CONTINUOUS INTERNAL EVALUATION- 2

Dept: CSE	Sem / Div: 5th/ Parallel	Sub: Automata Theory and Computability	S Code: 17CS54
Date: 02/12/2020	Time: 2:30 - 4:00 PM	Max Marks: 40	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

Q N		Questions	Marks	RBT	COs
		PART A			
1	a	Simplify the following CFG by removing useless symbols and productions. S → AB | AC A → aA | bAa | a B → bbA | aB | AB C → aCa | aD D → aD | bC E → b	6	L2	CO3,4
	b	Define Context Free Grammar. Give example. Write CFG for the following Languages and Verify your answer with example. i) $L = \{a^n b^m : n \neq m\}$ ii) $L = \{ \mid a^{n+3} b^n : n>=1 \}$	6	L2	CO3,4
	c	Define Deterministic Push Down Automata and design a PDA for the following language: $L = \{wcw^R : w \in \{a,b\}^*\}$. Write the computation/ID for the input string 'abacaba' and 'abcab'	8	L3	CO3,4
		OR			
2	a	Consider the CFG with productions E → E+T | T T → T*F | F F → (E) | 0 | 1 Write LMD, RMD and parse tree for the string 0+((1*0)+0)	6	L2	CO3,4
	b	Define CNF and GNF. Convert the following grammar into CNF S→ ABC A→ aC | D B→ bB | ε | A C→Ac | ε | Cc D→aa	6	L2	CO3,4
	c	Define Non-Deterministic Push Down Automata and Construct PDA for the following language with transition diagram. $L = \{w \in \{a, b\}^* : \#_a(w) = \#_b(w)\}$ Write the computations for "abab"	8	L3	CO3,4

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3	a	Write CFG for the following. Give an example string for each and verify. i) $L=\{ww^R \mid w \in \{a,b\}^*\}$ ii) $L = \{a^n b^m \mid n>=0, m>n\}$	6	L2	CO3,4
	b	Write an algorithm to remove epsilon production(removeEps( )) and unit production(removeUnit( )).	6	L3	CO3,4
	c	Check the ambiguity of the grammar S→ iCtS |iCtSeS|a C→ b	8	L3	CO3,4
		OR			
4	a	Convert the following grammar into CNF. S → aACa A → B | a B → C | c C → Cc | ε	6	L3	CO3,4
	b	Write the required algorithms to remove useless symbols. (removeUnproductive( ) and removeunreachable( ))	6	L3	CO3,4
	c	Define the following with example. i) Recursive and self embedding grammar ii) Inherently ambiguous grammar iii) Computation in PDA iv) Derivation	8	L3	CO3,4

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