Roll No. ..... Total Pages : 3

BT-5/D-20 **45003**

AUTOMATA THEORY

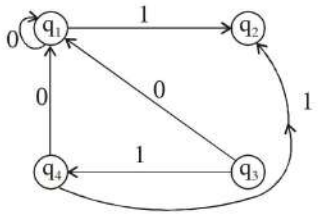
Paper–CSE-305

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions in all, selecting at least *one* question from each Unit.

UNIT–I

1. (a) Find the regular expression corresponding to given fig. 7



(b) What is difference between Deterministic finite automata and Non-Deterministic finite automata. Construct DFA with reduced states equivalent to the regular expression of 10+(0+11)0*1. 13

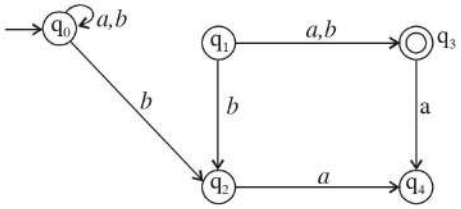
2. Give the Regular expression and corresponding DFA for all the words that begin and end with double letter. 20

UNIT–II

3. Construct a Mealy machine which is equivalent to the Moore machine given by table below 20

Present state	Next state		
	$a = 0$	$a = 1$	output
$\rightarrow q_0$	q_3	q_1	0
q_1	q_1	q_2	1
q_2	q_2	q_3	0
q_3	q_3	q_0	0

4. Construct a DFA equivalent to the NDFA whose transition diagram is given here 20



UNIT–III

5. What do you mean by Griebach Normal form (GNF) and also find grammar in GNF equivalent to grammar
$E \rightarrow E + T|T$, $T \rightarrow T*F|F$, $F \rightarrow (E)|a$ 20

6. (a) Let G be the grammar $S \rightarrow 0B|1A$, $A \rightarrow 0|0S|1AA$, $B \rightarrow 1|1S|0BB$. For the string 00110101. Find (a) the leftmost derivation (b) rightmost derivation and (c) the derivation tree. 10

(b) If G is grammar $S \rightarrow SbS|a$, show that G is ambiguous. 10

UNIT–IV

7. What is halting problem of Turing machine and also explain PCP problem in detail. 20

8. (a) What is Chomsky classification of languages and hierarchy of grammar and also explain it in detail. 10

(b) Design Turing machine which adds 2 unary numbers. 10