

Subject : I. T. - Elective-I a) Theory of Automata

Day : Saturday
Date : 10/12/2016

S.D.E.



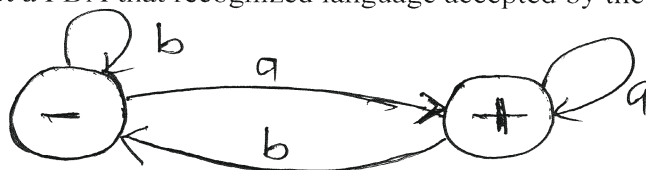
Time : 02.00 P.M. TO 05.00 P.M.
Max Marks : 80 Total Pages : 1

N.B.:

- 1) Attempt **ANY FIVE** questions from Section – **I** and attempt **ANY TWO** questions from section – **II**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in the **SAME** answer book.

SECTION - I

- Q.1** a) Prove that for all natural number n , $1 + 2 + 3 + \dots + n = n(n + 1)/2$. (05)
- b) Show that any subset of a countable set is countable. (05)
- Q.2** Construct a Binary adder as a finite state machine. (10)
- Q.3** Design a Finite Automata that reads strings made up of $\{0,1\}$ and accepts only those strings which end in either “00” or “11”. (10)
- Q.4** a) Describe in Simple English the language represented by the regular expression $r = (1 + 10)^*$. (05)
- b) Define the following and give suitable examples. (05)
- i) Regular set
 - ii) Regular expression
- Q.5** Let G be a content free grammar which is defined as: $S \rightarrow aSb | ab$. Find the CFL generated by G . (10)
- Q.6** Construct a PDA that recognized language accepted by the DFA shown in fig. (10)



- Q.7** Write short notes on: (10)
- a) Chomsky Normal Form
 - b) Post Canonical system

SECTION - II

- Q.8** Design a Post Machine that checks if the given string contains well – formed parentheses. (15)
- Q.9** Design a Turing Machine to find the 2’s complement of a given binary number. (15)
- Q.10** Construct a Moore machine to find out the residue – modulo – 3 for binary numbers. (15)

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