(3 Hours) **Marks: 80**

Note: Question No. 1 is Compulsory

Attempt any three out of the remaining five questions

Assumptions made should be clearly stated

Draw suitable diagram where ever necessary

Q.1.	**Attempt any four sub-questions.**	Marks
a.	Describe Moore machine with all tuples in detail.	5M
b.	Arrange a mealy machine to accept all strings ending with 00 or 11.	5M
c.	Design DFA to accept strings over the alphabet $\sum$ = {a,b} containing even number of a's.	5M
d.	Evaluate given context-free grammar and Identify whether it is ambiguous or not. $S \longrightarrow a \mid Sa \mid bSS \mid SSb \mid SbS$	5M
e.	Draw diagram for Chomsky hierarchy and Show all the types with proper explanation.	5M
Q.2.		
a.	Design NFA for accepting input strings that contain either the keyword 000 or the keyword 010 and convert it into an equivalent DFA	10M
b.	Design a DFA corresponding to regular expression (a+b)*aba (a+b)*	10M
Q.3.		
a.	Design a Mealy machine that accepts strings ending in “00” and “11”. Convert the same to Moore Machine	10M
b.	Define CFG, obtain CFG for the following grammar (110+11)*(10)*	10M
Q4.		
a.	Construct a Turing machine accepting palindromes over $\sum$={a,b}	10 M
b.	Design a PDA for $L = \{ a^n b^n \mid n >= 1\}$	10 M
Q5.		
a.	Design a Moore machine which counts the occurrence of substring bba in input string.	10 M
b.	Design a TM accepting the set of strings with equal number of 0’s and 1’s over {0,1}*	10 M
Q6.		
a.	Write Short note on: Halting Problem in TM.	10 M
b.	Explain applications of FM, PDA and Turing Machine with example.	10 M

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