T.E. (I.T.) (Sem IV) (Rev.) 8/12/06
Automata Theory.

107mk: E-2nd06.

Con. 5177-06. (REVISED COURSE) YM-6782

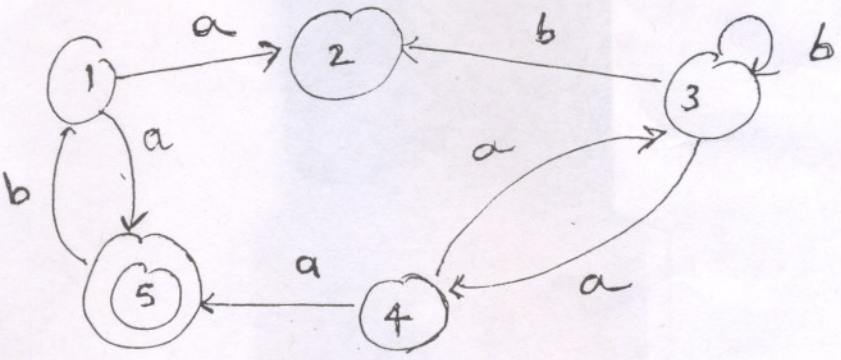
(3 Hours) [Total Marks : 100

N.B. (1) Question No. 1 is **compulsory**.
(2) Solve any **four** from remaining **six** questions.

1. (a) Find a regular expression corresponding to each of the following subset of { 0, 1 } :— 6
   (i) The language of all strings containing exactly two 0's
   (ii) The language of all strings that begin or end with 00 or 11
   (iii) The language of all strings containing both 11 and 010 as substrings.
   (b) Draw FA for following regular expression recognizing the corresponding language :— 4
   $(11 + 10)^*$.
   (c) Find a CFG generating the given language. 4
   The set of odd length strings in { a, b }* with middle symbol a.
   (d) Explain halting problem. 6

2. (a) Find a minimum state FA recognizing the language corresponding to each of these regular expression — 10
   $(0 * 10 + 1 * 0)\ (01)^*$
   (b) Convert the following grammer with productions :— 10
   $S \rightarrow a\ b\ A\ B$
   $A \rightarrow b\ A\ B \mid \lambda$
   $B \rightarrow B\ A\ a \mid A \mid \lambda$ into CNF.

3. (a) Construct NFA for the following regular expression — 10
   $10 + (0 + 11)0^*\ 1$
   (b) Convert following NFA to DFA :— 10



4. (a) Design P.D.A. for verifying well-formedness of parenthesis. 8
   (b) Construct PDA for $L = \left\{ 0^n 1^n \mid n \geq 0 \right\}$. 8
   (c) What is pumping lemma ? Give its application. 4

5. (a) Design TM to recognize the following language :— 16
   (i) $[\log_2 n]$
   (ii) $n !$
   (b) What is machine ? Give features of machine with example. 4

6. (a) Design a Moore and Mealy machine to get 2's complement of number. 10
   (b) Define different types of grammers with example. 10

7. Write short notes on any **four** :— 20

(a) Post correspondance problem
(b) Greibach normal form
(c) Power of PDA
(d) Parsing techniques
(e) Universal turing machine.