

Theory of Computation

Regular Expression Part-II

DPP-03

[MCQ]

1. For $L = \{a^n b^m \mid n, m \geq 0\}$

What will be the regular expression ?

- (a) $(a^* b^*)^*$ (b) $a^* b^*$
(c) $(ab)^*$ (d) $b^* a^*$

[MCQ]

2. Consider the following regular expressions:

- (I) $(aa + aaa)^* = aa^+$
(II) $(a^* b (a + b)^* + (a^* b^*)^*) = (a + b)^*$
(III) $(\epsilon + aaa (aaa)^*) (\epsilon + a + aa) = (a + aa + aaa)^*$

Which the following is correct?

- (a) (I) and (III) only.
(b) (II) and (III) only.
(c) All are correct.
(d) None of them are correct.

[MSQ]

3. Which of the following is/are regular expression for the language:

$L = \{ \text{containing } ab \text{ as a substring} \}$

- (a) $b^* aa^* b (a^* b^*)^*$
(b) $(a + b)^* (ab)^* (a + b)^*$
(c) $(a^* b^*)^* ab (a^* + b^*)^*$
(d) $(a + b)^* ab (a + b)^*$

[MCQ]

4. What will be the regular expression for $L = \{a^{2n} \mid n \geq 15\}$ over $\Sigma = \{a\}$

- (a) $a^{15} (aa)^*$
(b) $(aa)^* a^{15}$
(c) $a^{30} (aa)^*$
(d) None of these

[MCQ]

5. Which of the following string does not belong to $(ab^*)^*$?

- (a) aaabbbaa (b) baaaabb
(c) aaabbbb (d) ababa

Answer Key

- | | |
|--------------|--------|
| 1. (b) | 4. (c) |
| 2. (b) | 5. (b) |
| 3. (a, c, d) | |



Hints and solutions

1. (b)

Regular expression for $L = \{a^n b^m \mid n, m \geq 0\} = a^* b^*$

2. (b)

False: $(aa + aaa)^* = (aa)^*$

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

True: $(\epsilon + aaa (aaa)^*) (\epsilon + a + aa) = (a + aa + aaa)^*$

3. (a, c, d)

- $b^* aa^* b (a^* b^*)^*$ will generate all the strings which content ab as substring.

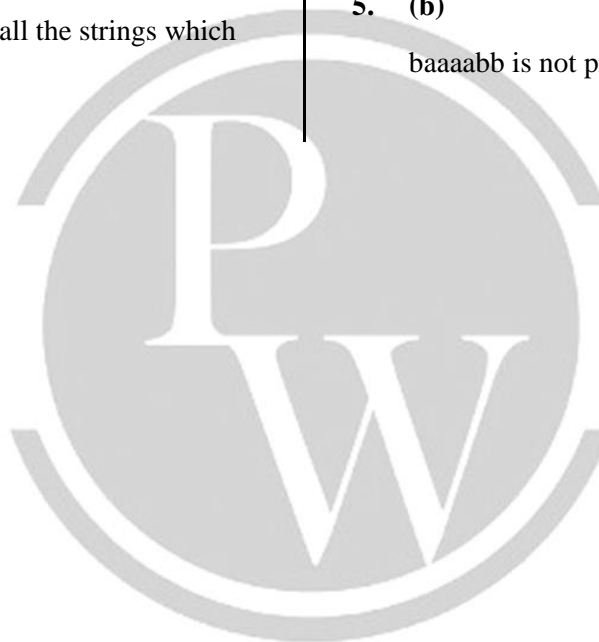
- $(a^* b^*)^* ab (a^* + b^*)^*$ will generate all the strings which content ab as substring.
- $(a + b)^* ab (a + b)^*$ will generate all the strings which content ab as substring.

4. (c)

Regular expression for $L = \{a^{2n} \mid n \geq 15\} = (aa)^* a^{30}$
 $= a^{30} (aa)^*$

5. (b)

baaaabb is not present in $(ab^*)^*$.



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