CS & IT ENGINEERING

Regular Languages & Non Regular Languages

Theory of Computation

DPP 06   Discussion Notes
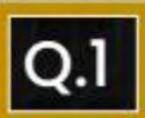
Mallesham Devasane Sir

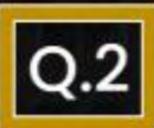**Q.1** Which of the following language is <u>not regular?</u>   [MCQ]

A. $L = \{w \mid w \in \{a, b\}^*\} = (a+b)^*$

B. $L = \{xy \mid x, y \in \{a, b\}^*\} = (a+b)^*$

C. $L = \{xy \mid |x| = |y|, x, y \in \{a, b\}^*\} = [(a+b)^2]^*$

D. None of these

Q.2 Which of the following language is/are regular? [MSQ]

A. $L = \{ww^R \mid w \in \{0, 1\}^*\}. \rightarrow$ Set of even length palindromes

B. $L = \{\text{Set of all palindrome}\}.$

C. $L = \{\text{Number of a's equal to number of b's}\}.$

D. $L = \{wwp \mid w, p \in \{0, 1\}^*\} = (0+1)^*$
$\quad\quad \varepsilon \quad \varepsilon$
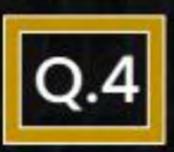
Consider the following given language L.

[MCQ] ⓟⓦ
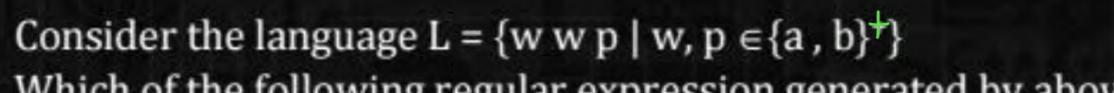
$L = \{p\, q\, w\, w\, r \mid w, p, q, r \in \{a, b\}^*\} = (a+b)^*$

$\varepsilon\ \varepsilon$

The regular expression generated by above language is?

A. $(a + b)^2 (aa + bb) (a + b)$
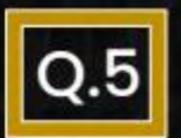
B. $[(a + b)^2]^* (aa + bb) (a + b)^*$

C. $(a + b)^*$ ✓

D. None of these

Q.4 Consider the language L = {w w p | w, p ∈{a , b}$^+$}   [MCQ]

Which of the following regular expression generated by above language?

$$\{ wwp \mid wp \in \{a,b\}^+ \}$$

A. $(a + b)^+$

B. $(a + b)^+ (a + b)^+$

C. $(aa + bb) (a + b)^+$

D. None of these

Consider the following language L:

$L = \{xw \mid |x| = 2, w, x \in \{a, b\}^*\}$

For the above language L, how many equivalence classes are possible?____.

$$\underbrace{x}_{2}, \underbrace{w}_{\geq 0}$$
$$\geq 2$$

$= 3$

Q.6
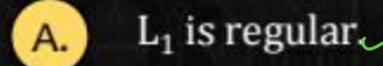
Consider the following languages.

$L_1 = \{w\,x\,w^R\} \mid w, x \in \{a, b\}^+\}$ → Regular

$L_2 = \{w\,w^R\,x \mid w, x \in \{a, b\}^+\}$

Which of the following language is regular?

A. L_1 is regular.

B. L_2 is regular.

C. Both L_1 and L_2 are regular.

D. None of these.