Total No. of Questions : 6]

SEAT No. :

P40

[Total No. of Pages : 2

Oct.-16/TE/Insem.-40
T.E. (Computer Engineering) (Semester - I)
THEORY OF COMPUTATION
(2012 Pattern)

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

Instructions to the candidates:

1) ***Answer either Q1 or Q2, and Q3 or Q4, and Q5 or Q6.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Assume suitable data if necessary.***
4) ***Give suitable examples wherever necessary.***

Unit - I

Q1) a) Give Regular Expression for the following languages : **[6]**

i) L = { x |x ∈ { a, b }* and x contains exactly two a's}

ii) L = {a, c, ab, cb, abb, cbb, abbb, cbbb, ...}

iii) L = {x | x ε {a, b}* and x is any string that begins in "*abb*" or "*a*"}

b) Design Finite Automata (FA) for accepting strings, over Σ = { 0, 1 }, with even number of 0's and odd number of 1's. **[4]**

OR

Q2) a) Construct a DFA with reduced states equivalent to the regular expression 10 + (0+11)0*1. **[6]**

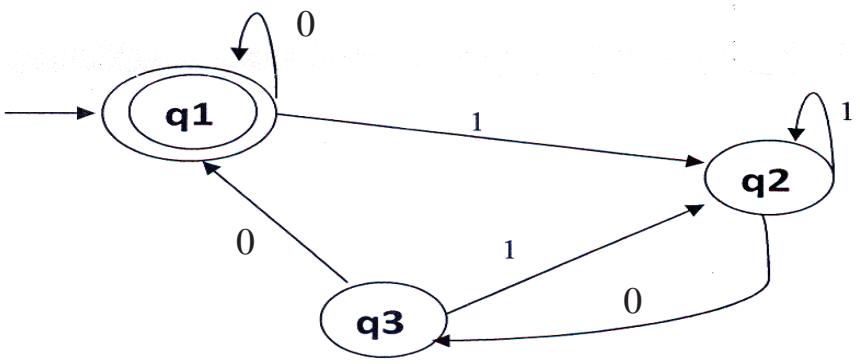
b) Prove the formula **[4]**

i) (r * s*)* = (r + s) *

ii) (ab)* ≠ a* b*

Unit - II

Q3) a) Find the regular expression for the set of strings recognized by the given FA. Use Arden's theorem. **[5]**



P.T.O.

b) Minimise the DFA given below: **[5]**

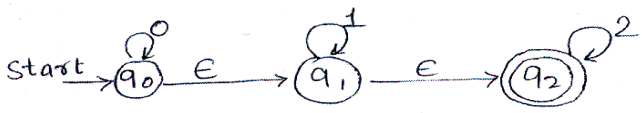
	Next State	
Input Symbols -> States	a	b
-> * 1	3	2
2	4	1
3	5	4
4	4	4
*5	3	2

Initial State: State 1 and Final States: States 1 and 5

OR

Q4) a) Design a Moore machine for computing the 2's complement of a binary number. Convert it into its equivalent Mealy machine. **[6]**

b) Consider the following NFA with E-transitions. Convert this in to NFA without ∈- moves. **[4]**



Unit - III

Q5) a) Give context free grammars for the following languages: **[6]**

i) L = { x |x ∈ { (,)}* with strings having well-formed parentheses (WFP)}

ii) L = { $a^m b^n c^{m+n}$|m,n > = 0}

b) Explain, with suitable examples, any two applications of context free grammars. **[4]**

OR

Q6) a) Convert the following CFG into Chomksy Normal Form (CNF): **[6]**

S -> AB
A -> CA | ^
B -> DB | ^
C -> 011 | 1
D -> 01

b) Explain graph grammars with a suitable example. **[4]**