Roll No ....

MCA - 304

M.C.A. III Semester

Examination, December 2014

Theory of Computation

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) What is an automation?

b) Differentiate between Kleene closure and transitive closure.

c) Design finite automata for the given expression
$0 + (0 + 1)* + 1$

d) Minimize the given automata:

http://www.rgpvonline.com
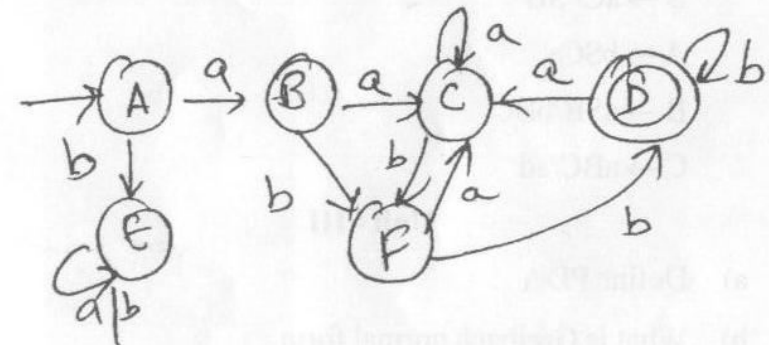
OR

Construct mealy machine equivalent to given moore machine

Input

	0	1	output
q_0	q_1	q_2	0
q_1	q_0	q_3	1
q_2	q_3	q_2	1
q_3	q_1	q_2	0

Unit - II

2. a) What is ambiguity in grammar?

   b) Define right most derivation and left most derivation.

   c) Design CFG to accept the language

   $L(G) = \{0^{n/n}/ n \geq 1\}$

   d) Show that the given grammar is ambiguocy.

   $S \rightarrow SbS/a$

OR

Find the reduced grammar equivalent to the given CFG:

$S \rightarrow aC/ SB$

$A \rightarrow bSCa$

$B \rightarrow aSB/bBC$

$C \rightarrow aBC/ad$

Unit - III

3. a) Define PDA

   b) What is Greibach normal form.

PTO

c) Explain the transitions mapping function of PDA.

d) Design PDA to accept $\{ww^R/w \in (0, 1)^*\}$. Where w is a word and w^R is reverse of word.

OR

Convert the given grammar to CNF?

$S \rightarrow aAC, A \rightarrow aB/bAB, B \rightarrow b, C \rightarrow c$

Unit - IV

4. a) Why Turing machine is known as acceptor?

   b) What is multi-dimensions Turing machine.

   c) Design Turing machine for the language.

   $L = \{a^n b^n a^{n+m} ; n \geq 1, m \geq 1\}$

   d) Explain universal Turing machine.

OR

Design Turing machine for the language:

$L(G) = \{0^n 1^n / n \geq 1\}$

Unit - V

5. a) What is undecidability?

   b) What is recursively enumerable sets?

   c) Explain complexity theory.

   d) Describe linear bounded automata and its applications.

OR

Explain context sensitive grammar and their equivalence.

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