

	<p align="center">FINALTERM EXAMINATION</p> <p align="center">SPRING 2007</p> <p align="center">CS402 - THEORY OF AUTOMATA (Session - 5)</p>	<p align="center">Marks: 55</p> <p align="center">Time: 120min</p>
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StudentID/LoginID: _____

Student Name: _____

Center Name/Code:

Exam Date: Saturday, July 07, 2007

- 1. This examination is closed book, closed notes, closed neighbors.**
- 2. Answer all questions.**
 - a. There is no choice.**
 - b. You will have to answer correctly all questions in this examination to get the maximum possible marks.**
- 3. Do not ask any questions about the contents of this examination from anyone.**
 - a. If you think that there is something wrong with any of the questions, attempt it to the best of your understanding.**
 - b. If you believe that some essential piece of information is missing, make an appropriate assumption and use it to solve the problem.**
- 4. Use of cell phone during the examination is strictly prohibited, otherwise strict disciplinary action will be taken as per university rules**
- 5. You are allowed to use only MS Word for drawing Diagrams and Symbols.**

****WARNING: Please note that Virtual University takes serious note of unfair means. Anyone found involved in cheating will get an `F` grade in this course.**

[illegible]

Question No: 1 (Marks: 1) - Please choose one

PDA is only used to represent a regular language.

- ▶ True
- ▶ False

Question No: 2 (Marks: 1) - Please choose one

If L is a regular language then L^c is also a regular language.

- ▶ True
- ▶ False

Question No: 3 (Marks: 1) - Please choose one

A production of the form non-terminal \rightarrow string of two non-terminal is called a live Production.

- ▶ True
- ▶ False

Question No: 4 (Marks: 1) - Please choose one

we can find a CFG corresponding to a DFA.

- ▶ True
- ▶ False

Question No: 5 (Marks: 1) - Please choose one

START, READ, HERE and ACCEPTS are conversions of the machine

- ▶ True
- ▶ False

Question No: 6 (Marks: 1) - Please choose one

A CFG is said to be ambiguous if there exists at least one word of its language that can be generated by different production trees

- ▶ True
- ▶ False

Question No: 7 (Marks: 1) - Please choose one

Syntax tree or Generation tree or Derivation tree are same tree

- ▶ True
- ▶ False

Question No: 8 (Marks: 1) - Please choose one

The symbols that cannot be replaced by anything are called terminals

- ▶ True
- ▶ False

Question No: 9 (Marks: 1) - Please choose one

The production of the form non-terminal \rightarrow one non-terminal is called unit production

- ▶ True
- ▶ False

Question No: 10 (Marks: 1) - Please choose one

DFA and PDA are equal in power.

- ▶ True
- ▶ False

Question No: 11 (Marks: 10)

a) Define Describe the following terms:

[Note: maximum in 20 to 30 words for each]

- I. CNF
- II. Regular Grammar

b) Convert the following CFG into CNF

$S \rightarrow CDCD$

$C \rightarrow 0|\Lambda$

$D \rightarrow 1|\Lambda$

Question No: 12 (Marks: 10)

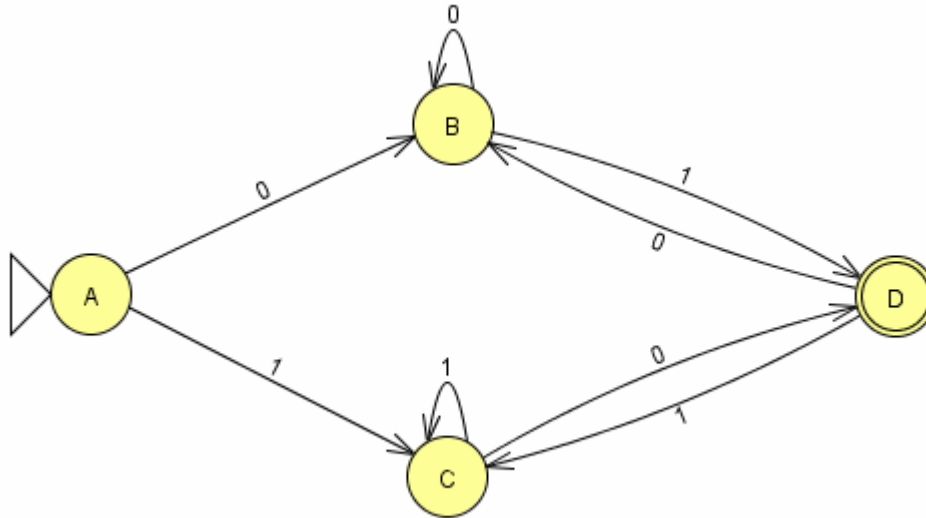
- a) Construct RE's for following languages over $\Sigma = \{0, 1\}$ (6)
 - i. All words in which "1" never follows "0". ("0" never appears before "1")
 - ii. All words which begin and end with different letters.

- b) How many minimum states can be there in an NFA of language having all word with "101" at the end? (4)

HINT: Build NFA for language for yourself but write only number of minimum states. No need to build NFA in software.

Question No: 13 (Marks: 10)

a) Is this an FA or NFA? (2)



b) Determine the CFG corresponding to the above FA or NFA (8)

Question No: 14 (Marks: 10)

a) Given CFG (Context Free Grammar): (6)

$S \rightarrow bS \mid aX \mid \Lambda$

$X \rightarrow aX \mid bY \mid \Lambda$

$Y \rightarrow aX \mid \Lambda$

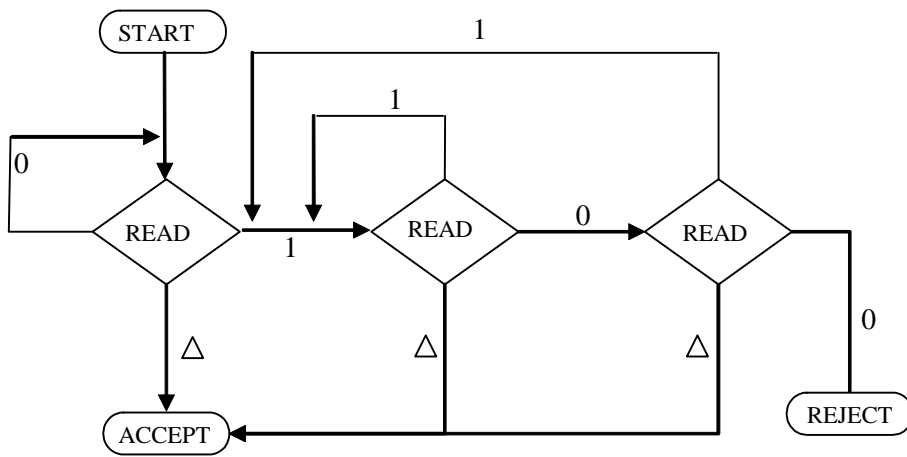
Derive following strings from above CFG. Show all steps. If string cannot be derived then describe it.

i. baabab

ii. ababaab

b) Describe language of following PDA (Push Down Automata): (4)

[Note: Don't write more than two to three lines for each. Only write to the point.]



Question No: 15 (Marks: 5)

Given a CFG below,

[5]

$S \rightarrow bS \mid aM$

$M \rightarrow bM \mid aF$

$F \rightarrow bF \mid aM \mid ^$

What is language accepted by above CFG?