**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**

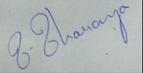
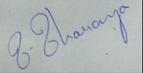
***SET-C***

**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 | Which operation on languages allows us to extract all possible strings from the input Σ= {a, b, c}?   1. Concatenation of symbols b) Union of symbols 2. Closure d) Reflexive   Ans: c) | 1 | 2 | 1 | 1 | **1.6.1** |
| 2 | Consider the word W1= {Formallanguages}and W2={Formal}. Which of the following is true?   1. W2 is only a substring of W1 b) W2 is prefix of W1   c) W2 is prefix and substring of W1 d) W2 contains W1  Ans: c) | 1 | 1 | 1 | **1** | **1.6.1** |
| 3 | Let u=a\*(a+b)\*, v=aa\*b and w=a\*b. Then which of the following holds true ?   1. L(v) can generate all the strings generated by L(w) 2. L(w) can generate all the strings generated by L(u) 3. L(v) can generate all the strings generated by L(u) 4. L(w) can generate all the strings generated by L(u)   Ans: a or b or c or d | 1 | 3 | 2 | 2 | **2.6.2** |
| 4 | A transition from a state to another state without reading any input is allowed in \_\_\_   1. DFA b) NFA c) epsilon-NFA d) RE   Ans: c) | 1 | 1 | 2 | 2 | **2.6.2** |
| 5 | Which of the following is true?   1. FSA cannot act as language acceptor 2. FSA can act as language acceptor 3. FSA can produce outputs d) FSA can count numbers   Ans: b | 1 | 2 | 2 | 1 | **1.6.1** |
| 6 | The string 1101 cannot be derived from\_\_   1. 110\* (0+1) b) 1(0+1)\*101   c) (10)\*(01)\*(00+11)\* d) (00+(11)\*0)\*  Ans: c) | 1 | 4 | 2 | 1 | **1.5.1** |
| 7 | Which of the following is the limitation of FSM?   1. It does not contain memory 2. It cannot recognise a regular language 3. It has infinite number of states 4. It contains memory, which is expensive   Ans: a) | 1 | 2 | 2 | 2 | **2.7.1** |
| 8 | What is the language recognized by the given FSA?     1. Any number of a’s and b’s where b follows a 2. Any number of a’s and b’s 3. Only one a and one b 4. Either a or b   Ans: b) | 1 | 4 | 2 | 2 | **2.6.3** |
| 9 | What does the given DFA recognize?     1. Odd number of a’s b) Odd number of b’s 2. Even number of a’s d) Odd number of a’s and b’s   Ans: d) | 1 | 4 | 2 | 2 | **2.6.2** |
| 10 | Which of the following is true?   1. (r + s) \*=r\* b) (r\*s\*)=(r+s)\*   c) (r+s)\*=r\*+s\* d) r\*s\*=r\* +s\*  Ans: b) | 1 | 2 | 2 | 2 | **2.6.3** |
| **Part-B (1 x 5=5 marks)** | | | | | | |
| 11 | Design a DFA that accepts strings in L such that the integer numbers , when expressed in its binary is divisible by 5. Give the 5 tuple structure.  3.5 marks  5 tuple structure: 1.5 marks | 5 | 5 | 1 | 6 | **6.1.3** |
| **Part-C (1 x 10=10 marks)** | | | | | | |
| 12 | Minimize the DFA:    Iteration 1: 4 marks  Iteration 2: 4 marks  Conclusion: 2 marks | 10 | 6 | 1 | 4 | **4.1.3** |

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