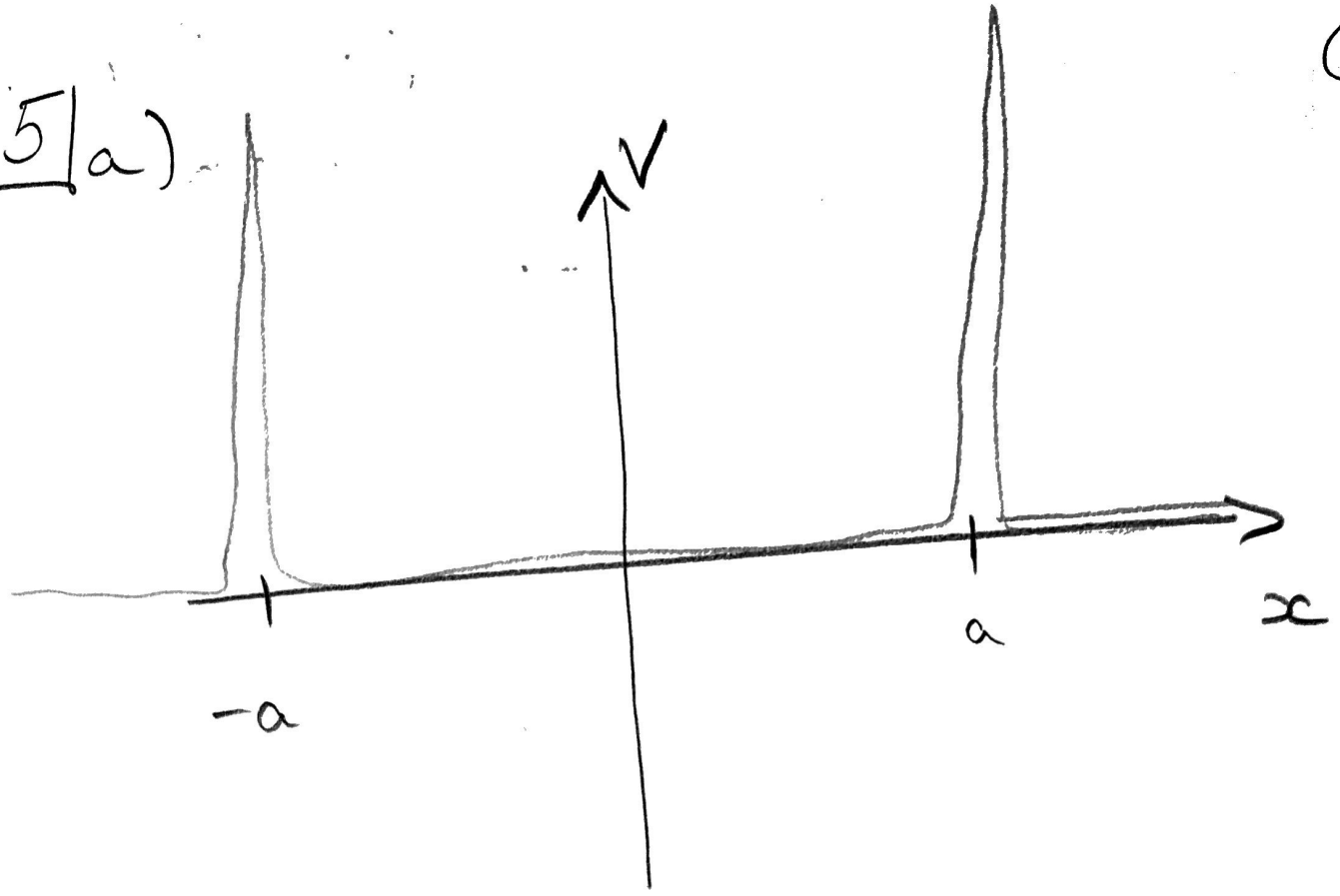
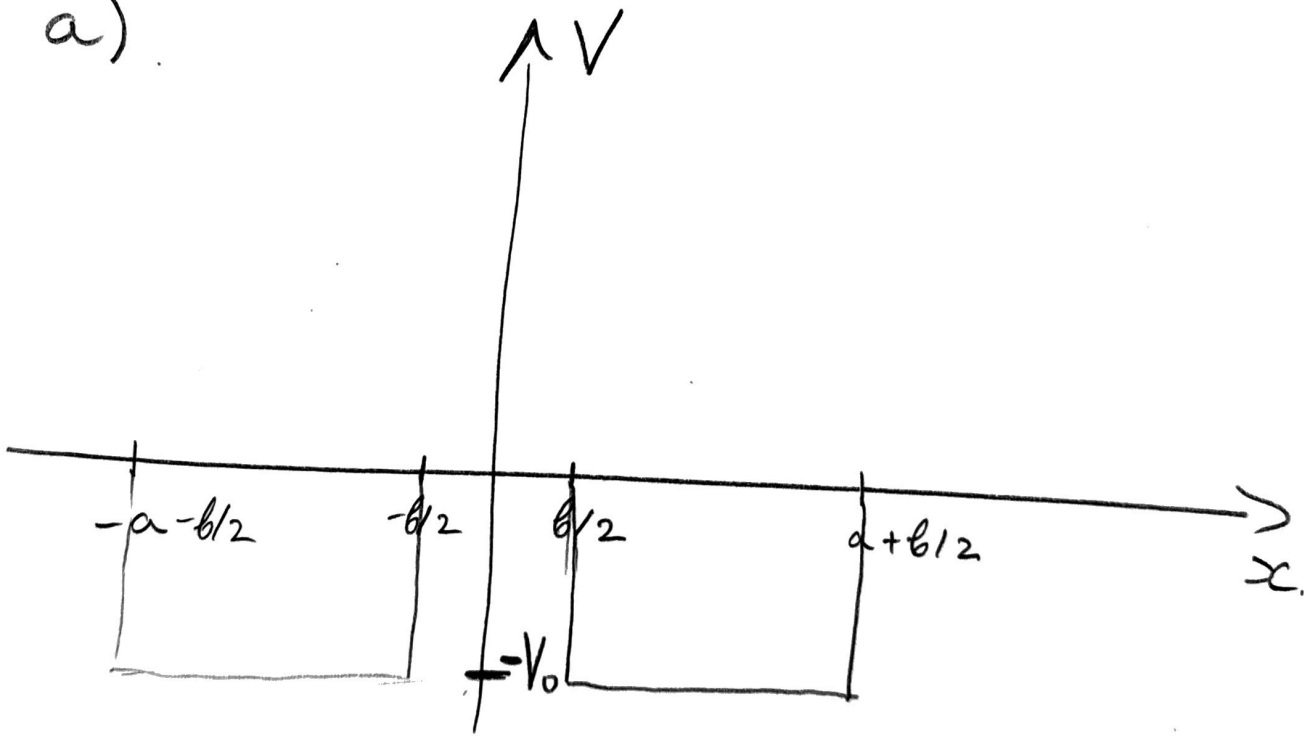
