

NADAR SARASWATHI COLLEGE OF ENGINEERING AND TECHNOLOGY, THENI.

Course/Branch : BE / CSE	Year / Semester : III / V	Format No.	NAC/TLP-07a.13
Subject Code : CS8501	Subject Name : Theory of Computation	Rev. No.	02
Unit No : II	Unit Name : Regular Expressions and Languages	Date	08.10.2020

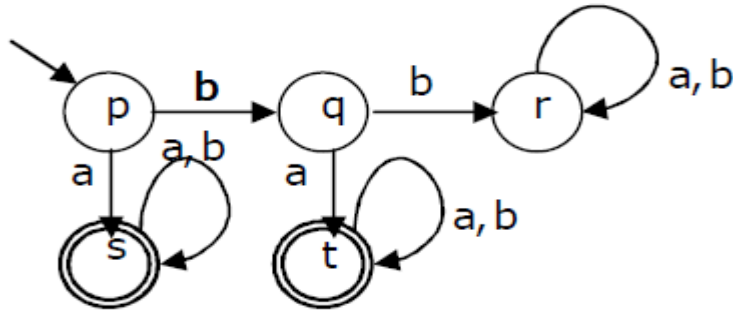
OBJECTIVE TYPE QUESTION BANK

S. No.	Objective Questions (MCQ /True or False / Fill up with Choices)	BTL
1.	Consider the languages $L1 = \phi$ and $L2 = \{a\}$. Which one of the following represents $L1 L2^* \cup L1^*$ A) $\{ \epsilon \}$ B) ϕ C) a^* D) $\{ \epsilon, a \}$	L3
2.	Given the language $L = \{ab, aa, baa\}$, which of the following strings are in L^* ? 1) abaabaaabaa 2) aaaabaaaa 3) baaaaabaaaab 4) baaaaabaa A) 1, 2 and 3 B) 2, 3 and 4 C) 1, 2 and 4 D) 1, 3 and 4	L3
3.	Definition of a language L with alphabet $\{a\}$ is given as following. $L = \{a^{nk} \mid k > 0, \text{ and } n \text{ is a positive integer constant}\}$ What is the minimum number of states needed in DFA to recognize L ? A) $k+1$ B) $n+1$ C) $2^{(n+1)}$ D) $2^{(k+1)}$	L3
4.	Which one of the following languages over the alphabet $\{0,1\}$ is described by the regular expression: $(0+1)^*0(0+1)^*0(0+1)^*$? A) The set of all strings containing the substring 00 B) The set of all strings containing at most two 0's C) The set of all strings containing at least two 0's D) The set of all strings that begin and end with either 0 or 1	L3
5.	Which of the following is TRUE? A) Every subset of a regular set is regular B) Every finite subset of a non-regular set is regular C) The union of two non-regular sets is not regular. D) Infinite union of finite sets is regular.	L2

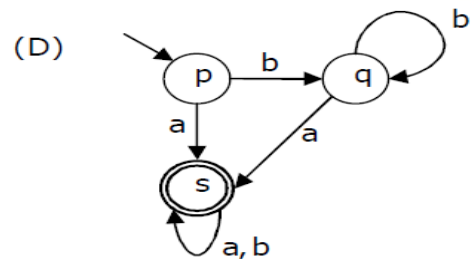
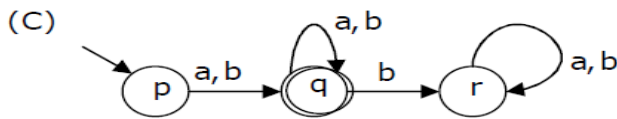
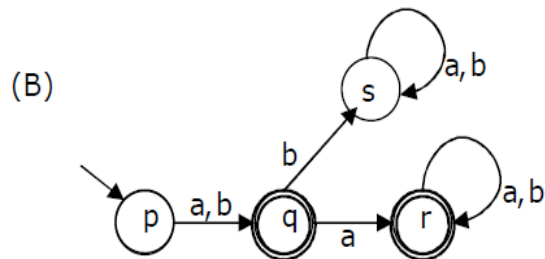
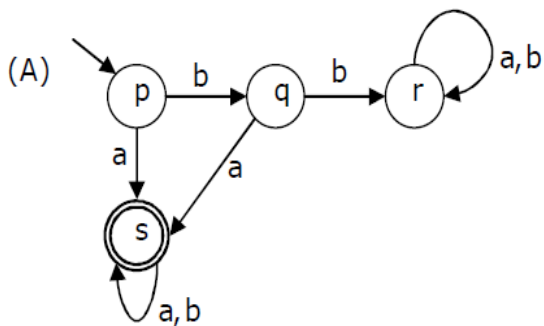
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A deterministic finite automation (DFA) D with alphabet {a,b} is given below



Which of the following finite state machines is a valid minimal DFA which accepts the same language as D?



