Total No. of Questions : 4]

SEAT N[ ]

PC26

[Total No. of Pages :2

[6360]-26

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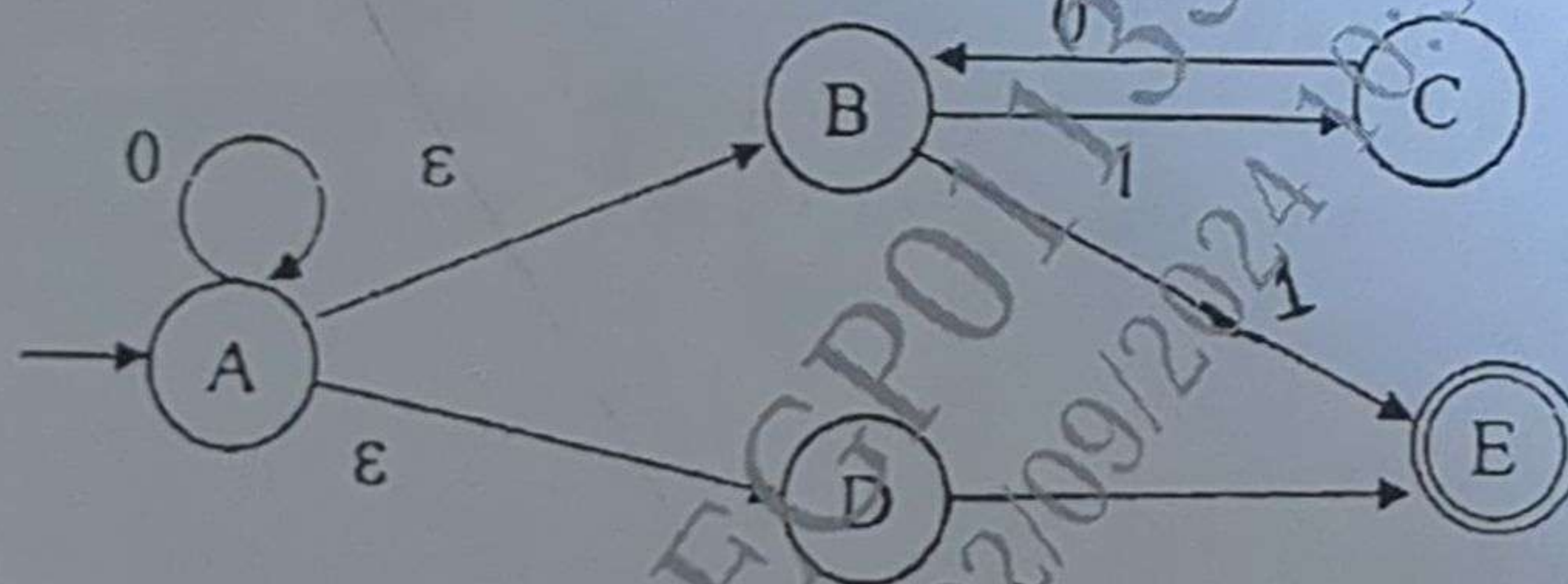### THEORY OF COMPUTATIONS
(2019 Pattern) (Semester- I) (310242)

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.
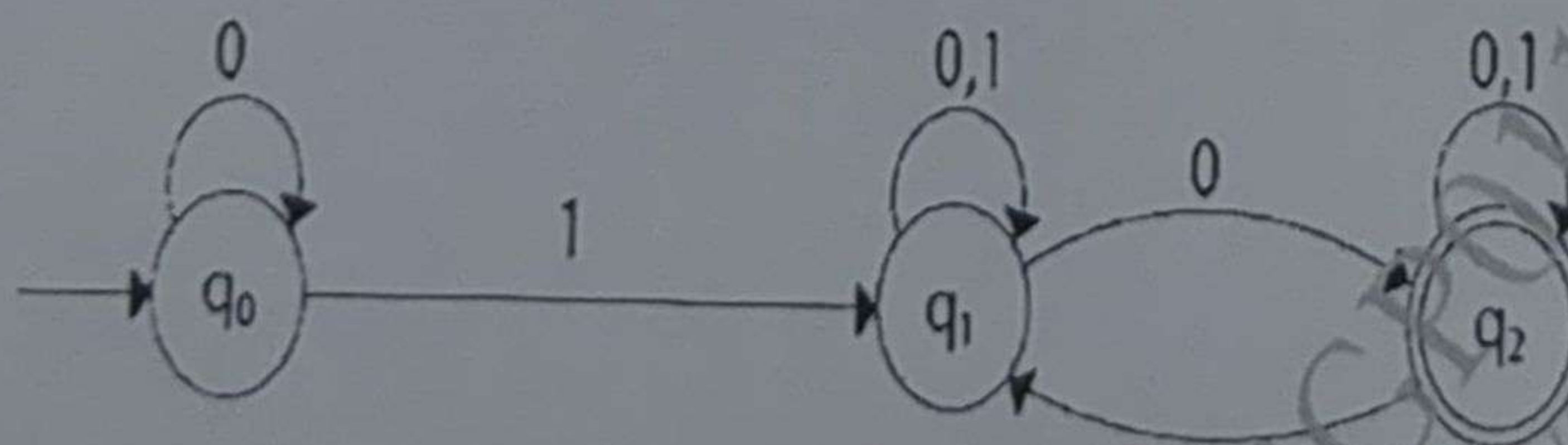4) Assume suitable data if necessary.

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]