DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD -402 103
Semester Winter Examination – December - 2019

Branch: B.Tech Computer Science   **Sem.:- V**
Subject:- Theory of Computation (BTCOC502)   **Marks: 60**
Date:- 11/12/2019   **Time:- 3 Hr.**

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Instructions to the Students
> 1. Each question carries 12 marks.
> 2. Attempt **any five** questions of the following.
> 3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
> 4. If some part or parameter is noticed to be missing, you may appropriately
> assume it and should mention it clearly

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Q.1. a) What is FA(Finite Automaton)? Explain with example. Elaborate on 'Automaton and complexity'. **(06)**

Q1. b) Convert following regular expression to their equivalent FA. **(06)**
   i) ba^*b
   ii) (a+b) c
   iii) a (bc)

Q.2. a) Let G be the grammar :
i. S→ 0B | 1A
ii. A→ 0 | 0S | 1AA
iii. B→ 1| 1S | 0BB
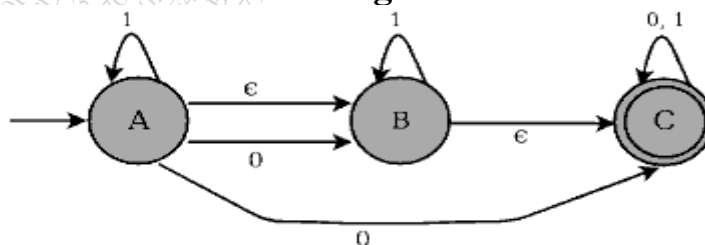**For the string 00110101and 11001010 find:**
1) Left most derivation
2)Right most derivation **(06)**

Q.2. b) Explain Pumping Lemma and its applications. **(06)**

Q.3. a) Construct DFA for following NFA

(06)

Q.3. b) Discuss the Chomsky Hierarchy of languages by taking suitable example of each classification. **(06)**

Q.4 a) Convert the given Grammar into Chomsky Normal Form (CNF)

       $S \rightarrow ASB$

       $A \rightarrow aAS \mid a \mid \varepsilon$

       $B \rightarrow SbS \mid A \mid bb$ **(06)**

Q.4. b) Explain:

1) Recursively Enumerable Language

2) Greibach Normal Form **(06)**

Q.5. a) Explain Turing Machine in details along with halting problem. Also state its applications. **(06)**

Q.5. b) Construct a PDA for language L = { wcw^R | w= $\{0, 1\}^*$}

where w^R is the reverse of w. **(06)**

Q.6. a) Explain Random access Turing Machines and Non deterministic Turing Machines. **(06)**

Q.6. b) Define Mealy machine and Moore machine and

Convert following Mealy machine into Moore machine.

State	Input	
	a	b
Q_0	$Q_{2,1}$	$Q_{3,0}$
Q_1	$Q_{0,0}$	$Q_{1,1}$
Q_2	$Q_{1,1}$	$Q_{2,0}$
Q_3	$Q_{2,0}$	$Q_{0,1}$

(06)

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