CLASS: BE   SEMESTER: V
BRANCH: CSE   SESSION : MO/2019

SUBJECT : CS5101 FORMAL LANGUAGES AND AUTOMATA THEORY

TIME: 1.5 HOURS   FULL MARKS: 25

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.


Q1   (a)   Design a finite automata that accepts the null set.   [1]
     (b)   Design a DFA that accepts those binary strings whose equivalent integer is divisible by 5   [4]

Q2   (a)   What is the language accepted by the automata given in Figure 1?   [1]
     (b)   Convert it into equivalent DFA.   [4]
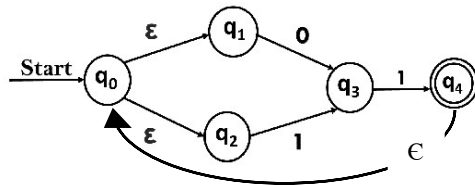
Q3   (a)   Find regular expression to represent the language that contains all strings that do not   [2]
           contain '01'
     (b)   Find regular expression to represent the language that contains the set of all strings of   [3]
           0's and 1's not containing '101' as a substring.

Q4   Convert the following automata into RE using either state elimination or $R_{ij}^{(k)}$ [5]
           induction. (formal and detailed step-by-step procedure should be followed)
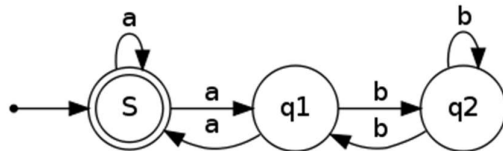
Q5   State pumping lemma for regular languages. Then check whether L={ww|w∈{a,b}*} is   [5]
           regular language or not.

Q6   (a)   Verify: (L + M)* = (L*M*)*.   [2]
     (b)   Intersection of two regular languages is always regular: prove or disprove.   [3]