FACULTY OF ENGINEERING

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

AUTOMATA LANGUAGE AND COMPUTATION

Time : Three Hours]　　　　　　　　　　　　　　　　　　　[Maximum Marks : 75

Note :— Answer **ALL** questions from Part-A.

Answer **FIVE** questions from Part-B.

PART—A

1. Give grammar for language $L(G) = 0^n \mid n \geq 1$. 　　3

2. Give FSM which accepts $(01)*$. 　　3

3. Prove whether "$(0 + 1)* \ 110$" is regular or not. 　　3

4. Define parsing tree. Give applications. 　　1+3

5. What is the advantage of stack in PDA ? 　　2

6. Mention the closure properties of CFL's. 　　3

7. Give the formal definition of T.M. 　　3

8. Define Ambiguous Language. 　　2

9. Mention the machine equivalent to type ϕ grammar. 　　1

10. Mention the machine equivalent to CSG. 　　1

PART—B

11. Give the design of FSM which accepts sentences having no. of a's divisible by 3, and no. of b's divisible by 2 (i.e. even). Alphabet = (a, b); justify your design with example. 　　10

12. (a) Give the design of FSM for aa* bb* c. Justify your design with example. 　　6

　　(b) Give the design of FSM, which accepts a null-string. 　　4

13. (a) Construct deterministic FSM for the following grammar :

　　　　$S \rightarrow aS$ 　　　$A \rightarrow bB$

$S \rightarrow bS$ $B \rightarrow aC$

$S \rightarrow aA$ $C \rightarrow d.$ 6

(b) Explain the theorems, methodologies, you use for the problem 13(a).   4

14. Reduce or simplify the following CFG :

$S \rightarrow AB/CA$

$B \rightarrow BC/AB$

$A \rightarrow a$

$C \rightarrow aB/b.$ 10

15. Construct PDA to accept language : $a^n b^{2n} \mid n \geq 1.$ 10

16. Convert the following grammar to PDA. Justify your design, with the help of an example. [i.e. take a sentence like 010000 and prove that it is acceptable by your PDA.]

$S \rightarrow OBB$

$B \rightarrow OS$

$B \rightarrow IS$

$B \rightarrow O.$ 10

17. Design A TM to accept language $L(G) = 0^n 111 \mid n \geq 0.$ Justify your design by an example. 10