Code No: RT22055 **R13** SET - 1

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 any **THREE** Questions from **Part-B**

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PART-A

1. a) What is the role of Automata in real world?
   b) Define Context-Sensitive Language? Give example.
   c) List down the Advantages of Non-Deterministic Finite Automata?
   d) State and explain the the Components of Regular Expression?
   e) Give an eaxmple to show the Elimination of Unit Productions?
   f) 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

2. a) Construct a finite automata that accepts those strings over {a,b} that contain *aaa* as substring.
   b) Write a short notes on Automata Classification? (8M+8M)

3. a) Describe in detail about recursive enumerable languages?
   b) What is push down automata? Show how context free languages accepted by push down automata? (8M+8M)

4. 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)

5. a) Construct an NFA equivalent to the regular expression 1*0+1101 and (0+1)*.
   b) Construct the regular grammar to generate the following Language $L=\{ a^n b^m \mid n,m \geq 1\}$
   (8M+8M)

6. a) Construct equivalent grammar in Chomsky Normal Form for the grammar G=({S,A,B, {a,b}, S->bA/aB, A->bAA/aS/a, B->aBB/bS/b } ,S}
   b) Give an example to explain the Relation between Regular Grammar and Finite Automata?
   (10M+6M)

7. Design a Turing Machine to recognize the language $L=\{ 1^n 2^n 3^n \mid n \geq 1\}$ (16M)

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