Code No: R1622055 **R16** SET - 1

II B. Tech II Semester Model Examinations, March 2018
Formal Languages and Automata Thoery

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 a state and write about few types of states? (4M)
   b) What is a string? Write about concatenation of two strings? (3M)
   c) Write the design strategy for NFA-ε ? (4M)
   d) Write about unreachable and dead states with illustration? (4M)
   e) Write about Leftmost derivation and rightmost derivation with example? (4M)
   f) Explain about offline Turing Machine? (3M)

PART -B

2. a) Explain the design of a finite state machine with an example? (10M)
   b) Explain the advantages of Finite State Machine? (6M)

3. a) What are Generative grammars? Write the components of such grammars? Explain with example the types of generative grammars? (8M)
   b) Show that the language $L=\{ww^R \mid w \in \{a,b\}^*\}$ is generated with context free grammar? (8M)

4. a) Write the Algorithm for minimizing DFA? (4M)
   b) Reduce the following DFA where q_1 is the start state and q_6 is the final state. (6M)

δ	0	1
q_1	q_2	q_3
q_2	q_4	q_5
q_3	q_6	q_7
q_4	q_4	q_5
q_5	q_6	q_7
q_6	q_4	q_5
q_7	q_6	q_7

   c) Construct a regular expression corresponding to the DFA represented by the below transition table. q_1 is both the initial state and final state. (6M)

δ	0	1
q_1	q_1	q_2
q_2	q_3	q_2
q_3	q_1	q_2
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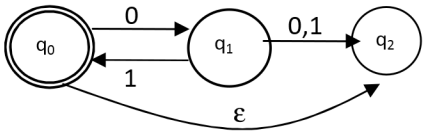
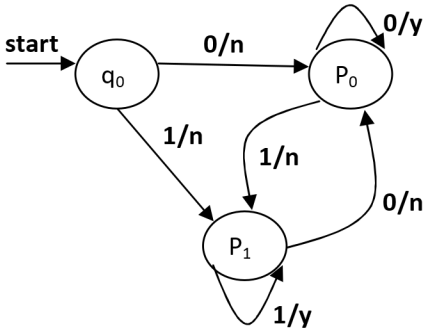
5. a) What is NFA? Explain the transitions of NFA? (4M)
   b) Construct an NFA that accepts the set of all strings over {0,1} that start with 0 or 1 and end with 10 or 01. (5M)
   c) Construct a DFA equivalent to the NFA given below (7M)



6. a) Convert the following Mealy machine to an equivalent Moore machine (8M)



   b) Explain different types of grammar with example? (8M)

7. a) Design a Turing Machine "Parity Counter" that outputs 0 or 1, depending on whether the number of 1's in the input sequence is even or odd respectively. (10M)
   b) What are P and NP class of Languages? What is NP Complete and give examples? (6M)