SCAN ME

C2+TC2

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: C2+TC2** **Exam Duration: 1.5 Hrs** **Maximum Marks: 50**

**Answer ALL Questions (5 x 10 = 50 Marks)**

1. (i) Consider the language L corresponding to the regular expression 01(0/1)*01(0/1)*. Construct a finite automata and the grammar G generating L. **(8 Marks)**

   (ii) Write the regular expression for the language over {a, b} that do not end with ab. **(2 Marks)**

2. (i) Construct non-deterministic finite automata with epsilon transition for the following regular expression. (a+b)*ab + a*. **(5 Marks)**

   (ii) Check the language $L=\{0^n1^m0^{n+m} \mid m\geq1 \text{ and } n\geq1\}$ is regular or not. **(5 Marks)**

3. Consider the following transition table and construct a regular expression for it by using Arden's theorem.

| State | Next State | |
|---|---|---|
| | a | b |
| → q1 | q2 | q4 |
| q2 | q3 | q1 |
| * q3 | q4 | q2 |
| q4 | q1 | q3 |

4. (i) For the string aabbabab, find leftmost derivation and rightmost derivation. Check the grammar is ambiguous or not. **(5 Marks)**

$S \rightarrow aB \mid bA$

$A \rightarrow a \mid aS \mid bA$

$B \rightarrow b \mid bS \mid aBB$

(ii) Convert right linear grammar to its equivalent left linear grammar. **(5 Marks)**

$S \rightarrow bB$
$B \rightarrow bC$
$B \rightarrow aB$
$B \rightarrow b$
$C \rightarrow a$

5. Simplify the following grammar and convert it into Chomsky Normal Form.

$S \rightarrow abAB$

$A \rightarrow bAB \mid \varepsilon$

$B \rightarrow BAa \mid A \mid \varepsilon$

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