

II B. Tech II Semester Supplementary Examinations, Nov/Dec-2016
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 only **THREE** Questions from **Part-B**
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PART-A

- What is the role of Automata in real world?
 - Define Context-Sensitive Language? Give example.
 - List down the Advantages of Non-Deterministic Finite Automata?
 - State and explain the the Components of Regular Expression?
 - Give an example to show the Elimination of Unit Productions?
 - Describe Multiple Tape Turing Machine? Is it true that multiple tape turing machine is superior to single tape turing machine in the language acceptance? Justify your answer?
(3M+4M+4M+4M+4M+3M)

PART-B

- Construct a finite automata that accepts those strings over {a,b} that contain *aaa* as substring.
 - Write a short notes on Automata Classification? (8M+8M)
- Describe in detail about recursive enumerable languages?
 - What is push down automata? Show how context free languages accepted by push down automata? (8M+8M)
- Construct a Deterministic Finite State Automata equivalent to the NFA given below
 $M = \{ \{q_0, q_1, q_2, q_3\}, \{0, 1\}, \delta, q_0, \{q_3\} \}$ where δ is defined by the following transition table

δ	0	1
q_0	(q_0, q_1)	(q_0)
q_1	(q_2)	(q_1)
q_2	(q_3)	(q_3)
q_3	null	(q_2)

(16M)

- Construct an NFA equivalent to the regular expression $1^*0+1101$ and $(0+1)^*$.
 - Construct the regular grammar to generate the following Language $L = \{ a^n b^m \mid n, m \geq 1 \}$
(8M+8M)
- Construct equivalent grammar in Chomsky Normal Form for the grammar
 $G = (\{S, A, B\}, \{a, b\}, S \rightarrow bA/aB, A \rightarrow bAA/aS/a, B \rightarrow aBB/bS/b) , S$
 - Give an example to explain the Relation between Regular Grammar and Finite Automata?
(10M+6M)
- Design a Turing Machine to recognize the language $L = \{ 1^n 2^n 3^n \mid n \geq 1 \}$ (16M)

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