B.E. 3/4 (IT) II Semester (**Main**) Examination, April/May 2007

Subject: **Theory of Automata**   (Elective-I)

Time : 3 Hours   Max. Marks: 75

Note: Answer all questions of Part - A and
answer any FIVE questions from Part - B.

PART-A (25 Marks)

1.	Define Grammar. Mention types of Grammars.	3
2.	What is the difference between DFA & NFA.	2
3.	Define mealy machine.	2
4.	Define right most derivation of a sentence. Explain with an example.	3
5.	What are useless productions in the following grammar.	4

$$S \rightarrow a\ S/A/C$$
$$A \rightarrow a$$
$$B \rightarrow a\ a$$
$$C \rightarrow a\ C\ b$$

6.	What is the speciality of PDA.	3
7.	Mention the types of tying machines.	2
8.	Define LR (K) grammar.	2
9.	Mention ID-format for TM.	2
10.	Give a grammar, which can generate palindromes.	2

PART-B (50 Marks)

11.a.	Design DFA which accepts sentences having || As a substring; alphabet is (0,1) justify design with example.	5
b.	Design DFA which accepts sentences having Odd no. of a's alphabet = (a,b) justify design with example.	5
12.	Mention algorithm for minimization of FSM. Explain with the help of an example.	10
13.	Design CFG for language $a^i\ b^i\ /\ i \geq 0$.	10
14.	Explain the methodology for simplification of a CFG. Explain with an example.	10
15.	Convert the following grammar to GNF.	10

$$G = (\ \{\ A_1,\ A_2,\ A_3\},\ \{a,b\},\ P,\ A_1\ )$$

$P :- A_1 \rightarrow A_2\ A_3$	$|\quad A_3 \rightarrow a$
$A_2 \rightarrow A_3\ A_1$	$|\quad A_3 \rightarrow A_1\ A_2$
$A_2 \rightarrow b$	$|$

16.	Design PDA to accept $a^n\ b^{2n}$; $n \geq 1$ justify design with example.	10