Total No. of Questions : 4] **SEAT No. :**

P8556 **[Total No. of Pages : 2**

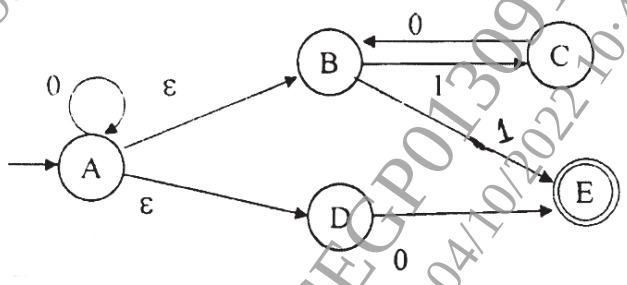
[Oct 22/TE/Insem]-526
T.E. (Computer Engineering)
THEORY OF COMPUTATION
(2019 Pattern) (Semester -I) (310242)

Time : 1 Hour] ***[Max. Marks : 30***

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Convert the given NFA–ε to an NFA to DFA. **[10]**

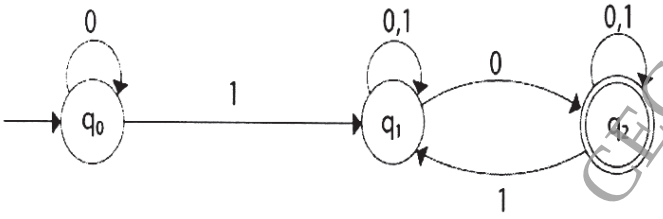


b) Define Pumping Lemma and apply it to prove the following

$L=\{0^m1^n0^{m+n} \mid m>=1 \text{ and } n>=1\}$ is not regular **[5]**

OR

Q2) a) Convert following NFA to DFA **[6]**



b) Design a Mealy machine that accepts strings ending in '00' or '11'. Convert the Mealy machine to the equivalent Moore machine **[9]**

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)
- The set of strings over {0,1} that have at least one 1. **[6]**
- The set of strings over {0,1} that have at most one 1.
- The set of all strings over {0,1} ending with 00 and beginning with 1.

OR

Q4) a) Consider the two RE r=0*+1*, s=01*+10*+1*0+(0*1)* **[8]**

i) Find the string corresponding to r but not to s.

ii) Find the string corresponding to s but not to r.

iii) Find the string corresponding to both r & s.

iv) Find the string corresponding to neither r nor s.

b) Write regular expressions for the following languages over the alphabet ∑={a,b} **[7]**

i) All strings that do not end with ‘aa’.

ii) The set of all strings ending neither in b nor in ba

iii) Find the shortest string that is not in the language represented by the regular expression a*(ab)*b*.

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