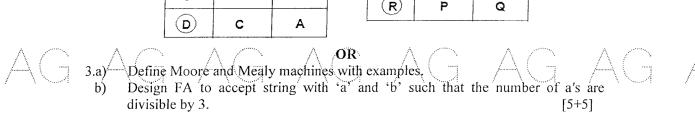
R15 Code No: 124AG JAWAHARLAL NEHRU TECHNOLOGICAL UNEVERSITY HYDERABAD B.Tech II Year II Semester Examinations, May - 2017 FORMAL LANGUAGES AND AUTOMATA THEORY (Computer Science and Engineering) Time: 3 Hours Max. Marks: 75 **Note:** This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions. PART- A (25 Marks) Define Transition Table. 1.a) [2] b) Explain the difference between DFA and NFA. [3] Construct CFG to generate strings with any number of 1's. c) [2] Explain Leftmost Derivation with an example. [3] d) Construct PDA for the language $L = \{a^m b^m c^n \mid m \land n \ge 1\}$ [2] e) / Define Ambiguity in CFG with an example. f)/ [3] Explain about Turing Machine. [2] g) Write a short note on Recursive languages. h) [3] List the properties of type-3 grammar. i) [2] j) Define Context-sensitive grammar. [3] PART-B (50 Marks) 2.a) Construct NFA with a which accepts a language consisting the strings of any number of 0's followed by any number of 1's followed by any number of 2's. Check whether the following two FSM's are equivalent. b) [5+5]1 M1 0 M2 0 D В ÷Α ÷ P R A (B) Q R P D В С (R)Р Q (D) C Α



4.a) Construct the left linear grammar for the language (0+1)*00(0+1)*.

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	5.	Design a FA for the following Languages a) (0*1*)*	
AG	_	b) (0+1)*111* c) (0*11*+101).	
	6.a)	Find the GNF equivalent to the following $S \rightarrow AA \mid a$	
	b)	$A \rightarrow SS \mid b$ Convert the following grammar to a PDA that accepts the language by empty	,
AG	1	$\begin{array}{c c} \text{Stack} \\ S \rightarrow 0S1 A \\ A \rightarrow 1A0 S \epsilon \end{array} $ OR OR	
	7.a)	Eliminate Useless symbols from the following grammar	
		$S \rightarrow aA \mid a \mid Bb \mid cC$ $A \rightarrow aB$	
A Z	Λ	$B \rightarrow a \mid Aa$	
AG		$\begin{array}{c} C \xrightarrow{eCD} \\ D \xrightarrow{ddd} \\ Construct \ CFG \ for \ the \ PDA \ M = (\{q_0,q_1\},\ \{0,1\},\ \{R,Z_0\},\ \delta,\ q_0,\ Z_0,\ \Phi) \ and \ \delta \ is \end{array}$	/
	b)	Construct CFG for the PDA M = $(\{q_0,q_1\}, \{0,1\}, \{R,Z_0\}, \delta, q_0, Z_0, \Phi)$ and δ is given by	
		$\delta(q_0, 1, Z_0) = (q_0, RZ_0)$ $\delta(q_0, 1, R) = (q_0, RR)$	
		$\delta(q_0, 0, R) = (q_1, R)$	
AG		$ \begin{array}{c} \delta(q_{1},0,Z_{0}) = (q_{0},Z_{0}) \\ \delta(q_{0},\varepsilon_{1},Z_{0}) = (q_{0},\varepsilon) \\ \delta(q_{1},1,R) = (q_{1},\varepsilon). \end{array} $	<i>'/</i>
	8.a)	Design a Turing Machine to accept $L=\{WW^R \mid W \text{ is in } (a+b)^*\}$. Design a TM to recognize the language $L=\{1^n2^n3^n \mid n \geq 1\}$. [5+5]	
	b)	OR	
46	9.a) b)	Design TM which will recognize strings containing equal number of 0's and 1's. Design TM that accepts the language 00*. [5+5]	/
		Explain Chomsky hierarchy of Languages. Write short note on NP- hard and NP-complete problem. OR [5+5]	
	11.a)	Disease shout universal tuning Machine	
A Z ^A N	b) △	Define post's correspondence problem and show that it is undecidable. [5+5]	/
	<u> </u>	Define post's correspondence problem and show that it is undecidable. [5+5] 00000	/
	Λ		/
$A \cup J$	$-/\!\!-\!$	G AG AG AG AG	/-