**PHYS 232 Assignment # 6 due Monday April 13*,* 2020 at 10 am**

1. Submit your solutions of the following 2 problems on Ritaj by **Monday April 13*,* 2020 at 10 am**
2. Submit maximum 2 pages (one page per problem)
3. Label the files by your name + problem number:

For example: SamirSalim1.jpg …etc….

1. A particle’s wavefunction at t = 0 is given by:

Ψ(x, 0) = $\left\{\begin{array}{c}0 , x<0\\\sqrt{\frac{30}{L^{5}}}x\left(L-x\right) , 0<x<L\\0 , x>L\end{array}\right.$

1. Show that this wavefunction is normalized. (25%)
2. Evaluate the probability of finding this particle between x=0 and

x = L/3 at t = 0 . (20%)

1. A wavepacket is given by $a\left(k\right)= \left\{\begin{matrix}0 for k<0\\A e^{-αk} for k\geq 0\end{matrix}\right\}$
2. Find Ψ(x, 0) and $\left|Ψ(x,0)\right|^{2}$ (25%)
3. Plot $\left|Ψ(x,0)\right|^{2}$ and $\left|a\left(k\right)\right|^{2}$ and show that the uncertainty principle is satisfied.

(20%)

Note: You can plot by hand or using Excel or Mathematica or any other app. Plot x in units of α and *k* in units of 1/α .

للرسم باليد يفضل استعمال ورق رسم بياني (أو ورق دفتر حساب) وقلم مبري جيدا.

**+10%** for good hand-writing and clear and well-organized solutions.

**You are expected to work alone. Academic honesty is very important. Cheating will make you lose grades.**