PHYS 232 Assignment # 9 due:Wednesday May6, 2020 10 am

1. An electron moving along the x-axis is incident with energy $E= \frac{1}{2}U\_{0} $ from -∞ towards the potential barrier:

$$U\left(x\right)=U\_{0}-\frac{1}{2}kx^{2}$$

1. Use equation (7.10) to find the probability T(E) that the electron will be transmitted to the other side of the barrier. (20%)
2. Plot the barrier (using Excel or any other computer app) and obtain a numerical answer for T(E) for the case

$U\_{0}=1.0×10^{2} eV$ and $k=1.0×10^{6}^{eV}/\_{nm^{2}}$ (20%)

1. An electron moving along the x-axis is incident with energy

E = U0 from -∞ towards the potential barrier:

$$U\left(x\right)=\left\{\begin{matrix}0, x<0\\U\_{0}, 0<x<L\\\infty , x>L\end{matrix}\right.$$

* 1. Solve the Schroedinger equation and write down the wavefunction in the three regions and apply the continuity conditions. (20%)

* 1. Show that the electron will be reflected to the x < 0 region with 100% probability. (10%)
	2. Calculate the probability ratio P(x=L/2)/P(x=0). Since there is 100% probability that the electron will reach x = 0, this ratio gives the probability that the electron will reach x=L/2. What is the classical answer? (10%)