

**S.D.E.**

**M.C.A. SEM - IV : SUMMER - 2018**

**SUBJECT: THEORY OF AUTOMATA**

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

**S-2018-4620**

Time: **02.00 P.M. TO 05.00 P.M.**  
Max. Marks: 80

**N.B.:**

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

**SECTION-I**

- Q.1** Define the following and give suitable example: (10)  
i) Cardinality of a set                      ii) Kleene closure  
iii) Closure of a set                      iv) Alphabet  
v) Language
- Q.2** a) Design a Finite Automata that reads string made of { 0, 1} and accept only those string which end up in either “00” or “11” (05)  
b) Write short note on properties and limitations of FSM. (05)
- Q.3** Construct NFA that recognizes regular expression  $(a/b)^*ab$  (10)  
Convert it to DFA . Draw transition table.
- Q.4** Express the following grammar using CNF (10)  
 $S \rightarrow ABA$      $A \rightarrow aA | \epsilon$      $B \rightarrow bB | \epsilon$  .
- Q.5** Construct a Finite Machine for Binary Adder. (10)
- Q.6** Design Markov algorithm for reversing a given string over  $\Sigma = \{a, b, c, d\}$ . (10)
- Q.7** Write short notes on: (10)  
i) Church’s Turing Hypothesis  
ii) Post canonical system

**SECTION-II**

- Q.8** Find the equivalent DFA accepting the regular language defined by the right grammar given as: (15)  
 $S \rightarrow 0A | 1B$   
 $A \rightarrow 0C | 1A | 0$   
 $B \rightarrow 1B | 1A | 1$   
 $C \rightarrow 0 | 0A$
- Q.9** Design Turing machine to find out GCD of given two numbers. (15)
- Q.10** Construct PDA accepting language consisting of even palindrome strings of ‘a’ s and ‘b’ s. (15)

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