SCAN ME

C1+TC1

VIT®

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Winter Semester 2019-2020

Continuous Assessment Test – II

Mode of Examination: Closed Book

Programme Name & Branch: B.Tech. IT

Course Name & Code: ITE1006 Theory of Computation

Slot: C1+TC1 **Exam Duration:** 1.5 Hrs **Maximum Marks:** 50

Answer ALL Questions (5 x 10 = 50 Marks)

1. Find the regular expression for the given Finite State Machine using Arden's theorem.

States	Input symbols	
	0	1
→ * q1	q2	q3
q2	q4	q1
q3	q1	q4
q4	q4	q4

2. (i) Construct non-deterministic finite automata with epsilon transition for the following regular expression. 01* + 10* + 001. **(5 Marks)**

(ii) Check the language L={*ww* | *w* is defined over {a,b}} is regular or not. **(5 Marks)**

3. (i) Consider the language L corresponding to the regular expression (a+b)*bbb (a+b)*. Construct a finite automata and grammar G generating L. **(8 Marks)**

(ii) Write the regular expression for the language over {0, 1} that contains atleast one *0* and atleast one 1. **(2 Marks)**

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4. (i) Check the following grammar is ambiguous or not. **(5 Marks)**

$G = (V, T, P, S), V = \{S, X\}, T = \{a, b\}$

$S \rightarrow XX$
$X \rightarrow XXX$
$X \rightarrow a$
$X \rightarrow bX$
$X \rightarrow Xb$

(ii) Write the equivalent right linear grammar for the given left linear grammar. **(5 Marks)**

$S \rightarrow B1 \mid A0 \mid C0$
$A \rightarrow C0 \mid A1 \mid B1 \mid 0$
$B \rightarrow B1 \mid 1$
$C \rightarrow A0$

5. (i) Reduce the following context free grammar. **(5 Marks)**

$Q \rightarrow aCb \mid A$
$A \rightarrow ab \mid ba \mid B$
$C \rightarrow \varepsilon \mid CD$

(ii) Reduce the grammar $G = (\{A, B, C, D, E\}, \{0, 1, 2\}, P, A)$ into a Form which is suited for Parser as well as for Proving Theorems. **(5 Marks)**

$A \rightarrow 0ABC$
$A \rightarrow BCD \mid 2 \mid 1B \mid 2DE$
$B \rightarrow CE \mid 1$
$C \rightarrow 0 \mid 2$
$D \rightarrow 2$
$E \rightarrow 1$