Given Language is Regular or not -

Language	R -	Result
1- $L = \{a^{n_1}, b^{n_2}, c^{n_3} \ldots\ldots z^{n_{26}}\}$ $n_i \geq 0,\ 0 \leq i \leq 25$  FA is possible		Regular
2- $L = \{a^m b^n \mid 1 \leq m \leq 500,\ 1 \leq n \leq 1000\}$ Language is finite		Regular
3. $L = \{a^n b^n \mid 1 \leq n \leq 10\}$ Finite Language		Regular
4- $L = \{a^n b^n \mid 1 \leq n \leq 2^{29\text{th}}$ binimeno $\}$ Finite Language		Regular
5- $L = \{a^n b^n \mid 1 \leq n \leq 2^{1\,GATE1}\}$ Finite Language		Regular

6- $L=\{a^n b^n \mid n \geq 0\}$

$L=\{\epsilon, ab, aabb, \cdots\}$

Language is infinite so FA is not possible

Not Regular

7- $L=\{a^m b^n \mid m,n \geq 0, m \neq n\}$

Language is infinite

Not Regular

8- $L=\{a^m b^n \mid m>n, n \geq 0\}$

Language is infinite

Not Regular

9- $L=\{a^m b^n \mid m$ is divisible by $n\}$

Let $m=4$ $n=2$
$m=6$ $n=2,3$ | counting is possible so

Regular

10- $L=\{a^m b^n \mid m=n^p, p \geq 1\}$

in this, comparision occure so

not Regular

11- $L=a^m b^n c^q \mid m=n=q$ "

"

12- $L=a^m b^n c^q \mid m+n=q$

"

R.L have no memory to remember the value so

"

13- $L = a^m b^n \mid m+n = \text{even}$ — Regular

$a^1 b^3$

$a^2 b^2$ produce finite & Lang so

$a^3 b^1$

14 - $L = a^m b^n \mid m+n = \text{odd}$ — Regular

15- $L = \{wcw^r \mid w \in \Sigma^*\}$

Here c is only a symbol

Let, $\Sigma = \{a, b\}$ $w = abb$ | FA does not remember any string so — Not Regular

abb c bba

16- $L = wcw \mid w \in \Sigma^*$ — " — "

17- $L = wcw^r \mid w \in \Sigma^+$ — " — "

18 - $L = wcw \mid w \in \Sigma^+$ — " — "

19- $L = ww \mid w \in \Sigma^*$ — " — "

20 - $L = ww \mid w \in \Sigma^+$ — " — "

21 - $L = ww^r \mid w \in \Sigma^+$ — " — "

22- $L = \{wcw^r \mid c, w \in \Sigma^*\}$

Let $\Sigma = \{a, b\}$ and $c = aa$

Ex $\underbrace{abb}_{w}\ \underbrace{aa}_{c}\ \underbrace{bba}_{w^r}$ — Regular

if w is $\in$ then string become {aa}

i.e Regular

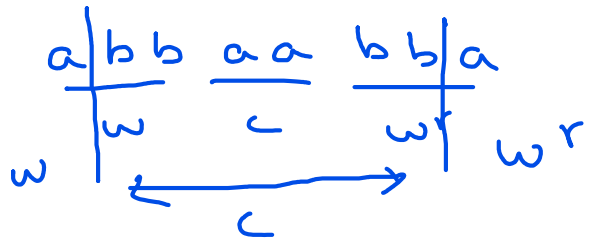
23- $L = \{cww^r \mid c, w \in \Sigma^*\}$ — Regular

24- $L = \{ww^r c \mid c, w \in \Sigma^*\}$ — "

25- $L = \{wcw^r \mid c, w \in \Sigma^+\}$ — "

Let, $w = abb$ $w^r = bba$

$c = aa$



26- $L = \{cww^r \mid c, w \in \Sigma^+\}$ — Not Regular

aa abb bba

elimination is not possible

27- $L = \{cww^r c \mid c, w \in \Sigma^+\}$ — "

28- $L = \{wcw \mid c, w \in \Sigma^*\}$ — Regular

~~abb aa bba~~

c

29- $L = \{cww \mid c, w \in \Sigma^*\}$ — "

30- $L = \{wwc \mid c, w \in \Sigma^*\}$ — "

31- $L = \{wcw \mid c, w \in \Sigma^+\}$ — Not Regular

32- $L = \{cww \mid c, w \in \Sigma^+\}$ — "

33- $L = \{wwc \mid c, w \in \Sigma^+\}$ — "