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NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI – 620015
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech (CSE) - Cycle Test 1 – January – May 2022
CSPC41– Automata and Formal languages

Semester: IV
Curriculum: NITTUGCSE20
Date of Exam: 8th March 2023

Max Marks: 20
Time: 1 hour

1. Design a finite automata for the following subsets of languages over {0,1}* (2)
   a. The language of all strings having odd number 0's.
   b. The language of all strings ending with *010* or *0010*.

2. Construct a DFA equivalent to the following NFA defined as ({1, 2, 3, 4}, {a, b}, δ, 1, {1}) where δ is given by (4)

State	a	b
→ 1	{2}	{5}
2	Φ	{3}
3	{4}	{3}
4	{3, 5}	Φ
*5	Φ	{1}

3. Construct a regular expression using Kleene's theorem for the following DFA (4)

State	0	1
→ A	B	B
*B	B	C
C	B	A

4. Using the properties of regular languages, construct a DFA that accepts the language over {0,1}* not containing the substring 000. (4)

5. Can every regular language not containing ε be accepted by an NFA having only one accepting state? Prove your answer. (2)

6. Construct a Mealy machine equivalent to the following Moore machine. (4)

State	Next State		Output
	0	1	
→ A	B	C	A
B	D	C	B
C	C	B	C
D	A	D	D

--- Best Wishes ---