

**INTERNAL ASSESSMENT TEST - 3**

Dept: CSE	Sem / Div: 5 <sup>th</sup> A & B	Sub: Automata Theory & Computability	S Code: 15CS54
Date: 27/11/2018	Time: 3.00-4.30	Max Marks: 40	Elective: N

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

QN	Questions	Marks	RBT	CO's
<b>PART A</b>				
1 a	Design TM that accepts for string concatenation on $L=\{1\}$ . Input will be $(w_1, w_2)$ and out put is $w_1w_2$ Write Transition Diagram and ID's for 11b111.	10	L3	CO4
b	Briefly explain Turing Machine model. Give its definition.	5	L2	CO4
c	Convert the following CFG to PDA. $S \rightarrow aABC$ $A \rightarrow aB \mid a$ $B \rightarrow bA \mid b$ $C \rightarrow a$	5	L3	CO4
<b>OR</b>				
2 a	Design TM that accepts $\{ 1^n 2^n 3^n \mid n \geq 1 \}$ . Obtain the computation for 112233.	10	L3	CO4
b	Convert the following PDA to CFG. $M = (\{q_0, q_1\}, \{a, b\}, \{A, Z\}, \delta, q_0, Z, \{q_1\})$ Transitions of PDA are as follows: $\delta(q_0, a, Z) = (q_0, AZ)$ $\delta(q_0, b, A) = (q_0, AA)$ $\delta(q_0, a, A) = (q_1, \epsilon)$	5	L3	CO4

	c	Explain two types of descriptions of Turing Machines	5	L2	CO4
<b>PART B</b>					
3	a	Define and explain the following TM. i) Multi Tape Turing Machine ii) Non-Deterministic Turing Machine.	10	L2	CO5
	b	Define Post Correspondence Problem(PCP). Explain PCP with one example.	5	L3	CO5
	c	Explain the model of Linear Bounded Automata.	5	L2	CO5
<b>OR</b>					
4	a	Briefly explain the techniques for Turing machine construction.	10	L2	CO5
	b	Prove that Every language accepted by a multitape TM is acceptable by some single-tape TM (that is, the standard TM).	5	L2	CO5
	c	$HALT_{TM} = \{(M, w) \mid \text{The Turing machine } M \text{ halts on input } w\}$ is undecidable.	5	L2	CO5

  
 19/11/18

Prepared by: Pramod Kumar PM

  
 HOD