

**B.TECH SEM – IV (2007 COURSE) (INF. TECH.) : SUMMER -
2018**

SUBJECT : THEORY OF AUTOMATA AND FORMAL LANGUAGES

Day : **Saturday**
Date : **02/06/2018**

S-2018-2625

Time : **10.00 AM TO 01.00 PM**
Max. Marks : 80

N. B. :

- 1) **Q. No. 1 and Q. No. 5 are COMPULSORY.** Out of the reimagining attempt **ANY TWO** questions from Section – I and Section – II.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.
- 4) Assume suitable data, if necessary.

SECTION - I

- Q.1** a) Define Moore and Mealy machine. (05)
b) Define the term ‘Regular Expression’. (05)
c) Write a short note on ‘ambiguous context free grammar’. (04)
- Q.2** a) Discuss the relative powers of NFA and DFA. (07)
b) Design FA to accept the binary strings containing even number of ‘0’s and odd number of 1’s. (06)
- Q.3** a) Write a short note on ‘Pumping Lemma’. (07)
b) Design NFA with ϵ moves for Regular Expression $(a^* \cdot (a+b)^+)^*$ (06)
- Q.4** a) Write a short note on ‘Chomsky Hierarchy’. (07)
b) Convert the following grammar to GNF
 $S \rightarrow AB, A \rightarrow BS \mid b, B \rightarrow SA \mid a$ (06)

SECTION - II

- Q.5** a) Give formal definition of Push Down Automata. (05)
b) Discuss the power of Turing Machine and Push Down Automata (05)
c) Enlist and explain the phases of compiler. (04)
- Q.6** a) Design the Push Down Automata for the strings of type $0^n 1^{n+1}$ where $n \geq 0$. (07)
b) Design the Push Down Automata to check well formedness of parenthesis. (06)
- Q.7** a) Design a Turing Machine that replaces all occurrences of ‘111’ by ‘101’ from binary string. (07)
b) Comment over undecidable problems for Turing Machine. (06)
- Q.8** a) Distinguish between Finite Automata, Push Down Automata and Turing Machine. (07)
b) Write a short note on GREP utility in UNIX. (06)

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