

II B. Tech II Semester Supplementary Examinations, November - 2019
FORMAL LANGUAGES AND AUTOMATA THEORY
 (Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**

PART-A

1. a) List and explain the elements of Finite State System?
 b) Give an example of a context sensitive grammar but which is not context free?
 c) With the help of an example explain Non-Deterministic Automata with ϵ -moves?
 d) If a regular grammar G is given by $S \rightarrow aS/a$, find DFA machine accepting $L(G)$.
 e) List the applications of Context Free Grammar?
 f) Give an example to explain the concept of Undecidable Problem?

(3M+4M+4M+4M+4M+3M)

PART-B

2. List and explain the steps involved in designing a finite state machine with an example. (16M)
3. a) Prove that all context free languages are not closed under intersection?
 b) Prove that complement of recursive language is recursive? (8M+8M)
4. a) Construct a Deterministic Finite State Automata equivalent to the NFA given below
 $M = \{ (q_0, q_1), \{a, b, c\}, \delta, q_0, \{q_1\} \}$ where δ is defined by the following transition table

δ	a	b	c
q_0	(q_0, q_1)	(q_1)	null
q_1	null	(q_0, q_1)	(q_1)

- b) Prove that for every NFA accepting a language L there exists an equivalent DFA accepting the same language L. (10M+6M)
5. a) Construct the regular grammar to generate the following Language $L = \{ a^{2n-1} \mid n \geq 1 \}$.
 b) Construct an NFA equivalent to the regular expression $(ab+aba)^*$. (8M+8M)
6. a) Construct Griebach Normal Form Equivalent to the context free grammar
 $S \rightarrow ASB/AB, A \rightarrow a, B \rightarrow b$
 b) State and explain the differences between Moore and Mealy Machine? (10M+6M)
7. a) Draw a transition diagram for turing machine and explain it in detail?
 b) Design a Turing Machine to accept the set of all palindrome over $\{0,1\}^*$. Draw the Transition diagram for the same. (6M+10M)