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.**

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

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

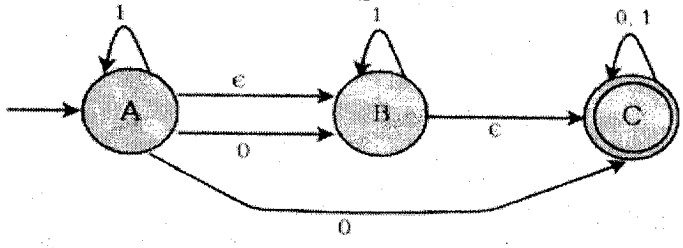
Q1. b) Convert following regular expression to their equivalent FA. **(06)**

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 $L = \{ wcw^R \mid w= \{0, 1\}^*\}$ 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)

Paper End