**SRM Institute of Science and Technology**

**College of Engineering and Technology**

**School of Computing**

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

**Academic Year: 2022-23 (ODD)**

**B.Tech-Computer Science & Engineering**

**Test: CLA-T1** **Date: 14.09.2022**

**Course Code & Title: 18CSC301T & Formal Languages and Automata Theory**  **Duration: 1 period**

**Year & Sem: III Year /V Sem** **Max. Marks: 25**

***SET-B***

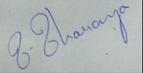
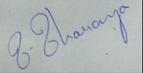
**Course articulation matrix:**

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| **PLO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| **CO 1** | **M** | **H** | **-** | **M** | **L** | **-** | **-** | **-** | **L** | **L** | **-** | **H** | **-** | **-** | **-** |
| **CO2** | **M** | **H** | **L** | **M** | **L** | **-** | **-** | **-** | **M** | **L** | **-** | **H** | **-** | **-** | **-** |
| **CO3** | **M** | **H** | **M** | **H** | **L** | **-** | **-** | **-** | **M** | **L** | **-** | **H** | **-** | **-** | **-** |
| **CO4** | **M** | **H** | **M** | **H** | **L** | **-** | **-** | **-** | **M** | **L** | **-** | **H** | **-** | **-** | **-** |
| **CO5** | **H** | **H** | **M** | **H** | **L** | **-** | **-** | **-** | **M** | **L** | **-** | **H** | **-** | **-** | **-** |
| **CO6** | **L** | **H** | **-** | **H** | **L** | **-** | **-** | **-** | **L** | **L** | **-** | **H** | **-** | **-** | **-** |

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| **Part - A**  **Instructions: Answer all** | | | | | | |
| **Q. No** | **Question** | **Marks** | **BL** | **CO** | **PO** | **PI Code** |
| 1 | All prime numbers are odd. But integer 2 is both prime and even. This can be proved by\_\_\_\_\_\_   1. Proof by counter example 2. Proof by contradiction 3. Proof by mathematical induction 4. Proof by deduction   Ans: a) | 1 | 1 | 1 | 1 | **1.6.1** |
| 2 | I: Σ={ \*, ^, #, a, 0} II: w= {101, abccc, \*yr7. Which of the following holds true?   1. I denotes symbols while w denotes alphabets 2. I denote alphabets and II denotes strings 3. I denotes alphabets but II is not words 4. I does not denote symbols but II denote words   Ans: b) | 1 | 2 | 1 | **1.6.1** |  |
| 3 | Let B={0,1}. What can be inferred about the operation that generated the following strings as output? Strings={ 0,1,00, 11, 01,10,111, 1010, 1010101, …}   1. Negative closure b) Positive closure   c) Closure d) Klenn's closure  Ans: b) | 1 | 3 | 2 | 2 | **2.6.2** |
| 4 | What type of language does the RE, R=(a+b)\* aaa (a+b)\* represent?  a) Language that accepts strings that contains ab as substring  b) Language that accepts strings that starts with a  c) Language that accepts strings that starts with b  d) Language that accepts strings has aaa as substring  Ans: d) | 1 | 2 | 2 | 2 | **2.6.2** |
| 5 | What can be told about the computing complexity of NFA, DFA and ε-NFA?   1. DFA is more computationally expensive than NFA 2. NFA is more expensive than DFA 3. NFA is more expensive than ε-NFA 4. The complexity is same for all   Ans: b) | 1 | 2 | 2 | 1 | **1.6.1** |
| 6 | Which of the following is true?   1. Both ε and φ indicates no transition between two states 2. Only ε indicates no transition between two states 3. Only φ indicates no transition between two states 4. Both ε and φ indicates presence of transition between two states   Ans: c) | 1 | 2 | 2 | 1 | **1.5.1** |
| 7 | Let S and T be language over ={a,b} represented by the regular expressions (a+b\*)\* and (a+b)\*, respectively. Which of the following is true?   1. S is a subset of T 2. T is a subset of S 3. S=T 4. S and T don’t have anything in common   Ans: c) | 1 | 3 | 2 | 2 | **2.7.1** |
| 8 | What is the complement of the language accepted by the FSM?     1. φ b) a c) ε d) a and ε   Ans: d) | 1 | 4 | 2 | 2 | **2.6.3** |
| 9 | Which of the following is the transition function of NFA?   1. Q x (Σ U ε) 🡪 2^Q 2. Q x (Σ U ε) 🡪 Q 3. Q x Σ 🡪 2^Q 4. Q x Σ 🡪 Q   Ans: c) | 1 | 2 | 2 | 2 | **2.6.2** |
| 10 | I: For every ε-NFA we can construct an equivalent DFA  II: A language recognized by a FSA may or may not be accepted by regular expression   1. Only II is true b) Only I is true   c)Both are false d) Both are true  Ans: b) | 1 | 2 | 2 | 2 | **2.6.3** |
| **Part-B (1 x 5=5 marks)** | | | | | | |
| 11 | Mithra and Kanira are playing a game. They are asked to recite strings in such a way that the words start and end with same letter on the inputs {a, b, c}. Create a DFA for the same with a special mention to 5 tuple structure. | 5 | 6 | 2 | 6 | **6.3.1** |
| **Part-C (1 x 10=10 marks)** | | | | | | |
| 12 | Give the equivalent regular expression for the given DFA: | 10 | 5 | 2 | 4 | **4.1.3** |

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**Question Paper Setter Approved by ~~Audit Professor~~/ Course Coordinator**