

**B.TECH SEM – IV (2007 COURSE) (INF. TECH.) :
WINTER - 2017
SUBJECT: THEORY OF AUTOMATA & FORMAL LANGUAGES**

Day: **Monday**
Date: **20/11/2017**

Time: **02.30 PM TO 05.30 PM**
Max. Marks: **80**

W-2017-2420

N.B.:

- 1) **Q. No. 1 and Q. No. 5 are COMPULSORY.** Out of the remaining attempt any **TWO** questions from each section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.

SECTION-I

- Q.1**
- a) Give formal definition of 'finite automata'. **(05)**
 - b) State 'Pumping lemma' for regular expression. **(05)**
 - c) Write short note on normal forms of grammar. **(04)**
- Q.2**
- a) Design a finite automata for language of strings containing '0' or '1' at the end where $\Sigma = \{0,1\}$. **(07)**
 - b) Distinguish between Moore and Mealy machine. **(06)**
- Q.3**
- a) Give formal definition of 'Regular Expression'. **(07)**
 - b) Draw DFA with epsilon moves for regular expression $(a^* + b^*)$. **(06)**
- Q.4**
- a) Write a short note on 'Chomsky Hierarchy'. **(07)**
 - b) When Grammar is said to be ambiguous? How to remove the ambiguity? **(06)**

SECTION-II

- Q.5**
- a) Give formal definition of 'Push Down Automata'. **(05)**
 - b) Write a short note on 'closure properties of CFL'. **(05)**
 - c) Write a short note on 'word processor'. **(04)**
- Q.6**
- a) Construct PDA for following language $L = \{a^n b^n \mid n \geq 0\}$. **(07)**
 - b) Give advantages of PDA over FA. **(06)**
- Q.7**
- a) Explain in brief 'Halting Problem' of TM. **(07)**
 - b) Design TM to obtain the reverse of string from the given input over $\Sigma = \{a,b\}$. **(06)**
- Q.8**
- a) Discuss the applications of Automata Theory in compiler construction. **(07)**
 - b) Distinguish between PDA and TM. **(06)**

* * * *