

BT-5 / D-19
AUTOMATA THEORY
Paper-CSE-301 N

Time allowed : 3 hours]

[Maximum marks : 100

Note:- Attempt any five questions in all, selecting at least one from each unit.

Unit-I

1. (a) What is difference between deterministic finite automata and non determinist finite automata. Construct a NFA accepting $\{9ab, ba\}$ and use it to find the FA accepting the same. 12
- (b) Design FA for decimal number divisible by 4 8
2. (a) Construct the DFA equivalent to the given regular expression is $(0+1)^*(00+11)(0+1)^*$ step by step 12
- (b) What is closure properties of Regular language 8

Unit-II

3. What is Ambiguous Grammar, find the following grammar is ambiguous or not? 20
 $S \rightarrow S+S$
 $S \rightarrow S*S$
 $S \rightarrow a$
 $S \rightarrow b$
4. (a) What is context sensitive grammar and also write the application of Context free grammar in real life. 10

- (b) Find a grammar in Chomsky Normal Form equivalent to $S \rightarrow aAbB, A \rightarrow a\Lambda/a, B \rightarrow b/B/b$ 10

Unit-III

5. (a) Design Moore machine for binary adder 10
- (b) What is purpose of Mealy machines and how the Moore machine can be converted to Mealy machines. Prove it by an example. 10
6. (a) What do you mean by Push down automata(PDA) and construct PDAA accepting $L = \{wcwTw \in \{a,b\}^*\}$ by final state. 10
- (b) Construct a PDAA equivalent to the following context free grammar: 10
 $S \rightarrow 0BB, B \rightarrow 0S|1S|0$. Test whether 010^4 is in $N(A)$

Unit-IV

7. (a) What is PCP problem and explain it with an appropriate example 10
- (b) What is Turing machine and write steps to calculate time complexity of turing machine. 10
8. (a) What is difference between restricted Turing Machine and Universal machine. 10
- (b) Design Turing machine which adds 2 unary numbers 10