

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

Day : Tuesday
Date : 07/06/2016



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) Answers to both the sections should be written in the **SAME** answer book.
- 3) Figures to the right indicate **FULL** marks.

SECTION – I

- Q.1** a) Prove that all finite languages are regular. [05]
 b) Prove that for any alphabet $\Sigma : \Sigma^* = \Sigma^{**}$. [05]
- Q.2** Construct DFA equivalent to NFA ($\{p, q, r, s\}, \{0, 1\}, \delta, p \{q, s\}$) where δ is given in the following table [10]

	Σ		
Q		0	1
p		q, r	q
q		r	q, r
r		s	p
s		---	p

- Q.3** Prove that the following language is non regular using Pumping lemma, $\{a^n b^{n+1} | n > 0\}$ [10]
- Q.4** Construct Post Machine which accepts language $L = \{a^n b^m | n \geq 0, m \geq 0\}$. [10]
- Q.5** Consider the following grammar: [10]
 $S \rightarrow aB|bA$
 $A \rightarrow a|aS|bAA$
 $B \rightarrow B|bS|aBB$
 With ‘S’ as the starting symbol. Find the left most and right most derivation for the string “bbaaba”.
- Q.6** Give the PMT system which can generate well-formed parantheses. [10]
- Q.7** Write short notes on: [10]
 a) Mealy and Moore machine
 b) Post canonical form

SECTION – II

- Q.8** a) Define POST Machine. [07]
 b) Any language that can be accepted by Post Machine can be accepted by some Turing machine. [08]
- Q.9** Consider PDA accepting language consisting of even palindromes strings of ‘a’s and ‘b’s. [15]
- Q.10** Construct TM which recognizes the words of the form $0^n 1^n$. [15]

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