv)) acceptance of w in a Non Deterministic Finite Automata. b. Show the decidability of acceptance of w in a Deterministic Finite Automata with algorithmic way.		
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JUIT TEST-3 EXAMINATIONS- MAY-2026