Chapter 19 Standardized Test Practice

1. An alpha particle	is equivalent to a:				
<u>A.</u> fast-moving proton.		<u>C.</u> low-energy gamm	C. low-energy gamma ray.		
<u>B.</u> helium atom's nucleus.		D. radioactive positre	<u>D.</u> radioactive positron.		
2. Which particle cannot be accelerated by the electric or magnetic field in a particle accelerator?					
<u>F.</u> Electron	<u>G.</u> Neutron	H. Helium nucleus	J. Hydrogen nucleus		
3. Identify the missing particle in the following reaction.					
$^{14}_{7}\text{N} + ^{4}_{2}\text{He} \rightarrow ?$	$+ \frac{17}{8}O$				
$\underline{\mathbf{A}}_{-1} = \begin{bmatrix} 0 \\ -1 \end{bmatrix} \mathbf{e}$	<u>B.</u> ${}^{1}_{0}n$	<u>C.</u> ¹ ₁ H	<u>D</u> , ² ₁ H		
4. The reaction ${}^{13}_{7}N \rightarrow {}^{13}_{6}C + {}^{0}_{1}e$ is an example of:					
<u>F.</u> alpha particle production.		H. electron capture.	H. electron capture.		
G. beta particle production.		J. positron production	J. positron production.		

5. A student summarized the characteristics of an unknown particle in Table 1.

Table 1				
Property	Description			
Stable or radioactive?	Radioactive			
Electrical charge	0			
Mass	0			

Based on the information in Table 1, the unknown particle must be:

<u>B.</u> a gamma ray. **A.** a positron. <u>C.</u> an alpha particle. <u>D.</u> a beta particle.

6. Which of the following equations represents the beta decay of Sr-90?

$\underline{\mathbf{F}}_{38} \overset{90}{\mathrm{Sr}} + \overset{0}{_{-1}\mathrm{e}} \xrightarrow{90} \overset{90}{_{37}\mathrm{Sr}}$	$\underline{\mathbf{H}}_{38}^{90}\mathrm{Sr} \longrightarrow {}^{86}_{36}\mathrm{Sr} + {}^{4}_{2}\mathrm{He}$
$\underline{\mathbf{G.}}_{38}^{90}\mathrm{Sr} \longrightarrow {}_{37}^{90}\mathrm{Sr} + {}_{1}^{0}\mathrm{e}$	$\underline{\mathbf{J}}_{38} \stackrel{90}{_{38}} \mathrm{Sr} \longrightarrow \mathrm{Sr} + {}_{-1}^{0} \mathrm{e}$

7. The half-life of carbon-14 is 5730 years. An animal bone fragment that contained 0.400 g of C-14 when the animal was alive now contains 0.050 g of C-14. How old is the bone fragment?

<u>A.</u> 5730 years **<u>B.</u>** 11,460 years <u>C.</u> 17,190 years **D.** 22,920 years

- 8. What is the function of the control rods in a nuclear reactor?
 - **F.** To emit positrons
 - **<u>G.</u>** To absorb neutrons
 - H. To direct the flow of coolant around the reactor core
 - **J.** To convert radioactive decay products into stable compounds

Passage I

Use the following passage and table to answer questions 9–11.

A student summarized the half-lives of several radioisotopes in Table 2.

Table 2				
Nuclide	Half-life			
Hydrogen-3	12.26 years			
Carbon-14	5730 years			
Sodium-24	14.66 hours			
Phosphorus-32	14.3 days			

9.	Which nuclide would	be considered the "hott	est"?			
	A. Hydrogen-3	<u>B.</u> Carbon-14	<u>C.</u> Sodium-24	<u>D.</u> Phosphorus-32		
10.	10. Given a 250.0-g sample of phosphorus-32, how much will remain after three half-live have passed?					
	<u>F.</u> 125.0 g	<u>G.</u> 62.50 g	<u>H.</u> 31.25 g	<u>J.</u> 15.63 g		
11.	11. A 3.60-g sample of a radioactive material has decayed to 0.45 g over the course of 6.75 hours. What is the half-life of this material?					
	<u>A.</u> 2.25 hours	<u>B.</u> 3.38 hours	<u>C.</u> 6.75 hours	<u>D.</u> 13.5 hours		
12.	Which of the followin	g has the greatest pene	trating power?			
		a				

<u>**F.**</u> Alpha particles <u>**G.**</u> Beta particles <u>**H.**</u> Gamma rays <u>**J.**</u> Sun rays