

(REVISED COURSE)

(3 Hours)

[Total Marks : 100

N.B. : (1) Question No. 1 is **compulsory**.

(2) Attempt any **four** questions from the **remaining** questions.

1. (a) Design the DFA for the language, contains strings in which leftmost 10 symbol differ from rightmost symbol.  $\Sigma$  is given  $\{ 0, 1 \}$ .  
(b) What is Turing machine ? Explain different techniques for Turing 10 machine construction.
2. (a) Compare and contrast Moore and Mealey machine. Design a Mealey 10 machine to convert each occurrence of substring abb by aba.  $\Sigma = \{ a, b \}$   
(b) What is parsing ? What are the two different parsing methods ? 10 Explain their differences with examples.
3. (a) Prove that it is undecidable whether a context free grammar is ambiguous. 10  
(b) Prove the variations and equivalence of the push down automata. 10
4. (a) State and prove pumping Lemma for context free languages. 10  
(b) Design a grammer for accepting an Even Palindrome over  $\Sigma = \{ a, b \}$ . 10
5. (a) Design a Turing machine to Compute  $n!$ . 10  
(b) Explain GNF with suitable example. 10
6. (a) Write a program to translate a regular expression to finite automata. 10  
(b) Construct a NFA for the regular expression  $01^* + 1$  and convert it 10 to DFA.
7. Write a detail note on (any **four**) :— 20
  - (a) Post correspondence problem
  - (b) Halting problem
  - (c) Universal TM
  - (d) Myhill-Nerode's theorem
  - (e) Ambiguity resolution.