- A) A
- B) B
- C) C
- D) D

6.

L3

Which of the following is true?

- A) $(01)^*0 = 0(10)^*$
- B) $(0+1)^*0(0+1)^*1(0+1) = (0+1)^*01(0+1)^*$
- C) $(0+1)^*01(0+1)^*+1^*0^* = (0+1)^*$
- D) All of the mentioned**

7.

L3

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<p>8.</p>	<p>Match the following NFAs with the regular expressions they correspond to</p> <ol style="list-style-type: none"> 1. $\epsilon + 0(01^*1 + 00)^* 01^*$ 2. $\epsilon + 0(10^*1 + 00)^* 0$ 3. $\epsilon + 0(10^*1 + 10)^* 1$ 4. $\epsilon + 0(10^*1 + 10)^* 10^*$ <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>P.</p> </div> <div style="text-align: center;"> <p>Q.</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;"> <p>R.</p> </div> <div style="text-align: center;"> <p>S.</p> </div> </div> <p>A) P - 2, Q - 1, R - 3, S - 4 B) P - 1, Q - 3, R - 2, S - 4 C) P - 1, Q - 2, R - 3, S - 4 D) P - 3, Q - 2, R - 1, S - 4</p>	<p>L3</p>
<p>9.</p>	<p>Which of the following are regular sets?</p> <div style="background-color: #e0e0e0; padding: 10px; margin-bottom: 10px;"> <p>I. $\{a^n b^{2m} \mid n \geq 0, m \geq 0\}$</p> <p>II. $\{a^n b^m \mid n = 2m\}$</p> <p>III. $\{a^n b^m \mid n \neq m\}$</p> <p>IV. $\{xycy \mid x, y \in \{a, b\}^*\}$</p> </div> <p>A) I and IV only B) I and III only C) I only D) IV only</p>	<p>L3</p>

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10.	<p>Which of the following languages is regular?</p> <p>(A) $\{ww^R \mid w \in \{0,1\}^+\}$ (B) $\{ww^Rx \mid x, w \in \{0,1\}^+\}$</p> <p>(C) $\{wxw^R \mid x, w \in \{0,1\}^+\}$ (D) $\{xww^R \mid x, w \in \{0,1\}^+\}$</p> <p>A) A B) B C) C D) D</p>	L3
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11.	<p>Consider the finite automaton in the following figure.</p> <p>What is the set of reachable states for the input string 0011?</p> <p>A) {q0, q1, q2} B) {q0, q1} C) {q0, q1, q2, q3} D) {q3}</p>	L3
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12.	<p>Which of the regular expressions given below represent the following DFA?</p> <p>I) $0^*1(1+00^*1)^*$ II) $0^*1^*1+11^*0^*1$ III) $(0+1)^*1$</p> <p>A) I and II only B) I and III only C) II and III only D) I, II, and III</p>	L3
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13.	A language is regular if and only if A) accepted by DFA B) accepted by PDA C) accepted by LBA D) accepted by Turing machine	L2
14.	Regular grammar is A) context free grammar B) non context free grammar C) english grammar D) none of the mentioned	L2
15.	Regular expressions are closed under A) Union B) Intersection C) Kleene star D) All of the mentioned	L2
16.	Regular expression $\{0,1\}$ is equivalent to A) $0 \cup 1$ B) $0 / 1$ C) $0 + 1$ D) All of the mentioned	L3
17.	Regular expression Φ^* is equivalent to A) ϵ B) Φ C) 0 D) 1	L2
18.	Consider following regular expression i) $(a/b)^*$ ii) $(a^*/b^*)^*$ iii) $((\epsilon/a)b^*)^*$ Which of the following statements is correct A) i,ii are equal and ii,iii are not B) i,ii are equal and i,iii are not C) ii,iii are equal and i,ii are not D) all are equal	L3
19.	The behavior of NFA can be simulated using DFA. A) always B) never C) sometimes D) none of the mentioned	L2
20.	The appropriate precedence order of operations over a Regular Language is A) Kleene, Union, Concatenate B) Kleene, Star, Union C) Kleene, Dot, Union D) Star, Union, Dot	L2

