Problems:

1) If \( \hat{A} \) and \( \hat{B} \) are Hermitian, which of the following are Hermitian?
   a) \( i(AB-BA) \)
   b) \( (AB-B\hat{A}) \)
   c) \( (AB+B\hat{A})/2 \)
   d) if \( \hat{A} \) is not Hermitian, is the product \( \hat{A}^\dagger \hat{A} \) Hermitian?
   e) if \( \hat{A} \) corresponds to the observable \( A \) and \( \hat{B} \) corresponds to \( B \), what is a "good" (i.e. Hermitian) operator that corresponds to the physically observable product \( AB \)?

2) For a particle moving in one dimension, show that the observable \( \hat{x}\hat{p} \) is not Hermitian. Construct an operator which corresponds to this physically observable product that is Hermitian.

3) Obtain uncertainty relations for the following products
   a) \( \Delta x\Delta E \)
   b) \( \Delta p_x\Delta E \)
   c) \( \Delta x\Delta T \)
   d) \( \Delta p_x\Delta T \)

   for a particle with kinetic energy \( T \) and total energy \( E \).

4) Can the total energy and linear momentum of a particle moving in one dimension in a constant potential field be measured consecutively with no uncertainty in the values obtained?