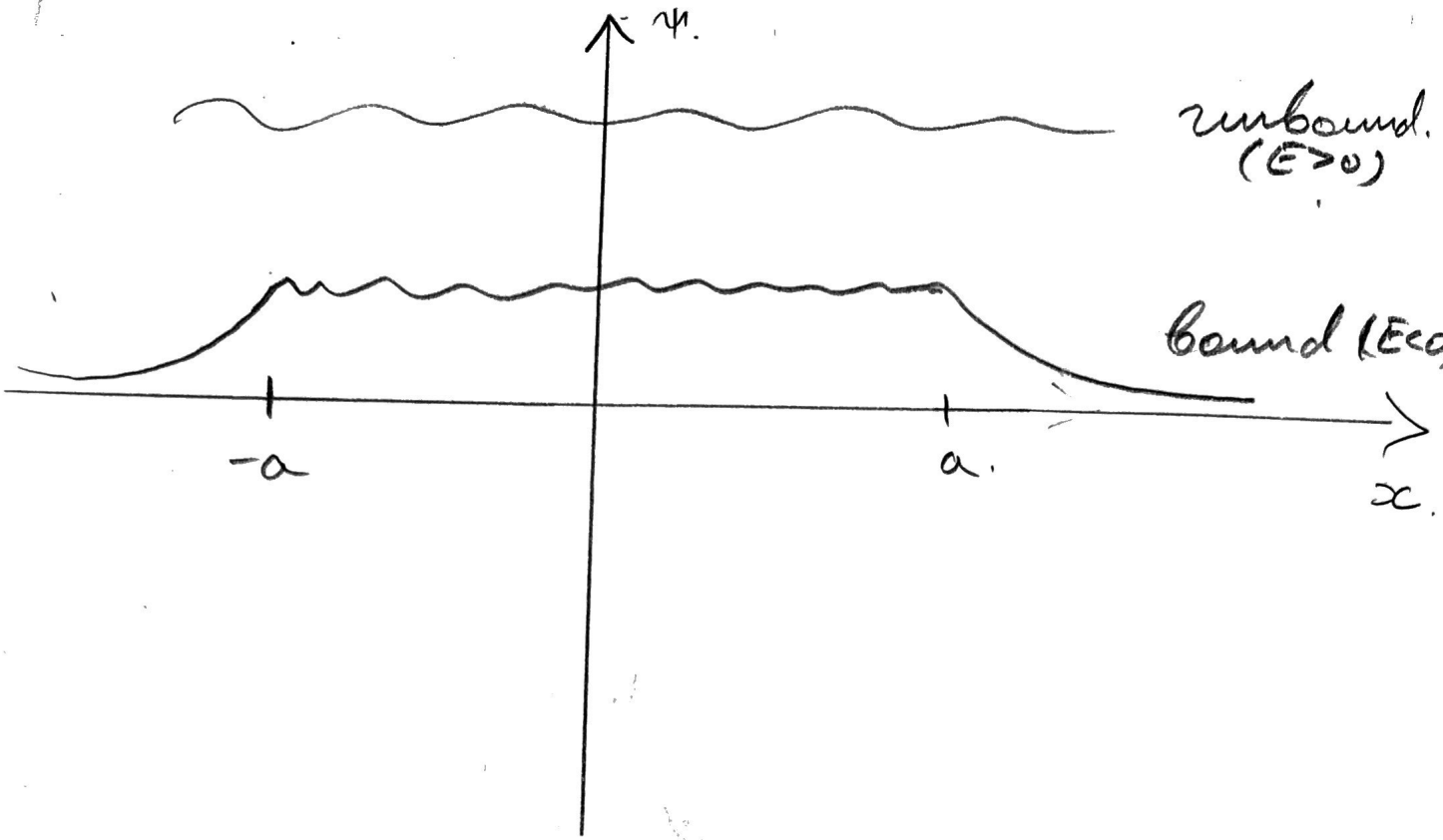
5 a)



