Post-Lecture #10: Detection of Radiation I

1. Your supervisor has come to you with a brilliant new idea; they want to improve the sensitivity of their GM detectors. They believe that increasing the voltage of their GM by 50% should be perfect for their work. How would you respond?

2. Seemingly ignoring your previous response (to avoid giving you the answer), they exclaim: "Oh wait, I have a better idea!" They now wish to create an ultra-safe gaseous detector that even Dr. House's nursery babies could use! They settle on an operating voltage of 24 V (16 AA batteries!). How would you respond?

3. Now somewhat annoyed and perplexed, your supervisor asks you what voltage you would use, and what types of detectors are in each voltage range. Please provide an in-depth answer regarding the many types of gaseous detectors.

4. "Wow, you listed a lot of different ionization chambers. How do they differ? Wow..."

5. "I have heard of survey meters before, but I thought they were all the same thing. What is the difference between the two most common designs?" (Pancake, McDonald's)

6. "Why do I care about paralyzability? My GM should just work, right?"

7. Your supervisor was the lead safety officer for the Chernobyl Nuclear Reactor. As the reactor alarms go off, you realize this should have been expected. He asks you what the dosimeter is reading; you bark back, "3.6 Roentgen per hour, the highest it goes." You know that this scintillator dosimeter is non-paralyzable, and that all of your GM dosimeters are reading zero cps. Understand that 1.0 R is approximately 10 mSv Si for photons of this energy in human tissue. Do you think you are safe?