

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA
Mid Odd Semester Examination for session 2021-22

COURSE NAME: B.Tech

SEMESTER: 5th

BRANCH NAME: Information Technology
SUBJECT NAME: Formal Language & Automata Theory

FULL MARKS: 20

TIME: 2 Hour

Answer All Questions.

The figures in the right hand margin indicate Marks. Symbols carry usual meaning.

Q1. Answer all Questions. [1 × 5]

- a) Construct a Finite Automaton accepting all valid 'C' identifiers. - CO4
- b) While construction of NFA " M " from an e-NFA " M' " what are the conditions for deciding the final states of M . - CO3
 $L(M) = L(M')$
- c) Define Regular expression. Find the RE for all the string whose left most symbol differ with the right most symbol over an alphabet $\{a, b\}$. - CO1
- d) Find all strings in $L = ((a+b)^*b(a+ab)^*)$ of length less than 4. - CO3
- e) Write the Chomsky classification of languages. - CO2

Q2. [5]

- a) Design a DFA over an alphabet $\{0, 1\}$, which accept all the binary strings in which 4th symbol from the right is different from the left most symbol. - CO1
- b) Let L be a language accepted by a NFA. Then prove that there exist a DFA which accepts the same language L .

OR

- c) Prove that $\delta(q, xy) = \delta(\delta(q, x), y)$, where $x, y \in \Sigma^*$. - CO1
- d) Design a DFA over an alphabet $\{0, 1\}$, which accept all the strings containing 00 as a substring but not 000.

Q3. [5]

- a) Construct a DFA equivalent to the NFA. Where $M = (\{p, q, r\}, \{0, 1\}, \delta, p, \{q, s\})$ and δ is defined in the following table. - CO4

	0	1
$\rightarrow p$	$\{q, s\}$	$\{q\}$
$*q$	$\{r\}$	$\{q, r\}$
r	$\{s\}$	$\{p\}$
$*s$	-	$\{p\}$

- b) Construct the NFA for the Language $L = \{a^n b^m | n + m = \text{even}\}$.

OR

- CO4

