

# CS & IT ENGINEERING



## Theory of Computation

Regular Languages : DPP 01  
DISCUSSION Notes




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TOPICS TO BE  
COVERED



Basics Of TOC

Q.1

Consider decimal alphabet  $\Sigma = \{0, 1, 2, \dots, 9\}$ , then how many two length strings are possible?

[MCQ]



A. 4

B. 20

C. 100 ✓

D. 2

$$|\Sigma| = 10$$

$$|\Sigma| = n$$

k length-

$$\begin{array}{c} \text{---} \end{array} \downarrow \begin{array}{c} \text{---} \end{array} \downarrow$$
$$10 \times 10 = 100$$

0 0  
0 1  
0 2  
⋮  
0 9  
1 0  
⋮  
1 9  
⋮



**Q.2**

Consider a binary alphabet  $(\Sigma) = \{0, 1\}$

How many 3 length strings are possible, the third symbol of the string must be 0?

[MCQ]

A. 4 ✓

B. 8

C. 3

D. 5

$$\overline{2} \times \overline{2} \overline{0} = 4$$

0	0	0	}
0	1	0	
1	0	0	
1	1	0	

Q.3

Consider the following strings and their respective lengths:

$$|w_1| = p$$

$$|w_2| = q$$

$$|w_3| = r$$

[MSQ]



Then, which of the following is/ are correct?

$$\frac{ab}{2} \quad \frac{cde}{3}$$



- A. The length of the string  $w_1 \cdot w_2 = p \cdot q$  ✗
- B. The length of the string  $w_1 \cdot w_2 \cdot w_3 = p + q + r$  ✓
- C. The length of the string  $w_1 \cdot w_2 \cdot w_3 = pqr$  ✗
- D. The length of the string  $w_1 \cdot w_3 = p + r$  ✓



Q.4

Which of the following is correct about Regular Grammar?

[MCQ]



- ☒ A. Every Regular grammar is Left Linear Grammar.
- ☐ B. Every Right Linear grammar may/may not be Regular Grammar.
- ☐ C. If grammar is regular then it must be left linear as well as right linear.
- ☒ D. If grammar is regular then it must be ~~either~~ left linear or right linear.



Q.5

Which of the following is / are not an alphabet?

[MSQ]



- ☒ A.  $\Sigma = \{\underline{a}, \underline{b}, \underline{ab}\}$  Not alphabet
- ☒ B.  $\Sigma = \{1, 2, 3, 4, \dots\}$  Not Alphabet
- ☒ C.  $\Sigma = \{\}$  Not alphabet
- ☐ D.  $\Sigma = \{\epsilon\}$  Alphabet.

**Q.6**

If  $w$  is a string and  $w_R$  is reversal of the string then which of the following is incorrect?

**[MCQ]**

A.  $(w^R)^R = w$  correct

B.  $(w w^R)^R = w \cdot w w^R$  Incorrect  
 $((abc)^R)^R = abc$   
 $(abc \cdot cba)^R = (abc) \cdot \underline{abccba}$

C.  $(w x w^R)^R = w \cdot [x] \cdot w^R$  Incorrect  
 $abc \cdot cba$

D.  $(w w^R)^R = w^R \cdot w$  Incorrect  
 $abccba \neq cba \cdot abc$   
 $abc \neq cba$   
 $\underline{abc} \neq cba$



**Q.7**

For 10 length strings, Total number of maximum substrings possible are \_\_\_\_.

**[NAT]**

- A.  $(w^R)^R = w$
- B.  $(w w^R)^R = w \cdot w w^R$
- C.  $(w x w^R)^R = w \cdot x \cdot w^R$
- D.  $(w w^R)^R = w^R \cdot w$

10 length

All 10 symbols are distinct

$$\frac{n(n+1)}{2} + 1$$

$$\frac{10(11)}{2} + 1 = 56$$



Q.8

Consider following statements:

$S_1$ : Every prefix or suffix is a substring.

$S_2$ : Total number of prefixes are same as ~~total~~ number of suffixes in a string.

$S_3$ : Total number of suffixes for  $n$  length string is  $(n + 1)$ .

Number of correct statements are 3.

[NAT]



3 //



