Laboratory 2: Radiation and Life Presentation

Name: _____

Introduction:

This lab will provide you with the necessary background for future labs (because we may not cover the material needed to perform the upcoming experiments soon enough in class). The lab report consists of a number of questions based on the presentation. Answer the questions and submit this handout either today or at the start of the next lab period.

Questions (5 points apiece):

1. The three basic building blocks of the atom are:

   a. _____ b. _____

   c. _____

2. Four types of ionizing radiation are:

   a. _____ b. _____

   c. _____ d. _____

3. One (1) becquerel represents _____radioactive decay(s) per second.

4. 3.7×10^{10} radioactive decays per second = one (1) _____.

5. The half-life of a radioactive element is the time it takes for ½ of the element to decay to another element (T / F).

6. _____are generally the least penetrating form of ionizing radiation.

7. Beta particles are electrons that originate in the nucleus (T / F).

8. The primary difference between gamma-rays and x-rays is that gamma-rays originate in _____, while x-rays are created either by transitions between energy states of orbital electrons or as bremsstrahlung radiation.

9. Alpha particles will typically only cause damage to biological tissue as a result of internal exposure (T / F).

10. The most penetrating form of ionizing radiation is generally:

    a. beta particles. b. alpha particles.

    c. x-rays. d. gamma rays.

Laboratory 2: Radiation and Life Presentation

11. Which of the following is not a way to minimize exposure to radiation?

    a. Minimize exposure time.

    b. Maximize shielding.

    c. Minimize distance from the source of radiation.

    d. Maximize distance from the source of radiation.

12. A common variety of radiation detector operates by collecting the charge generated after radiation ionizes the gas inside the detector (T / F).

13. If a person becomes contaminated with radioactive material, he/she will become radioactive as a result (T / F).

14. The biggest single contributor to the average annual exposure to radiation in the US is radium gas (T / F).

15. Emissions from nuclear power plants account for what percentage of the average annual exposure to radiation in the US:

    a. <1% c. 10%

    b. >1% d. 0%

16. Exposure to natural radioactivity is less harmful than exposure to man-made sources of radiation (T / F).

17. Exposure to radiation from radon gas (progeny) poses a greater risk of lung cancer than does cigarette smoking (T / F).

18. Risk-benefit analysis can help you to decide whether or not it is worthwhile to invest in a smoke detector even though it contains radioactive materials (T / F).

19. An example of a consumer product containing radioactive materials that has greater potential benefits than risks is:

    a. fiesta ware. c. a wrist watch with radium painted dials

    b. a shoe-fitting fluoroscope. d. none of the previous three choices.

20. Fiesta ware is by far the most fashionable form of dinnerware that a restaurant can offer (T / F).