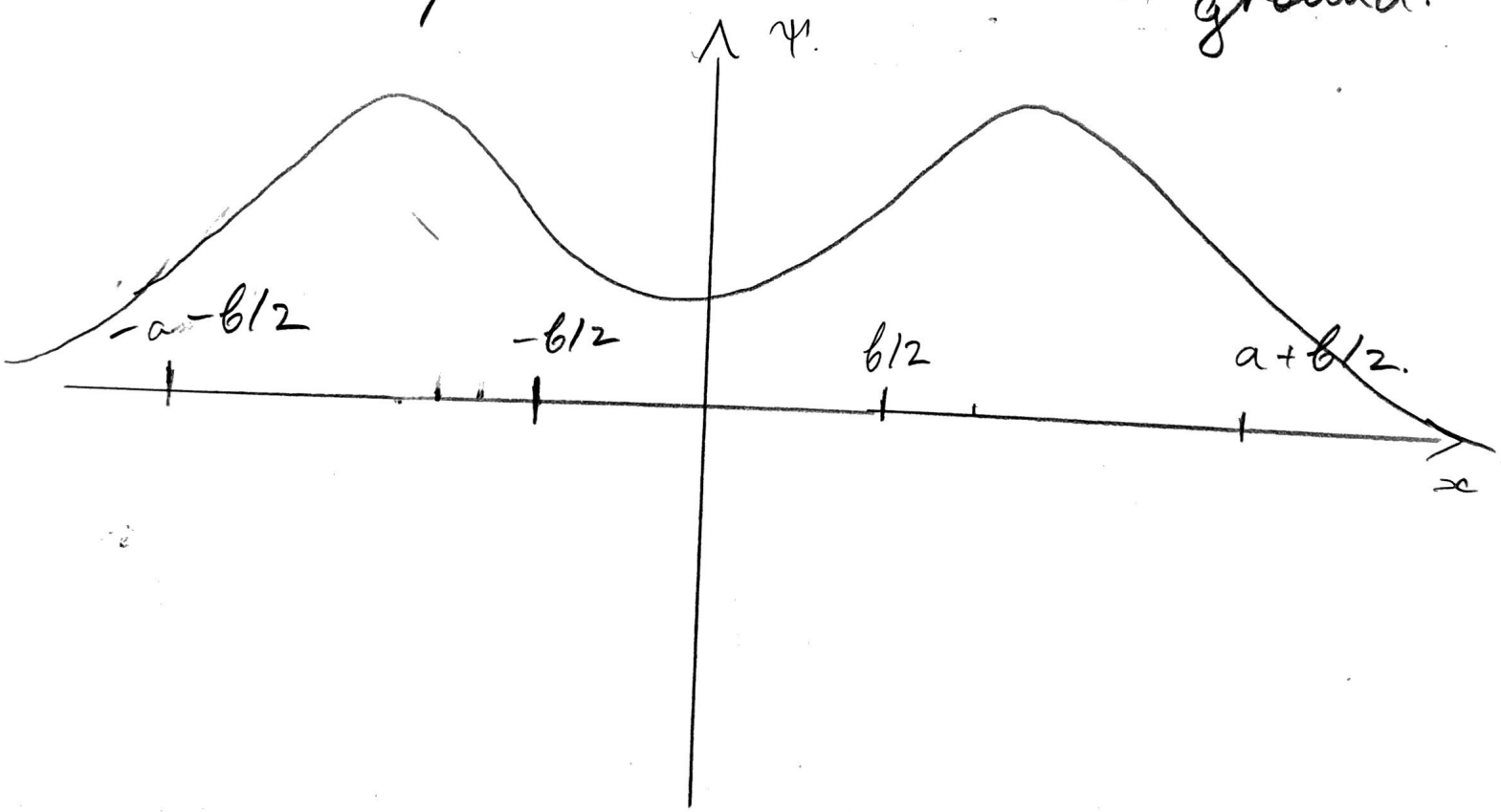
7 a)

