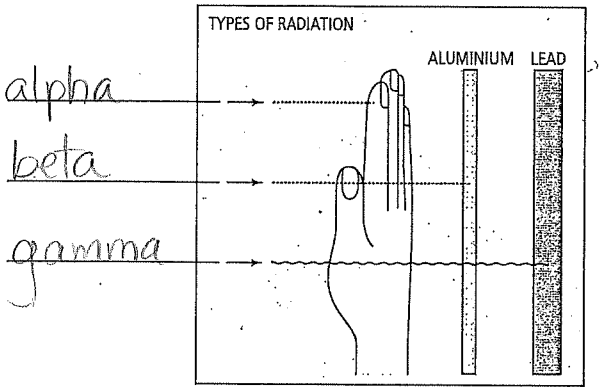
Name Date

Comprehension
Section 7.1

Use with textbook pages 294–297.

Alpha, beta, and gamma radiation

1. Label the following diagram. Identify the penetrating power of the three forms of radioactive decay products: alpha particle, beta particle, and gamma ray.



2. Indicate whether the description is referring to an alpha particle, a beta particle, or a gamma ray. The description can refer to more than one of the forms of radiation.

(a) ${}^{0}_{0}\gamma$ gamma ray

(b) ${}^{0}_{-1}\beta$ or ${}^{0}_{-1}e$ beta particle

(c) ${}^{4}_{2}\alpha$ o+++r ${}^{4}_{2}$He alpha

(d) has a charge of 0 gamma

(e) has a charge of 1- beta

(f) has a charge of 2+ alpha

(g) is a helium nucleus alpha

(h) is a high-speed electron beta

(i) is emitted from the nucleus all three

(j) is emitted only during beta decay beta

(k) is emitted only during alpha decay alpha

(l) can be stopped by aluminum foil beta

(m) is emitted only during gamma decay gamma

(n) is affected by electric and magnetic fields alpha + beta

(o) is not affected by electric and magnetic fields gamma

(p) is a high energy wave with short wavelengths gamma

(q) is the highest energy form of electromagnetic radiation gamma

(r) has low penetrating power (can be stopped by a single piece of paper) alpha

(s) has the greatest penetrating power (can only be stopped by lead or concrete) gamma

Name Kelly Date

Applying Knowledge
Section 7.1

Use with textbook pages 286–299.

Radioactive decay and nuclear equations

Remember the following two rules when working with nuclear equations:

I. The sum of the mass numbers does not change.

II. The sum of the charges in the nucleus does not change.

Identify each nuclear equation as alpha decay, beta decay, or gamma decay, and then complete the nuclear equation.

1. $^{32}_{15}P$ ----> $^{32}_{16}S$ + $^{0}_{-1}\beta$ — beta
2. $^{218}_{84}Po$ ----> $^{214}_{82}Pb$ + $^{4}_{2}He$ — alpha
3. $^{35}_{17}Cl$ ----> $^{18}_{5}Ar$ + $^{0}_{-1}e$ — beta
4. $^{24}_{12}Mg^*$ ----> $^{24}_{12}Mg$ + $^{0}_{0}\gamma$ — gamma
5. $^{234}_{91}Pa$ ----> $^{230}_{89}Ac$ + $^{4}_{2}\alpha$ — alpha
6. $^{141}_{58}Ce$ ----> $^{141}_{59}Pr$ + $^{0}_{-1}e$ — beta
7. $^{216}_{84}Po$ ----> $^{216}_{85}At$ + $^{0}_{-1}\beta$ — beta
8. $^{20}_{9}F$ ----> $^{20}_{10}Ne$ + $^{0}_{-1}\beta$ — beta
9. $^{58}_{26}Fe^*$ ----> $^{58}_{26}Fe$ + $^{0}_{0}\gamma$ — gamma
10. $^{225}_{89}Ac$ ----> $^{221}_{87}Fr$ + $^{4}_{2}\alpha$ — alpha
11. $^{149}_{64}Gd^*$ ----> $^{149}_{64}Gd$ + $^{0}_{0}\gamma$ — gamma
12. $^{226}_{86}Ra$ ----> $^{222}_{26}Rn$ + $^{4}_{2}He$ — alpha
13. $^{217}_{81}Tl$ ----> $^{212}_{82}Pb$ + $^{0}_{-1}\beta$ — beta
14. $^{214}_{83}Bi$ ----> $^{210}_{81}Tl$ + $^{4}_{2}\alpha$ — alpha
15. $^{254}_{98}Cf^*$ ----> $^{254}_{98}Cf$ + $^{0}_{0}\gamma$ — gamma

