General Science 1110L Lab #10
Radioactivity Pre-Test Questions.

1. What is the objective of this lab?

2. What apparatus is used in today's lab?

3. Describe an alpha(a) particle, a beta (b) particle and a gamma(g) ray. (See your Textbook too.)

4. What type of materials will stop the three types of radiation?

5. Give the equation that tells us the intensity of radiation that gets through an absorber. Give SI units for each variable.

6 If 1.34 X10^8 gamma rays per second hit lead absorber 8 mm thick, how may gamma rays will penetrate the absorber and come out the other side. The absorption coefficient (also called the range of the particles) is 5.67 mm.

7. A piece of lead with an absorption coefficient of 5.67mm has a thickness of 25mm. If the number of g particles hitting one side of the absorber is 9.5 X 10^{10} particles per second, how many will get through to the other side? How thick will the absorber have to be, to cut the number of g rays that get through to 1/1000 of the number that got though in the first case?

8 What kind of curve should we get when we plot the graph of Intensity vs. Thickness of the absorber?

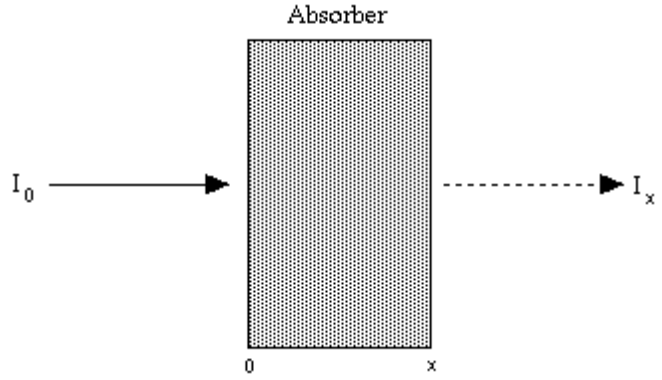
9. How will we find the range of the particles (Also called the Absorption coefficient) from the graph of Intensity vs. Thickness of the absorber?

10 What will be used to measure the thickness of the absorber?

Answers

5. **$I_x = I_0 e^{-X/X_o}$: X = thickness of the absorber in mm, Xo is the absorption coefficient in mm, (This is also called the range of the particles) Io is the original number of particles/ second hitting the absorber and Ix is the**

number of particles/second getting through.



Note: Ix<Io

6. $Ix = Io\ e^{-X/Xo} = 1.34\ X10^{8}$ (p/s) $e^{-(8mm/5.67mm)}$
$=1.34\ X\ 10^{8}$ p/s (0.2349) = 32684633 p/s = 3.27 x 10^{7} p/s

7. $Ix = Io\ e^{-X/Xo} = 9.5\ X10^{10}$ (p/s) $e^{-(25mm/5.67mm)}$ =

$9.5X\ 10^{10}$ p/s (0.0121) = 1155699531 p/s = $1.15\ X\ 10^{9}$ p/s

This is the number that gets through the 25mm piece of lead

1/1000 Ix = 1155699531p/s(0.001) = $1.15\ X\ 10^{6}$ p/s

7A.