**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**

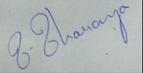
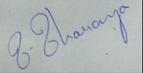
***Set -A***

**Course articulation matrix:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** | **-** | **-** | **-** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Part - A**  **Instructions: Answer all** | | | | | | |
| **Q. No** | **Question** | **Marks** | **BL** | **CO** | **PO** | **PI Code** |
| 1 | Consider A={0,1,2,3,4,5,6,7}. Then what can be inferred from A\*?   1. Finite set of decimal numbers 2. Set of all octal numbers 3. Set of finite strings formed from numbers from {0-7} 4. Set of natural numbers   Ans: b) | 1 | 1 | 1 | 1 | **1.6.1** |
| 2 | Which of the following is not a part of inductive proof?   1. Basis b) induction 2. Proof d) logical rules   Ans: d) | 1 | 1 | 1 | **1** | **1.6.1** |
| 3 | Which of the following is false about Finite State Machines (FSM)?   1. FSM has unique output state 2. FSM can have multiple transitions for same input from same state 3. All transitions should start from initial state 4. Multiple transitions for multiple inputs can originate from same state   Ans: a) | 1 | 2 | 2 | 2 | **2.6.2** |
| 4 | What is the minimum number of states to recognize the language L={w/w ϵ (0+1+2)+}?   1. 1 b) 2 c) 3 4) 4   And: b) | 1 | 3 | 2 | 2 | **2.6.2** |
| 5 | Give the regular expression that generate strings with "000" as substring over the input Σ={0,1}   1. (0+1)\*000 (0+1)\*       b) (0+1)\*000   c) 000 (0+1)\*    d) (000)\*  Ans: a) | 1 | 4 | 2 | 1 | **1.6.1** |
| 6 | What can be told about the recognizing capability of NFA, DFA and ε-NFA?   1. DFA is more powerful than NFA 2. NFA is more powerful than DFA 3. NFA is more powerful than ε-NFA 4. The recognising power is same   Ans: d) | 1 | 2 | 2 | 1 | **1.5.1** |
| 7 | How many states are there in ε closure of q0 in the given diagram?     1. 1 b) 2 c) 3 d) 4   Ans: c or d | 1 | 4 | 2 | 2 | **2.7.1** |
| 8 | Distinguishable states \_\_\_\_\_\_\_   1. Move to same output state for same input 2. Move to different output state for same input 3. Move to same output state for all inputs 4. Move to same output state for unique inputs   Ans: b) | 1 | 1 | 2 | 2 | **2.6.3** |
| 9 | Which one of the following regular expressions represents the set of all binary strings with an odd number of 1’s?   1. 10\*(0\*10\*10\*)\* b) ((0+1)\*1(0+1)\*1)\*10\* 2. (0\*10\*10\*)\*10) d) (0\*10\*10\*)\*0\*1   Ans: a or b or c or d | 1 | 4 | 2 | 2 | **2.6.2** |
| 10 | Palindromes cannot be recognized by FSA because ----   1. It cannot match second half and first half 2. It cannot be recognised using countable number of states 3. It has many edges 4. It has multiple final states   Ans: a) | 1 | 2 | 2 | 2 | **2.6.3** |
| **Part-B (1 x 5=5 marks)** | | | | | | |
| 11 | A leading firm in India is having a unique password setting scheme. Their employees must create their password adhering to the following rules:   1. It should start with the letters { i, j, k}   ii) The fifth symbol from the right end should be i.  Create a FSA for this password scheme. Give the five-tuple structure for this FSA. | 5 | 6 | 2 | 6 | **6.3.1** |
| **Part-C (1 x 10=10 marks)** | | | | | | |
| 12 | Give the DFA equivalent for the following:    Steps: 8 marks  Final Diagram: 2 marks | 10 | 5 | 2 | 4 | **4.2.1** |

|  |  |
| --- | --- |
|  |  |

** **

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