1. DP, let $f[i][j][\ell]$ denote whether $s1[i,\dots,j]$ can be matched with $s2[\ell,\dots,\ell+j-i]$. Enumerate the breakpoint in $O(n)$ time. In total $O(n^4)$.
2. Use bit packing. $O(\frac{n^4}{w})$.
3. The idea is to use boolean matrix multiplication (BMM). Wlog consider the case that we don't flip the string (the flip case is similar). Fix $i-\ell=d$, let $g[i][j]=f[i][j][i-d]$, we simultaneously consider all such $g[i][j]$'s. The transition function is $g[i][j]=\bigvee(g[i][k]\wedge g[k+1][j])$, which is exactly BMM.
But we successfully compute $g[i][j]$ only when the values of $g[i][k]$ and $g[k+1][j]$ have been already computed, and the dependency chain can have depth $O(n)$. To fix this, let α be a parameter to be fixed later, if $\min\{k-i+1,j-k\}\le n^\alpha$ then we compute $g[i][k]$ by brute force, in $O(n^\alpha)$ time. Now we only need to perform $O(n^{1-\alpha})$ rounds of BMMs, each round consists of $O(n)$ BMMs (because there are $O(n)$ possible d's). Set $\alpha=\frac{\omega-1}{2}$, the total running time is $O(n^3\cdot n^\alpha+n^{1-\alpha}\cdot n\cdot n^\omega)=O(n^{\frac{5+\omega}{2}})\approx O(n^{3.69})$.

The transition function is

$$f[i][j][\ell]=\bigvee(f[i][k][\ell]\wedge f[k+1][j][k+1-i+\ell])\bigvee(f[i][k][\ell+j-k]\wedge f[k+1][j][\ell+j-k-1]).$$

For the second part, fix $\ell+j=d$, we can also use BMM.

References