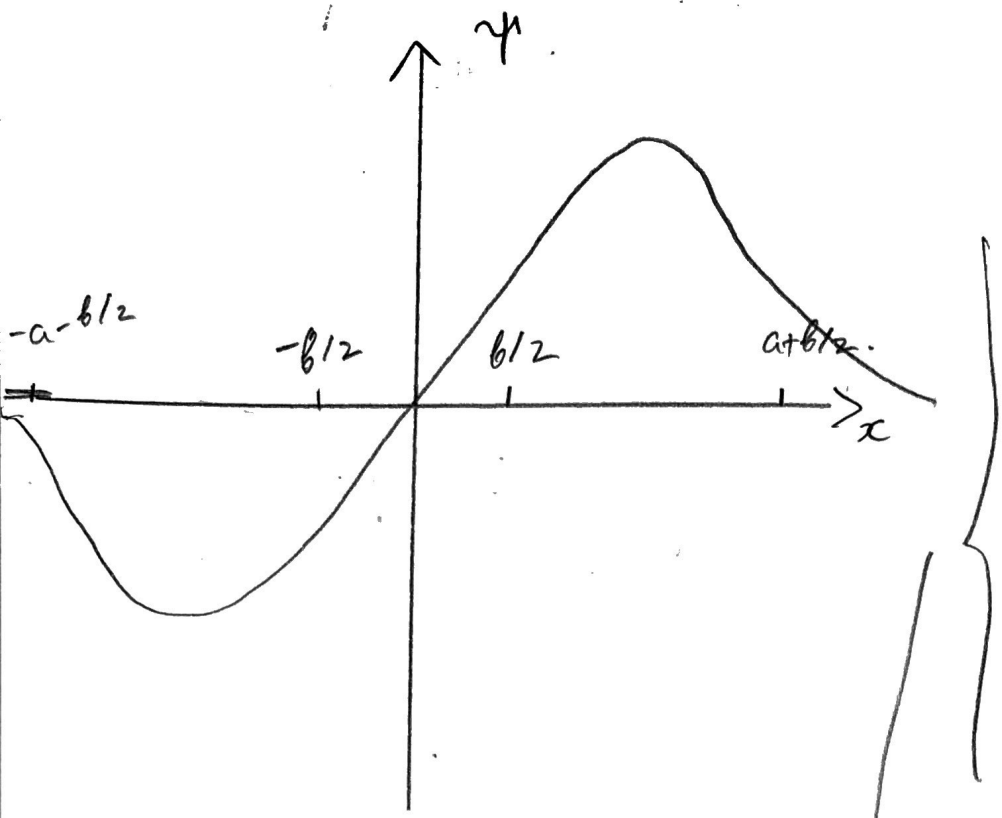


$b = 0 \Rightarrow$ same as 1 well. (in book).



$b \gg a$: coupled wells:

