Exam. Code: 0924
Sub. Code: 33561

2056
B.E. (Information Technology)
Sixth Semester
PCIT601: Theory of Computation

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Attempt the following:-

a) Differentiate between NFA and DFA.

b) Prove that reversal of any regular is also regular.

c) What do you mean by useless symbol? Explain with an example.

d) List down the properties of recursively enumerable languages?

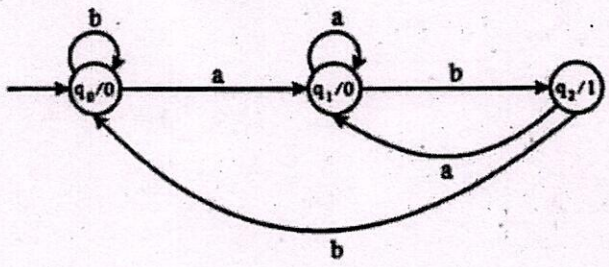
e) What is the relationship between PDA and CFL? (5x2)

<u>UNIT - I</u>

II. Discuss about the Chomsky hierarchy of languages with their grammar constraint rules and corresponding automata of each class (10)

III. a) Design a DFA that accepts all strings over {0,1} where string starts and ends with different alphabets.

b) Write the differences between Mealy machine and Moore machine. Convert the given Moore machine into its equivalent Mealy machine. (2x5)



IV. a) Two regular languages is regular under the Union operation? Justify your answer with suitable example.

b) Show that the language L= (0^n1^m| n, m>=1, m and n are not equal) is not regular using pumping Lemma. (2x5)

P.T.O.

UNIT - II

V. a) Convert the following CFG into Chomsky Normal Form

S->ASB|Ɛ

A->aAS|a

B->SbS|A|bb

b) Design a PDA that will accept strings (a+b)* in which number of a's is greater than the number of b's given the alphabet $\Sigma = \{a, b\}$. (2x5)

VI. Design a Turing machine to recognize the language $\{0^n1^n0^n|n>=0\}$. (10)

VII. Write notes on the following:

a) Universal Turing Machine

b) Undecidability (2x5)

x-x-x