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21.	The finite automata accept the following languages: A) Context Free Languages B) Context Sensitive Languages C) Regular Languages D) All the mentioned	L1
22.	Which of the following does not represents the given language? Language: {0,01} A) 0+01 B) {0} U {01} C) {0} U {0}{1} D) {0} ^ {01}	L3
23.	Concatenation of R with Φ outputs: A) R B) Φ C) R. Φ D) None of the mentioned	L2
24.	If L1 and L2 are regular sets then intersection of these two will be A) Regular B) Non Regular C) Recursive D) Non Recursive	L2
25.	Reverse of a DFA can be formed by A) using PDA B) making final state as non-final C) making final as starting state and starting state as final state D) None of the mentioned	L2
26.	A _____ is a substitution such that h(a) contains a string for each a. A) Closure B) Interchange C) Homomorphism D) Inverse Homomorphism	L2
27.	Homomorphism of a regular set is _____ A) Universal set B) Null set C) Regular set D) Non regular set	L2
28.	Which of the following is a utility of state elimination phenomenon? A) DFA to NFA B) NFA to DFA C) DFA to Regular Expression D) All of the mentioned	L2

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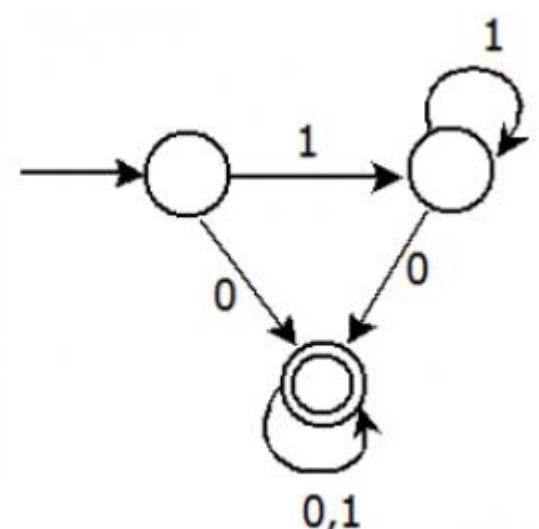
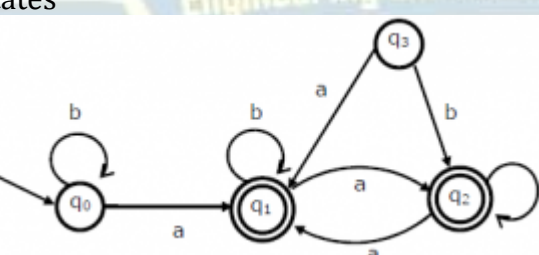
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29.	<p>Which regular expression best describes the language accepted by the non-deterministic automaton below?</p> <p>A) $(a + b)^* a(a + b)b$ B) $(abb)^*$ C) $(a + b)^* a(a + b)^* b(a + b)^*$ D) $(a + b)^*$</p>	L3
30.	<p>Which of the following regular expressions describes the language over $\{0, 1\}$ consisting of strings that contain exactly two 1's?</p> <p>A) $(0 + 1)^* 11(0 + 1)^*$ B) $0^* 110^*$ C) $0^* 10^* 10^*$ D) $(0 + 1)^* 1(0 + 1)^* 1(0 + 1)^*$</p>	L3
31.	<p>Which of the following regular expressions denotes zero or more instances of an a or b?</p> <p>A) $a b$ B) $(ab)^*$ C) $(a b)^*$ D) $a^* b$</p>	L3
32.	<p>Which of the following do we use to form an NFA from a regular expression?</p> <p>A) Subset Construction Method B) Power Set Construction Method C) Thompson Construction Method D) Scott Construction Method</p>	L2
33.	<p>It is less complex to prove the closure properties over regular languages using</p> <p>A) NFA B) DFA C) PDA D) Can't be said</p>	L2
34.	<p>Myhill-Nerode Theorem is used for _____</p> <p>A) Minimization of DFA B) Maximization of NFA C) Conversion of NFA D) Conversion of DFA</p>	L1

