

T.E. (Computer Engineering) (Insem)
THEORY OF COMPUTATIONS
(2019 Pattern) (Semester- I) (310242)

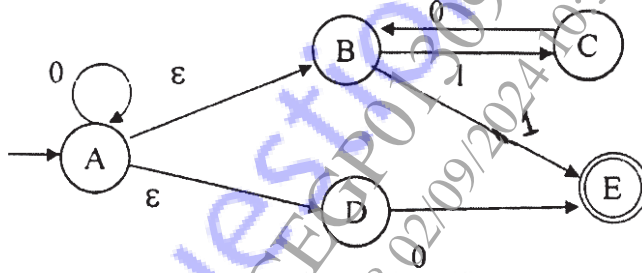
Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer the question of 1 or 2, 3 or 4.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.

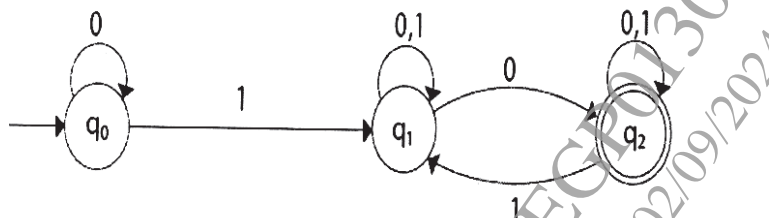
Q1) a) Convert the given NFA-ε to an NFA to DFA. [9]



b) Design a DFA which can accept a decimal number divisible by 3. [6]

OR

Q2) a) Convert following NFA to DFA. [7]



- b) i) Design a moore machine for the 1's complement of binary number.
- ii) Design a Mealy machine to find out 2's complement of a given binary number. [8]

P.T.O.

Q3) a) Convert the following RE to ϵ -NFA and find the ϵ -closure of all the states and corresponding DFA. $(0+1)^*.1.(0+1)$. [9]

- b) i) Regular Expression of strings over $\{0,1\}$ that have at least one 1.
ii) Regular Expression of strings over $\{0,1\}$ that have at most one 1.
iii) Regular Expression of all strings over $\{0,1\}$ ending with 00 and beginning with 1.

[6]

OR

Q4) a) i) Write the regular expression for the language starting with a but not having consecutive b's.

ii) Write the regular expression for the language L over $\Sigma = \{0,1\}$ such that all the string do not contain the substring 01.

iii) Write the regular expression for the language containing the string over $\{0,1\}$ in which there are atleast two occurrences of 1's between any two occurrences of 1's between any two occurrences of 0's.

[7]

b) Design a FA from given regular expression $10 + (0+11)0^*1$. [4]

c) Construct the regular expression for the given DFA using Ardens Theorem. [4]