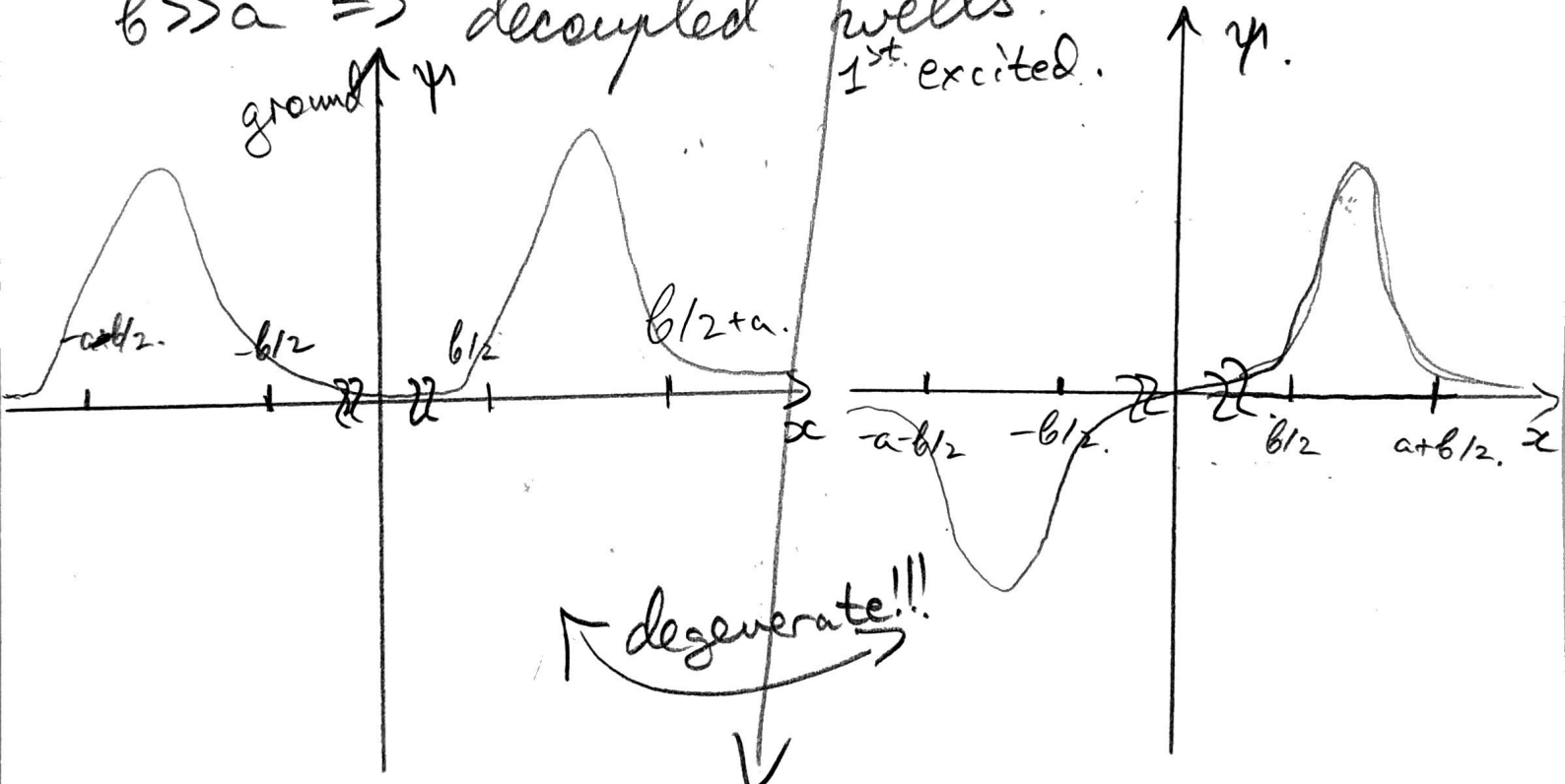




1st excited.

In general:
$2n^{th}$ state will have more wiggles in the potential regions and be even.
$(2n+1)^{th}$ ~~state~~ will have more wiggles and be odd.

$b \gg a \Rightarrow$ decoupled wells:



degenerate!!!

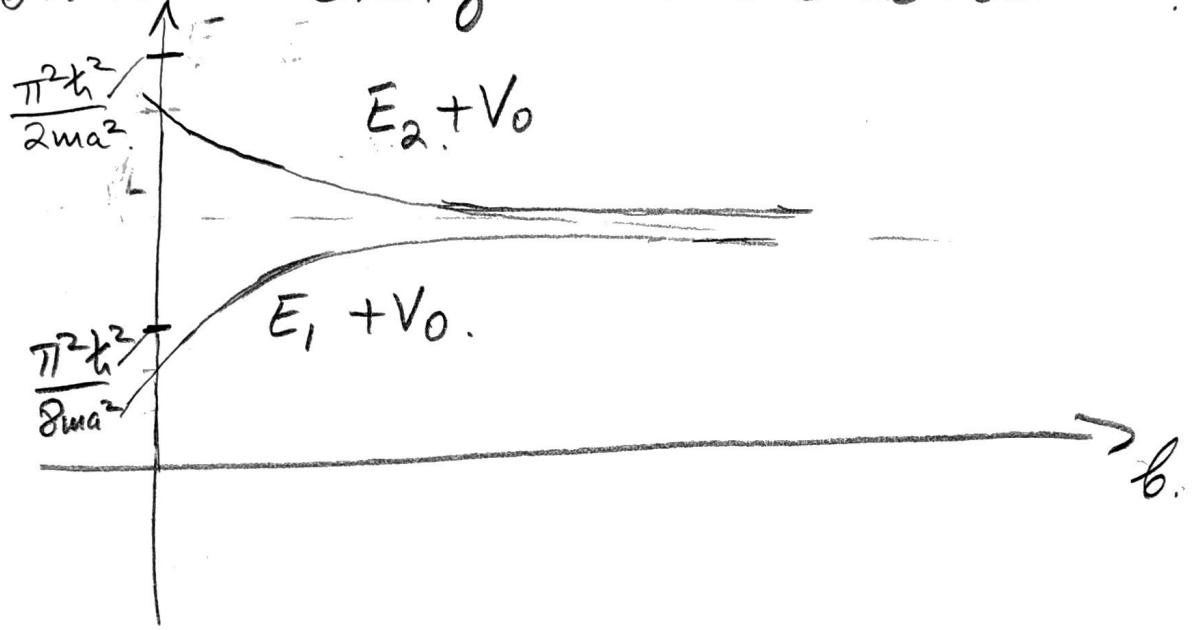
same for $2n^{th}$, $(2n+1)^{th}$.

b) $b = 0 \Rightarrow$ energies are less than those for ∞-square well of width $2a$:

$n=1$: $\dfrac{\pi^2\hbar^2}{2m(2a)^2} = \dfrac{\pi^2\hbar^2}{8ma^2} \leftarrow E + V_0$

$n=2$: $\dfrac{\pi^2\hbar^2}{2ma^2}$

$b \gg a \Rightarrow$ energies are the same. (V_0 large)



c) Even ground state, w/ $b \to 0$, gives the lowest energy, so the e^- draws the nuclei together. The odd 1st excited state pushes them apart.