Standardized Test Prep

Answer the following items on a separate piece of paper.

MULTIPLE CHOICE

1. Complete the following nuclear equation:
$\underline{?} \longrightarrow {}^{187}_{76}\text{Os} + {}^{0}_{-1}\beta$

A. ${}^{187}_{77}\text{Os}$
B. ${}^{187}_{75}\text{Os}$
C. ${}^{187}_{77}\text{Ir}$
D. ${}^{187}_{75}\text{Re}$

2. The mass of the nucleus is
A. greater than the mass of the protons and neutrons that make up the nucleus.
B. equal to the mass of the protons and neutrons that make up the nucleus.
C. less than the mass of the protons and neutrons that make up the nucleus.
D. converted to energy.

3. Which type of radiation has the most penetrating ability?
A. an alpha particle
B. a beta particle
C. a gamma ray
D. a neutron

4. Which two particles have the same mass but opposite charge?
A. a beta particle and a positron
B. a neutron and a proton
C. a proton and an electron
D. an alpha particle and a proton

5. Which of the following nuclear equations is correctly balanced?
A. ${}^{37}_{18}\text{Ar} + {}^{0}_{-1}e \longrightarrow {}^{37}_{17}\text{Cl}$
B. ${}^{6}_{3}\text{Li} + 2{}^{1}_{0}n \longrightarrow {}^{4}_{2}\text{He} + {}^{3}_{1}\text{H}$
C. ${}^{254}_{99}\text{Es} + {}^{4}_{2}\text{He} \longrightarrow {}^{258}_{101}\text{Md} + 2{}^{1}_{0}n$
D. ${}^{14}_{7}\text{N} + {}^{4}_{2}\text{He} \longrightarrow {}^{17}_{8}\text{O} + {}^{2}_{1}\text{H}$

6. Gamma rays
A. have the same energy as beta particles do.
B. are visible light.
C. have no charge and no mass.
D. are not a form of electromagnetic radiation.

7. Which of the following nuclides is radioactive?
A. ${}^{40}_{20}\text{Ca}$
B. ${}^{226}_{88}\text{Ra}$
C. ${}^{12}_{6}\text{C}$
D. ${}^{206}_{82}\text{Pb}$

8. The half-life of thorium-234 is 24 days. If you have a 42.0 g sample of thorium-24, how much will remain after 72 days?
A. 42.0 g
B. 21.0 g
C. 10.5 g
D. 5.25 g

9. It takes 5.2 min for a 4.0 g sample of francium-210 to decay until only 1.0 g is left. What is the half-life of francium-210?
A. 1.3 min
B. 2.6 min
C. 5.2 min
D. 7.8 min

SHORT ANSWER

10. Write the nuclear equation that represents the process in which a neutron in the nucleus is changed to a proton with the emission of a beta particle.

11. Describe a positron, and write its nuclear symbol.

EXTENDED RESPONSE

12. Explain the difference between nuclear fission and nuclear fusion, and explain the energy changes that accompany each process.

13. What is meant by the term *mass defect*?

Test TIP Keeping a positive attitude during any test will help you focus on the test and likely improve your score.