JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B.Tech.-III Semester (CSE)

COURSE CODE (CREDITS):25B11CI315 (03) MAX. MARKS: 15

COURSE NAME: Theory of Computation

COURSE INSTRUCTORS: ARV*, HST, MKA, NSA, RMS, SKS MAX. TIME: 1 Hour

Note: *(a) All questions are compulsory.*

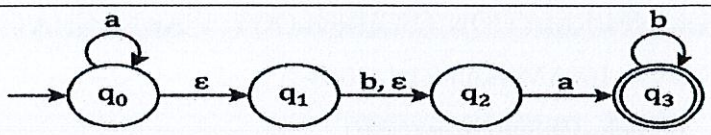
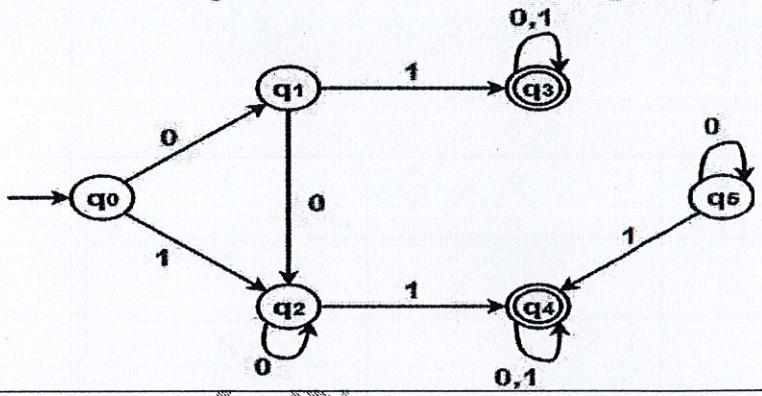
(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is not allowed

JUIT-CS-T1-EXAMINATION-AUG-2026

Q. No	Question	CO	Marks
Q1	Find the regular expression for the following DFA ($\Sigma = \{0, 1\}$): Transition Table: State \ Σ: 0 → A, 1 → B; A: 0 → A, 1 → B; B: 0 → C, 1 → B; C: 0 → A, 1 → B Additional Information: • State A is the start state. • State A is also the only final (accepting) state.	1	2.5
Q2	Design a DFA over the alphabet set $\Sigma = \{a, b\}$ that accepts all strings having an even number of a's and even number of b's.	2	2.5
Q3	Consider the Non-deterministic Finite Automaton with Epsilon transitions (ε-NFA) defined below, Design an Equivalent DFA for the same.	2	2.5

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Q4	Construct the Regular expressions for the following set of languages: (i) L = {w ∈ Σ* | the number of 1's in w is a multiple of 3, and w does not contain "111" as a substring}, where Σ = {0, 1} (ii) L = {w ∈ Σ* | w contains an even number of a's and an odd number of b's, where Σ = {a, b} (iii) L = {w ∈ Σ* | every "a" in w is immediately followed by a "b" (i.e., no "a" is followed by anything other than "b", including being the last character), and w contains an odd number of c's}, where Σ = {a, b, c}	1	2.5
Q5	Minimize the following DFA. 	2	2.5
Q6	Explain whether a language of palindromes is accepted by Finite Automata. Justify your answer.	1	2.5

AUG-2026
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