Total No. of Questions : 4]

SEAT No. : ____

P-5054

[Total No. of Pages : 3

[6187]-457
T.E. (Information Technology) (Insem)
THEORY OF COMPUTATION
(2019 Pattern) (Semester - I) (314441)

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

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 or Q.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) Design a Mealy machine to find 2's complement of any binary number. Write the definition of a Mealy Machine. **[4]**

b) Find the final DFA by performing the DFA minimization process. A is initial state and final states are B, C, D, E, F, G. **[5]**

Q/Σ	0	1
A	B	-
B	C	C
C	D	E
D	C	C
E	B	G
F	E	-
G	B	G

c) Write the formal definitions for the following : **[6]**

i) NFA (Non-Deterministic Finite Automata)

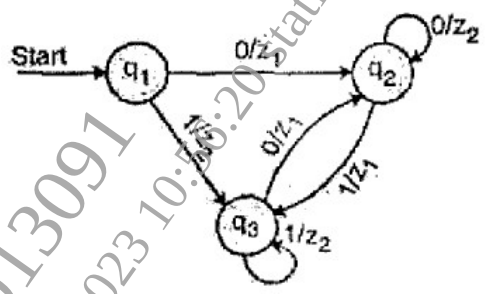
ii) Mealy Machine

iii) Moore Machine

OR

P.T.O.

Q2) a) Construct a Moore machine equivalent to the Mealy machine represented by the following Transition Diagram : **[5]**



b) Design a DFA (Deterministic Finite Automata) that reads strings made up of the letters in the word 'UNIVERSITY' and recognizes those strings that contain the word 'UNITY' as a substring. **[5]**

c) Justify that there can be the equivalent Mealy machine for any Moore machine by suitable example. **[5]**

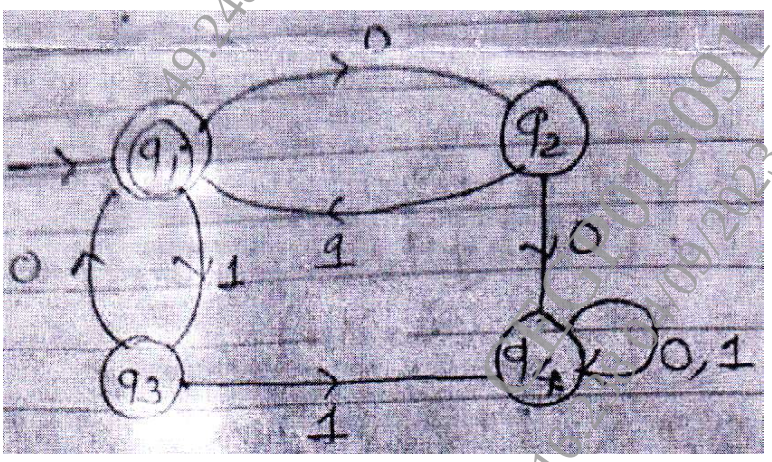
Q3) a) For the following regular expressions, draw the FA (Finite Automata) recognizing the corresponding language. **[5]**

i) 1(01 + 10)* + 0(11 + 10)*

ii) (01 + 10)* 00 (01 + 11)*

b) State and explain Pumping Lemma for a regular language. **[5]**

c) Find the regular Expression for the FA (Finite Automata) using Arden's Theorem. **[5]**



OR

Q4) a) Use pumping lemma to check whether the language, L = {0^n | n is prime} is regular or not. **[5]**

b) Find the regular expression for the language over inputs {a, b}. **[5]**

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

ii) The set of all strings containing at least one 'a' and at least one 'b'

c) Prove that "Regular language is closed under Kleene Star". **[5]**

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