

JAYPEEUNIVERSITYOFINFORMATIONTECHNOLOGY, WAKNAGHAT

MAKE UP EXAMINATION- NOVEMBER 2025

B.Tech- Vth Semester

COURSE CODE (CREDITS): 18B11CI513 (3)

MAX.MARKS:25

COURSENAME: Formal Languages and Automata Theory

COURSEINSTRUCTORS: Dr.Praveen Modi, Dr. Rakesh Kanji,

MAX.TIME: 1:30 Hr

Dr. Amit Jhakad and Mr. Faisal

Note : (a) All questions are compulsory.

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

Q.No	Question	CO	Marks		
Q1	a. Write the constraints of Arden's Lemma for finding the regular expression? b. Write the regular expression for language $L = a^{n+k}a^{m+k}$?	5	2 3		
Q2	a. Modify the given left recursive grammar $G(\{S\}, \{a, b\}, P, \{S\})$, where P are the following productions, into the right recursive grammar? $S \rightarrow SS \mid aSb \mid ab$ b. Write the CFG for language $L = a^n b^{n+k}$?	4	3 3		
Q3	Consider the grammar $G(\{S, E\}, \{i, e, t, b\}, P, \{S\})$ with the following production set P $S \rightarrow S+S \mid S*S \mid id$ Prove whether the given above grammar is ambiguous or unambiguous for the String "id+id*id"?	4	5		
Q4	Simplify the following grammars with the given production set P? <table><tr><td> a. $G(\{S, A, B\}, \{a, b, \epsilon\}, P, \{S\})$ $S \rightarrow aA \mid bB$ $A \rightarrow \epsilon$ $B \rightarrow \epsilon^+$ </td><td> b. $G(\{S\}, \{(\cdot), \epsilon\}, P, \{S\})$ $S \rightarrow id S \mid \epsilon$ </td></tr></table>	a. $G(\{S, A, B\}, \{a, b, \epsilon\}, P, \{S\})$ $S \rightarrow aA \mid bB$ $A \rightarrow \epsilon$ $B \rightarrow \epsilon^+$	b. $G(\{S\}, \{(\cdot), \epsilon\}, P, \{S\})$ $S \rightarrow id S \mid \epsilon$	5	4
a. $G(\{S, A, B\}, \{a, b, \epsilon\}, P, \{S\})$ $S \rightarrow aA \mid bB$ $A \rightarrow \epsilon$ $B \rightarrow \epsilon^+$	b. $G(\{S\}, \{(\cdot), \epsilon\}, P, \{S\})$ $S \rightarrow id S \mid \epsilon$				
Q5	Design the pushdown automata for following languages $L_1 = \{a^n n=1\}$ and $L_2 = \{a^n b^n n \geq 2\}$	6	5		