Code No.: 11028/N

FACULTY OF SCIENCE

M.Sc. II Semester Examination, April/May 2005

COMPUTER SCIENCE

Paper I (2.1)

(Automata Language and Computation)

Time : 3 Hours] [*Max. Marks :* 100

Section A – (Marks : 8 × 5 = 40)

Answer **all** *the questions.*

1. Write about Deterministic Finite Automata.
2. Define regular expression.
3. Define Moore Machine.
4. State Pumping Lemma for Regular sets.
5. Write short notes on Push down automata.
6. Find the Left most and the Right most derivation of the string *aabbaa* of the grammar.
   $S \rightarrow a\ AS/a$
   $A \rightarrow S\ b\ A/SS/ba.$
7. State Church's hypothesis and explain.
8. Write about Turing Machine as computing of functions.

Section B – (Marks : 4 × 15 = 60)

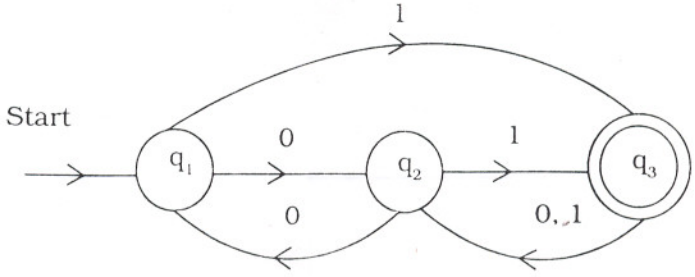
Answer **all** *the questions.*

9. (a) Construct DFA M' equivalent to NFA M given as follows:

   $M = (Q, \Sigma, \delta, q_0, F)$, where
   $Q = \{q_0, q_1\}$, $\Sigma = \{0, 1\}$, $F = \{q_1\}$ and
   $\delta(q_0, 0) = \{q_0, q_1\}$, $\delta(q_0, 1) = \{q_1\}$, $\delta(q_1, 0) = \phi$,
   $\delta(q_1, 1) = \{q_0, q_1\}$.

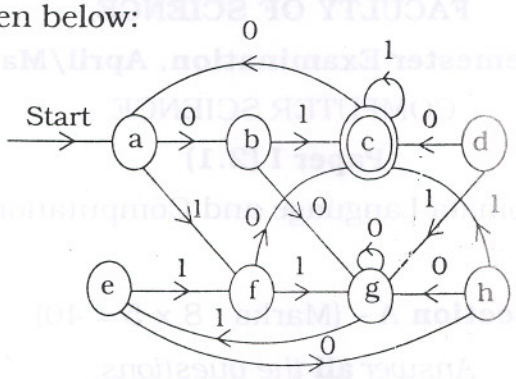
   Or

   (b) Find the regular expression of the Language accepted by DFA M whose transition diagram is given below:



[P.T.O.

10. (a) Find the FA M' with minimum states equivalent to FA M whose transition diagram is given below:



Or

(b) State and explain Myhill-Nerode theorem.

11. (a) Convert the grammar $G = \{ \{ S, A, B \}, \{ a, b \}, P, S \}$ that has P the set of following productions.

$S \rightarrow bA/aB$

$A \rightarrow bAA/as/a$

$B \rightarrow aBB/bs/b$

into equivalent grammar in Chomsky Normal Form.

Or

(b) Find whether the string *baaba* generated by the grammar or not.

$S \rightarrow AB/BC$

$A \rightarrow BA/a$

$B \rightarrow CC/b$

$C \rightarrow AB/a$

Where the terminals are a and b.

12. (a) Design a Turing machine that accepts the Language $\{0^n 1^n / n \geq 1\}$.

Or

(b) Write about Chomsky hierarchy by specifying the form of productions of the grammar generating the languages and the machine accepting the languages.