NKT/KS/17/5266

Bachelor of Computer Application (B.C.A.) Semester—IV (C.B.S.) Examination

THEORY OF COMPUTATION

Paper–III

Time : Three Hours] [Maximum Marks : 50

N.B. :— (1) **ALL** questions are compulsory and carry equal marks.

(2) Draw neat and labelled diagrams whenever necessary.

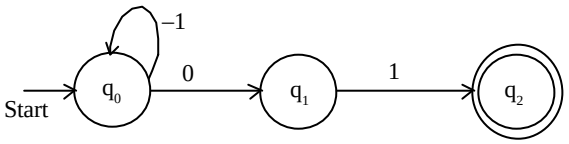
EITHER

1. (a) What is Finite Automata ? Construct a NFA accepting all strings in $\{a, b\}^+$ with either two consecutive a's *or* two consecutive b's. 5

(b) Explain the construction of NFA with E-transition from any given regular expression. 5

OR

(c) Explain the steps in conversion of NFA to DFA. Convert the following NFA to DFA. 5



(d) Explain Finite Automata with output. 5

EITHER

2. (a) Explain the closure properties of regular set with example. 5

(b) Explain Derivation Tree in detail. 5

OR

(c) Find whether the languages :

$\{ww^R$, w is in $(1+0)^*\}$ is regular *or* not. 5

(d) Explain Decision Algorithm for Regular sets. 5

EITHER

3. (a) Explain Chomsky Normal form with suitable example. 5

(b) Explain the process of eliminating useless symbols from CFG. 5

OR

(c) Explain Greibach Normal form with suitable example. 5

(d) Explain closure properties of context free language. 5

EITHER

4. (a) Discuss about PDA acceptance :

(i) From empty stack to final state.

(ii) From final state to empty stack. 5

(b) Define a PDA. Give an example for a Language accepted PDA by empty stack. 5

OR

(c) Construct PDA for language :

$L = \{ww^R/w \text{ in } (a+b)^*\}$. 5

(d) If L is context free language then prove that there exists PDA M such that L = N (M). 5

5. Attempt **ALL** :

(a) Explain two way finite automata. 2½

(b) Define parse tree. 2½

(c) Explain pumping lemma for context free language. 2½

(d) Give formal definition of a PDA. 2½