

III B.Tech I Semester Supplementary Examinations, April/May 2005
THEORY OF COMPUTATION
 (Common to Computer Science & Engineering and Information Technology)

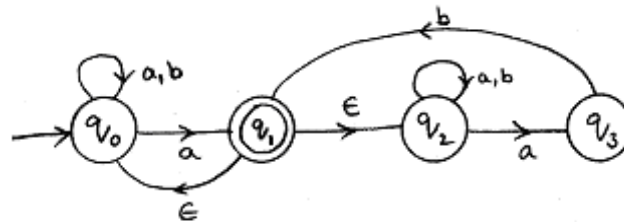
Time: 3 hours

Max Marks: 70

Answer any FIVE Questions
 All Questions carry equal marks

- Define a NFA and explain how an equivalent DFA is obtained from NFA..
 - Construct an equivalent DFA for a NFA $M=(q_1, q_2, q_3, \epsilon, q_1, q_3)$ where ϵ is given by

$$\begin{aligned} \delta(q_1, 0) &= \{q_2 q_3\}, & \delta(q_1, 1) &= \{q_1\} \\ \delta(q_2, 0) &= \{q_1 q_2\}, & \delta(q_2, 1) &= \phi \\ \delta(q_3, 0) &= \{q_2\}, & \delta(q_3, 1) &= \{q_1 q_2\} \end{aligned}$$
- For the NFA-E given check whether the string aannanan is accepted or not, If accepted write the transition path. Find equivalent NFA without epsilon transitions, explain the procedure used and check the string given on your new NFA.



- 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.
 - Describe whether $L = \{a^{2n} | n \geq 1\}$ is regular. State and explain the theorem used.
- Construct a regular grammar G generating the regular set represented by $a^*b(a+b)^*$.
 - Give the CFG to generating the following sets. The set of all strings of balanced parenthesis
- Convert the following GNF

$$\begin{aligned} S &\rightarrow aA/B/C/a \\ A &\rightarrow aB/\epsilon \\ B &\rightarrow aA \\ C &\rightarrow cCD \\ D &\rightarrow abd \end{aligned}$$

- (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 $L = \{a^n b^n / n \geq 1\}$
7. Construct LR(0) items for the grammar given, find its equivalent DFA. Check the parsing by taking a suitable derived string.
- $$S \rightarrow a A B$$
- $$A \rightarrow a A b \mid a b$$
- $$B \rightarrow a B \mid a$$
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.
