Total No. of Questions : 5]

SEAT No. :

PC-1584

[Total No. of Pages : 3

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T.Y. B.Sc.
COMPUTER SCIENCE
CS-356 : Theoretical Computer Science
(Revised 2019 Pattern) (CBCS) (Semester - V)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any Eight of the following (Out of Ten) : **[8 × 1 = 8]**

a) Define the term ∈ - Closure.

b) State two differences between NFA and DFA.

c) Give the meaning of 'δ' function of NFA with ∈ moves.

d) Define Formal Languages.

e) State operations on Regular Languages.

f) Define tuples of Push Down Automata.

g) Define ambiguous grammar.

h) Define 'λ' function of Melay and Moore machine.

i) Name the type of language accepted by Pushdown Automata.

j) Define useless symbols.

P.T.O.

Q2) Attempt any Four of the following (Out of Five) : **[4 × 2 = 8]**

a) Differentiate between FA and PDA.

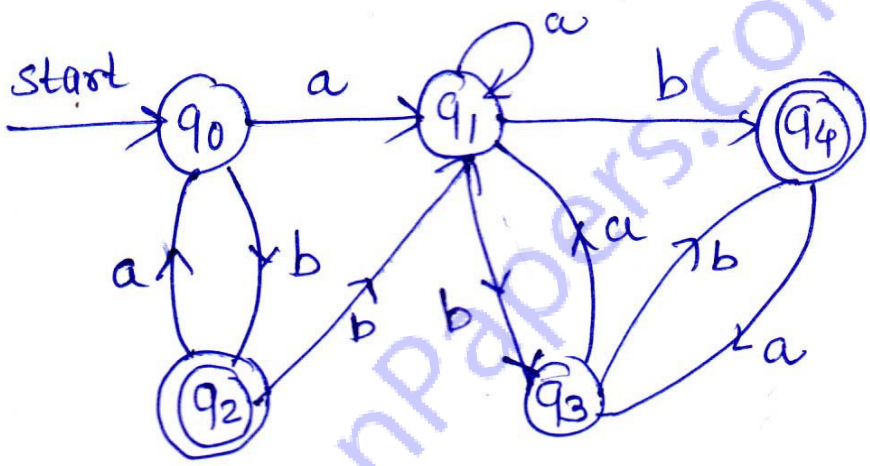
b) Construct FA for regular expression.

((a+b)* + abb)*

c) Construct CFG for language L which accepts set of all palindromes over Σ = {a,b}*.

d) Define Turing Machine.

e) Construct minimal DFA for the following.



Q3) Attempt any Two of the following (Out of Three) : **[2 × 4 = 8]**

a) Construct a DFA for a language containing strings starting with 'a' and ending with 'b' over alphabet {a,b} that is string generated from

L= {a (a + b)*b}

b) Construct the following grammar into GNF

S-> ABA |AB|BA|AA|A|B

A->aA | a

B->bB | b

c) Design TM for language, L= $\{a^m b^n c^m \mid m,n>=0\}$

Q4) Attempt any Two of the following (Out of Three) **[2 × 4 = 8]**

a) Construct a PDA for the language L= $\{a^n b^n \mid n>=1\}$.

b) Construct a Moore machine which outputs even or odd according to number of a's encountered is even or odd.

c) Explain Left linear grammar and Right linear grammar with example.

Q5) Attempt any one of the following (Out of Two) **[1 × 3 = 3]**

a) Construct a Mealy machine to convert each occurrence of substring 101 by 100 over alphabet {0,1}.

b) Show that L = $\{0^n 1^n \mid n> = 1\}$ is not regular.