**ACHARYA BANGALORE B SCHOOL**

**DEPARTMENT OF COMPUTER SCIENCE – BCA**

**Online Assessment -- April 2020**

**BCA 6 semester**

**BCA601: Theory of Computation**

***Choose and write the correct answer.***

1. The non- Kleen Star operation accepts the following string of finite length over set A = {0,1} | where string s contains even number of 0 and 1  
   a) 01,0011,010101  
   b) 0011,11001100  
   c) ε,0011,11001100  
   d) ε,0011,11001100
2. Finite state machine are not able to recognize Palindromes because:  
   a) Finite automata cannot deterministically find the midpoint  
   b) Finite automata cannot remember arbitrarily large amount of data  
   c) Even if the midpoint is known, it cannot find whether the second half matches the first  
   d) All of the mentioned
3. The minimum number of states required to recognize an octal number divisible by 3 are/is  
   a) 1  
   b) 3  
   c) 5  
   d) 7
4. Which of the following is a not a part of 5-tuple finite automata?  
   a) Input alphabet  
   b) Transition function  
   c) Initial State  
   d) Output Alphabet
5. Given: ∑= {a, b}  
   L= {xϵ∑\*|x is a string combination}  
   ∑4 represents which among the following?

a) {aa, ab, ba, bb}  
b) {aaaa, abab, ε, abaa, aabb}  
c) {aaa, aab, aba, bbb}  
d) All of the mentioned.

1. Which of the technique can be used to prove that a language is non regular?  
   a) Arden’s theorem  
   b) Pumping Lemma  
   c) Ogden’s Lemma  
   d) None of the mentioned
2. While applying Pumping lemma over a language, we consider a string w that belong to L and fragment it into \_\_\_\_\_\_\_\_\_ parts.  
   a) 2  
   b) 5  
   c) 3  
   d) 6
3. Fill in the blank in terms of p, where p is the maximum string length in L.  
   Statement: Finite languages trivially satisfy the pumping lemma by having n = \_\_\_\_\_\_  
   a) p\*1  
   b) p+1  
   c) p-1  
   d) None of the mentioned
4. Which of the following is not a regular expression?  
   a) [(a+b)\*-(aa+bb)]\*  
   b) [(0+1)-(0b+a1)\*(a+b)]\*  
   c) (01+11+10)\*  
   d) (1+2+0)\*(1+2)\*
5. Which among the following looks similar to the given expression?  
   ((0+1). (0+1)) \*  
   a) {xϵ {0,1} \*|x is all binary number with even length}  
   b) {xϵ {0,1} |x is all binary number with even length}  
   c) {xϵ {0,1} \*|x is all binary number with odd length}  
   d) {xϵ {0,1} |x is all binary number with odd length}

***Answer all the questions.***

1. What is Finite Automata? Explain with block diagram.
2. Design a regular expression over ∑ = { a,b} for the language accepting string of exactly length 2.
3. State Pumping Lemma for Regular Languages.
4. State Arden’s Theorem.
5. Construct a DFA to accept the string ‘abba’.
6. Define E-NFA with mathematical representation.
7. Design Regular Expression (RE) for the language containing any number of a’s and b’s ending with aa.
8. Define Alphabet and Symbol with example.
9. Construct a DFA to accept strings of 0’s and 1’s ending with 101.
10. Write the applications of Regular Expressions.

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