

**28.1****NUCLEAR RADIATION****SECTION REVIEW****Objectives**

- Discuss the processes of radioactivity and radioactive decay
- Characterize alpha, beta, and gamma radiation in terms of composition and penetrating power

**Key Terms**

- |                 |                     |                   |
|-----------------|---------------------|-------------------|
| • radioisotopes | • radioactive decay | • beta radiation  |
| • radioactivity | • alpha radiation   | • beta particles  |
| • radiation     | • alpha particles   | • gamma radiation |

**Part A Completion**

*Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.*

- Isotopes with unstable nuclei are 1 and are called 1. \_\_\_\_\_
2. The 3 of radioisotopes decay to 4 nuclei 2. \_\_\_\_\_
- plus 5. The radiation may be alpha, 6, or gamma. 3. \_\_\_\_\_
- 7 radiation consists of alpha particles (positively charged 4. \_\_\_\_\_
- 8 nuclei) that are easily stopped by a sheet of paper. Beta 5. \_\_\_\_\_
- radiation is composed of fast-moving particles, which are 6. \_\_\_\_\_
9. Beta radiation is more penetrating than alpha radiation; 7. \_\_\_\_\_
- it is stopped by 10. 11 radiation is electromagnetic 8. \_\_\_\_\_
- radiation similar to 12, but much more energetic. Gamma 9. \_\_\_\_\_
- radiation has no 13 or charge. It is extremely penetrating. 10. \_\_\_\_\_
- 14 bricks and 15 reduce the intensity of gamma 11. \_\_\_\_\_
- radiation but do not completely 16 it. 12. \_\_\_\_\_
13. \_\_\_\_\_
14. \_\_\_\_\_
15. \_\_\_\_\_
16. \_\_\_\_\_

## Part B True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

- \_\_\_\_\_ 17. Beta radiation is emitted when a radioisotope decays.
- \_\_\_\_\_ 18. Gamma radiation has a negative charge
- \_\_\_\_\_ 19. Gamma radiation and X-radiation are high-energy electromagnetic radiation.
- \_\_\_\_\_ 20.  ${}_{92}^{238}\text{U} + {}_{-1}^0e \rightarrow {}_{92}^{239}\text{U}$
- \_\_\_\_\_ 21. When a beta particle is emitted, the atomic number increases by 1, and the mass number stays the same.

## Part C Matching

Match each description in Column B to the correct term in Column A.

Column A	Column B
_____ 22. radioisotopes	a. the process in which an unstable nucleus loses energy by emitting radiation
_____ 23. radioactive decay	b. isotopes that have unstable nuclei and undergo radioactive decay
_____ 24. gamma radiation	c. high-energy radiation with no mass or charge
_____ 25. alpha particles	d. fast moving electrons emitted from a radioactive source
_____ 26. beta radiation	e. helium nuclei emitted from a radioactive source

## Part D Questions and Problems

Answer the following in the space provided.

27. Write nuclear equations for these processes.

a. The alpha decay of  ${}_{84}^{218}\text{Po}$

\_\_\_\_\_

b. The beta decay of  ${}_{82}^{210}\text{Pb}$

\_\_\_\_\_