Total No. of Questions : 4]

SEAT No. : [ ]

PE326

[Total No. of Pages : 2

[6579]-326

T.E. (Computer Engineering)/(Computer Science) (Insem)

THEORY OF COMPUTATION

(2019 Pattern) (Semester - I) (310242)

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

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Assume suitable data if necessary.***

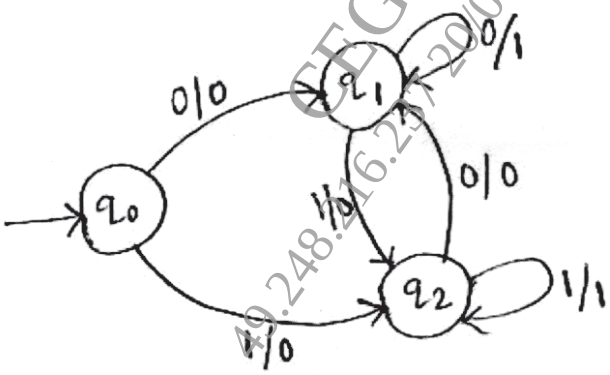
Q1) a) Design DFA which accepts set of strings over alphabet ∑{a, b} such that **[8]**

i) if it contains exactly 3 number of a' s.

ii) if it contains at least 3 number of a' s.

b) Consider the following Mealy Machine of Construct equivalent Moore machine. **[7]**

Also differentiate between Moore and Mealy machine (any 4 points).



OR

Q2) a) Design Moore machine such that for every substring that ends in bab the machine will give output 1 over alphabet ∑ {0, 1}. Further convert the same Moore machine into Mealy machine. **[8]**

b) Design a DFA which can accept a binary number divisible by 3. Explain the logic also. **[7]**

P.T.O.

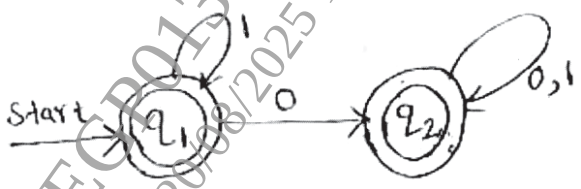
Q3) a) Write a regular expression to accept following language over alphabet $\{a,b\}^*$ **[6]**

i) Strings having at least one occurrence of substring 'aaa'.

ii) Strings starting and ending with same symbol.

iii) Strings having even number of a' s.

b) Using Arden's theorem, find regular expression. **[5]**



c) Draw NFA with epsilon Moves for RE = (a^*+b^*) **[4]**

OR

Q4) a) Check the equivalence of the Regular Expression. **[6]**

i) $(a^*bbb)^*a^*$ & $a^*(bbba^*)^*$

ii) $((a+bb)^*aa)^*$ & $E+(a+bb)^*aa$

b) Describe the languages accepted by the following regular expression and justify. **[5]**

i) a (a + b) * ab

ii) $(1\ ^*01^*01^*)^*$

c) Show that L = $\{a^n | n$ is a prime$\}$ is not regular. **[4]**

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