2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS
THEORY OF COMPUTATION
(COMMON TO COMPUTER SCIENCE & ENGINEERING AND
INFORMATION TECHNOLOGY)

<u>/APRIL/MAY 2005</u>

TIME: 3 HOURS
MAX MARKS: 70

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Define a NDFA and explain how an equivalent DFA is obtained from NDFA..

(b) Construct an equivalent DFA for a NDFA M=(q1,q2,q3,, ?, q1, q3) where ? is given by

(q1, 0) = {q2q3}, (q1,1) = {q1}

(q2, 0) = {q1q2}, (q2,1) = -

(q3, 0) = {q2}, (q3,1) = {q1q2}

2. For the NFA-E given check whether the string aannanan is accepted or not, If ac- cepted write the transition path. Find equivalent NFA without epsilon transitions, explain the procedure used and check the string given on your new NFA.

3. (a) Construct a regular expression representing the following sets The set of all strings over {a,b} in which there are atleast two occurrences of b between any two occurrences of a.

(b) Describe whether L = {a2n/n   1}is regular. State and explain the theorem used.

4. (a) Construct a regular grammar G generating the regular set represented by a*b(a+b)*.

(b) Give the CFG to generating the following sets. The set of all strings of bal- anced parenthesis

5. (a) Convert the following GNF

S ! aA/B/C/a

A ! aB/"

B ! Aa

C ! cCD

D ! abd

 (b) Construct CFG generating the set of all strings over {a, b} consisting of equal no of a's and b's.

6. (a) Give tuple definition of Turing Machine and explain the significance of movement of R/W head.

(b) Design Turing Machine to recognize the language L = {anbn/n   1}

7. Construct LR(0) items for the grammar given, find its equivalent DFA. Check the parsing by taking a suitable derived string.

S → a A B

A → a A b | a b

B → aB | a

8. Discuss any three of the following briefly.

(a) Decidability of problems

(b) Undecidability of post correspondence problem.

(c) P and NP problems.

(d) RICE?s theorem.