B.E. (Fifth Semester) EXAMINATION, Dec., 2002

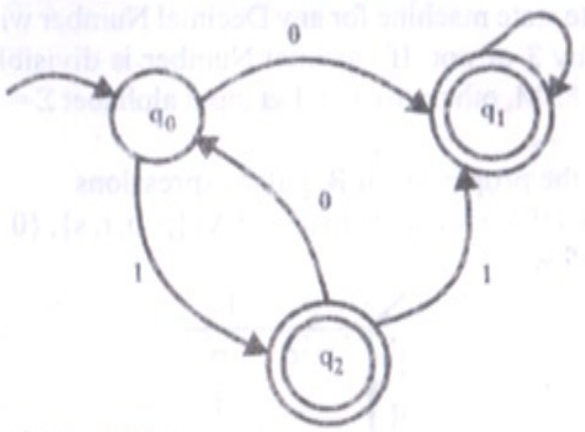
(Computer Science & Engg.)

THEORY OF COMPUTATION

(CS–5511)

Note : Attempt any *five* qustions. All questions carry equal marks. Subparts and parts of a question should be attempted together.

1. (a) Define phrase structured grammars with its classification. Define any *two* categories of phrase structured grammars.
   (b) Show that regular languages are closed under complement and substraction operation.
2. (a) Define the following :
   (i) Orden's lemma
   (ii) Closure properties of CFL's
   (b) Describe CFL's are closed under homomorphism.
3. (a) Find equivalent regular expression to the following D.F.A. :



   (b) Construct the CFL :

$$L = \{a^n b^n c^m d^m \mid n \geq 1, m \geq 1\} \cup \{a^n b^m c^m d^m \mid n \geq 1, m \geq 1\}$$

4. Define the following :
   (a) Application of pumping Lemma
   (b) Homomorphisms
   (c) Chomsky Normal form
   (d) Greibach Normal form
5. (a) Write the MYHILL-NERODE theorem.
   (b) Write the technique's for turing machine construction.
6. (a) Construct a petrinet model either for representing a mutual exclusion problem or for representing simplex communciation protocol.
   (b) What is undecidability ? Describe post's correspondance problem.
7. Write brief notes on any *four* of the following :
   (i) Modification of turing machine
   (ii) Multidimensional turing machine
   (iii) Conservative petrinets
   (iv) Complexity theorem
   (v) CYK Algorithm
   (vi) Church's hypothesis

8. Write short notes on any *four* of the following :
   (i) Computable languages and function
   (ii) One way and two way finite automata
   (iii) Non-deterministic finite automata
   (iv) Market Petrinets
   (v) NDRA
   (vi) Equivalent of DFA and NDFA