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C033512(033)

B. Tech. (Fifth Semester) Examination, Nov.-Dec. 2021

AICTE
(New Scheme)

(Information Technology Engg. Branch)

THEORY of COMPUTATION

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Part (a) of each question is compulsory and carrying 4 marks each. Attempt any two parts from (b), (c) and (d) of each questions & carries 8 marks each.*
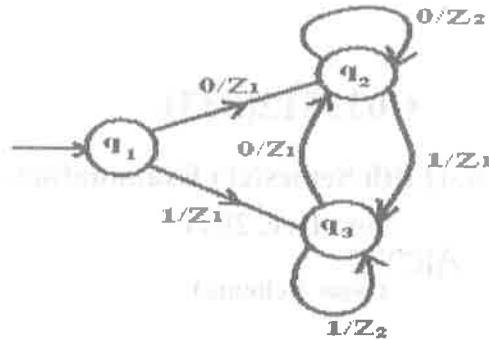
Unit-I

1. (a) Explain 2-way finite Automata with example.

   (b) Consider the mealy machine described by transition

table in given figure, construct a moore machine which is equivalent to the given mealy machine.

(c) Define Myhill nerode theorem. Explain the property of FSM.

(d) Find DFA for following language on $\Sigma = [a, b]$

   (i) $L = \{w[na(w) - nb(w)] \bmod 3 > 0\}$

   (ii) $L = \{w/w$ second symbol in w from right hand side should be a.

Unit-II

2. (a) Convert regular expression to dfa for $a + b(ab)^* ba$.

(b) What is Pumping Lemma? Also explain closure properties of regular language.

(c) Construct finite automata equivalent to the regular expression $(D + 1)^* (00 + 11)(D + 1)^*$.

(d) State & Prove Arden's theorem and also explain with suitable example.

Unit-III

3. (a) Define context free Grammar and write a grammar for $S = \{anbn, n >= 1\}$.

(b) Convert the grammar into GNF

   $S \rightarrow AB$

   $A \rightarrow BS/a$

   $B \rightarrow SA/b$

(c) Find reduced grammar equivalent to the grammar G whose productions are :

   $S \rightarrow AB/CA$

   $S \rightarrow BC/AB$

   $A \rightarrow a$

   $S \rightarrow aB/b$

(d) Explain chomsky hierarchy of grammar.

Unit-IV

4. (a) Define DPDA and NPDA.

(b) To construct a PDA for accepting the palindrome

String where $\Sigma = \{a, b\}$.

(c) Construct a PDA A accepting the set of all string

over $\{a, b\}$ with equal member of a and B.

(d) Design a PDA for $S = \{a^n b^m c^m d^n\}$.

Unit-V

5. (a) Explain Turing model for computation.

(b) Design a TM that accepts $a^n b^n c^n / n >= 1$.

(c) Explain Halting problem of Turing Machine.

(d) Explain Recursive and Recursive Enumerable Sets.