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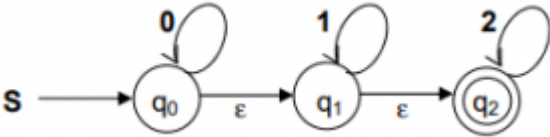
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35.	<p>Choose the correct statement for the following:</p>  <p>A) For the language accepted by A which is also a minimal DFA B) A accepts all strings over {0,1} of length at least 2 C) None of the mentioned D) Both of the mentioned</p>	L3
36.	<p>The minimum state automaton equivalent to the below FSA has the following number of states</p>  <p>A) 1 B) 2 C) 3 D) 4</p>	L3
37.	<p>Regular Expression denote precisely the _____ of Regular Language. A) Class B) Power Set C) Super Set D) None of the mentioned</p>	L2

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38.	<p>Which of the following statements is not true?</p> <p>A) Every language defined by any of the automata is also defined by a regular expression</p> <p>B) Every language defined by a regular expression can be represented using a DFA</p> <p>C) Every language defined by a regular expression can be represented using NFA with ϵ moves</p> <p>D) Regular expression is just another representation for any automata definition</p>	L2
39.	<p>Which of the following is not a step in elimination of states procedure?</p> <p>A) Unifying all the final states into one using ϵ-transitions</p> <p>B) Unify single transitions to multi transitions that contains union of input</p> <p>C) Remove states until there is only starting and accepting states</p> <p>D) Get the resulting regular expression by direct calculation</p>	L2
40.	<p>Finite state machine are not able to recognize Palindromes because:</p> <p>A) Finite automata cannot deterministically find the midpoint</p> <p>B) Finite automata cannot remember arbitrarily large amount of data</p> <p>C) Even if the mid-point is known, it cannot find whether the second half matches the first</p> <p>D) All of the mentioned</p>	L2
41.	<p>What are the final states of the DFA generated from the following NFA?</p>  <p>A) q0, q1, q2</p> <p>B) [q0, q1], [q0, q2], []</p> <p>C) q0, [q1, q2]</p> <p>D) [q0, q1], q2</p>	L3
42.	<p>Subset Construction method refers to:</p> <p>A) Conversion of NFA to DFA</p> <p>B) DFA minimization</p> <p>C) Eliminating Null references</p> <p>D) ϵ-NFA to NFA</p>	L2
43.	<p>Given an arbitrary non-deterministic finite automaton (NFA) with N states, the maximum number of states in an equivalent minimized DFA is at least?</p> <p>A) N^2</p> <p>B) 2^N</p> <p>C) 2N</p> <p>D) N!</p>	L2

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44.	How many minimum states are required to find whether a string has odd number of 0's or not? A) 1 B) 2 C) 3 D) 4	L2
45.	The reorganizing capability of NDFAs and DFAs is? A) May be different B) Must be different C) Must be same D) None of the mentioned	L2
46.	The set of all strings over $\Sigma = \{a,b\}$ in which strings consisting a's and b's and ending with in bb is? A) ab B) a*bbb C) (a+b)* bb D) All of the mentioned	L3
47.	The set of all strings over $\Sigma = \{a,b\}$ in which a single a is followed by any number of b's and single b followed by any number of a's is? A) $ab^* + ba^*$ B) ab^*ba^* C) $a^*b + b^*a$ D) None of the mentioned	L3
48.	The set of all strings over $\Sigma = \{a,b\}$ in which all strings having bbbb as substring is? A) $(a+b)^* bbbb (a+b)^*$ B) $(a+b)^* bb (a+b)^* bb$ C) $bbb(a+b)^*$ D) $bb (a+b)^*$	L3
49.	Which of the following identity is true? A) $\epsilon + RR^* = R^* = \epsilon + R^*R$ B) $(R_1R_2)^*R_1 = R_1 (R_2R_1)^*$ C) $R^*R^* = R^*$ D) All of the mentioned	L2
50.	If L1 and L2 are regular languages is/are also regular language(s). A) $L_1 + L_2$ B) L_1L_2 C) L1 D) All of the mentioned	L2