This is only a preview of the survey. Responses will not be saved. Close

Energy Measurements Pretest

University of Colorado

Please type your name in the form: Last, First:

Required.

NOTE!! Please type in your CU userid (that's the username you use to log in to CULearn. We do NOT want your password. It probably looks like your last name, perhaps with a few extra characters. Note that it is definitely NOT your numerical (9 digit) student ID!!
This script cannot "error check", you have to be sure you type it in correctly! Thanks

Please type your CU userid:

Required.

Consider a quantum mechanical free particle which is prepared so that at t = 0 it is in the following state

$$\Psi(x,0) = \frac{1}{(2\pi a^2)^{1/4}} e^{\left[-\frac{(x-x_0)^2}{2a^2}\right]}$$

Q1:

a) Does the wave function associated with this state depend on time?

Required.

Select one...

b) If so, describe how you would write down its time dependence. If not, explain why not.

Required.

Q2:
a) Does the probability density associated with this state depend on time?

Required.
Select one...

b) If so, describe its time dependence. If not, explain why not.

Required.

Time remaining: 0:14:41

Assume that a quantum mechanical system is prepared so that its initial state is given by:

$$\Psi_i = \Psi(x,0) = i\sqrt{\frac{1}{3}}\psi_1 - \sqrt{\frac{2}{3}}\psi_2$$

where ψ_1 and ψ_2 are two states which satisfy the time independent Schrödinger equation:

$$\hat{H}\psi_1 = E_1\psi_1$$

and

$$\hat{H}\psi_2 = E_2\psi_2$$

Q3:
a) Consider an energy measurement made on this system. Are there times when the probability of measuring E_2 is zero and the probability of measuring E_1 is one?

Required.
Select one...

b) If so, give the first such time. If not, explain why not.

Required.

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Modified by Steve Goldhaber (University of Colorado at Boulder)

Submit responses

Questions or Comments?
Contact the 123 tutorial pretest coordinator at uwttl123@u.washington.edu

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