

# CS & IT ENGINEERING

Theory of Computation

**Regular Expression Part-1**

**Finite Automata : DPP 02**

**DISCUSSION Notes**



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# TOPICS TO BE COVERED

01 Question

02 Discussion

Q.1

Which of the following is/are true?



A.

$$(a^*b^*)^* = (b^*a^*)^* = (a+b)^*$$

B.

$$(a + \epsilon)^+ = a^+ \quad \times \quad (a + \epsilon)^+ = a^*$$

C.

$$(a+b)^*(ba)^* = (ab)^*(a+b)^* = (a+b)^*$$

D.

$$(ab+ba)^* = (ab(ab)^* + ba(ba)^*)^*$$
$$(x+y)^* \quad (xx^* + yy^*)^* \quad (x^+ + y^+)^*$$



Q.2

Consider the following regular expressions:

(I)  $a^*b^* + a^*$   $= a^*b^*$

(II)  $(\epsilon + aa^*)(bb^* + \epsilon) = (\epsilon + a^+)(b^+ + \epsilon) = \underline{a^*b^*}$

~~(III)  $b^*a^* + a^*b^* + b^*$~~

~~(IV)  $aa^+bb$~~

Which the following is equivalent to  $a^*b^*$ ?

$\underline{a^*b^*}$

~~A.~~

(I) and (II) only

B.

(I) only

C.

(II) and (III) only

D.

(I) and (IV) only

Q.3

Which of the following is not correct?



A.

$$\underline{a^*} \underline{bb^*} = \underline{a^*} \underline{b^+} \text{ correct}$$

B.

$$a^* a^+ = a^+ \text{ correct}$$

~~C.~~

$$a^+ a^+ = a^+ \text{ Not correct}$$

D.

$$\phi^* = \epsilon \text{ correct}$$

Q.4

Regular expression ~~is not~~ is used in:



A.

Lexical Analysis ✓

B.

Pattern matching ✓

C.

String matching ?

D.

Syntax analysis !



Q.5

Consider the regular expression:

$$\text{regular expression} = \underline{a^* b (a + b a^*)^*} = a^* b (a + b)^*$$

Above regular expression is equivalent to which of the following below regular expression?

Contains 'b'

~~A.~~

$$b a^* (b b)^* \quad \text{--- } \underline{ab}$$

~~B.~~

$$b a^* (a + b a^* b)^*$$

~~C.~~

$$(b + a a^* b) + (b + a a^* b) (b a^* b + a) (b a^* b + a)^*$$

D.

$$a^* b (a + b)^*$$



Q.6



Which of the following statement will generate finite language?

~~A.~~

PDA with finite stack.  $\approx$  Regular language

~~B.~~

Regular expression without kleene star and kleene plus.

$a.b$

~~C.~~

Regular expression with unary alphabet.

$a+ab$

~~D.~~

Regular expression with binary alphabet.

$a^*$   
Inf set



Q.7

Consider following regular expressions:

~~[I]~~  $(ab)^*a = a(ab)^*$

~~[II]~~  $(bb)^*b^* = \underline{b^*}$

~~[III]~~  $(b+\epsilon)^+ = b^*$

$$\underbrace{(ab)^*}_{a} a = \underbrace{a(ab)^*}_{aab}$$

Which of the following is correct?

$$(bb)^*b^* = \underline{\underline{b^*}}$$

A.

II and III only. ✓

B.

I and II only.

C.

All are correct.

D.

None of these are correct.

$$\underbrace{(ab)^*}_{a} a = \underbrace{a(ba)^*}_{aba}$$

Q.8



Consider the string  $[(ab)^{10}(ab)^7((ab)^3)^2]$  the length of the string is \_\_\_\_\_.

$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \\ 20 & 14 & 12 \\ \hline & 46 & \end{array}$$

$$= 46$$

$$(ab)^3 \cdot (ab)^3 \\ \underbrace{ababab}_6 \quad \underbrace{\hspace{1cm}}_6$$



