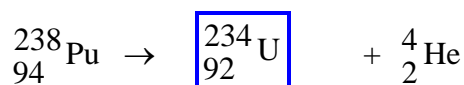
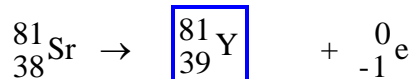


CHM 1020  
Nuclear Chemistry  
Homework Part 3  
Answers

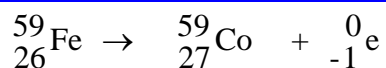
1. What is the mass and charge of gamma radiation? **No mass and no charge.**  
**The gamma ray is part of the electromagnetic spectrum, it is like light or X-rays. Gamma rays are more energetic than light or X-rays.**
2. Which decay product could penetrate almost a foot of lead? **Gamma rays.**
3. How many grams of 200g of Au-198 would remain after two half-lives? **50 g.**  
**After the first half life, there would be 100 grams left. After the second half life, half of the 100 grams would be gone and there would be 50 grams left.**
4. What is an isotope commonly usually used in nuclear reactors? **Uranium-235**
5. Which sub-atomic particle is usually released from the reaction? **The neutron.**
6. Atoms of Uranium-235 and Uranium-238 differ by three **neutrons**.
7. In a radioactive nucleus, the electric force **is overwhelmed by** the strong nuclear force.
8. How many protons are in a Tin-117 atom? **50**  $^{117}_{50}\text{Sn}$
9. How many neutrons are in a Tin-117 atom? **67**
10. How many protons are in an Iodine-131 atom? **53**
11. How many neutrons are in a Iodine-131 atom? **78**
12. Plutonium-238 is an alpha emitter. What is the other product of the decomposition?



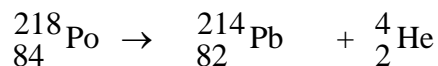
13. Strontium-81 is a beta emitter. What is the other product of the decomposition?



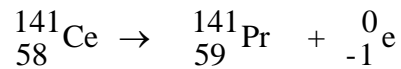
14. Please write an equation to describe the beta decay of Fe-59.



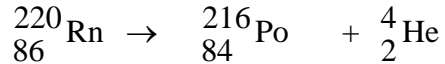
15. Please write an equation to describe the alpha decay of Po-218



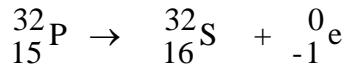
16. Please write an equation to describe the beta decay of Ce-141.



17. Please write an equation to describe the alpha decay of Radon-220.



18. Please write an equation to describe the beta decay of Phosphorous-32.



19. Describe three ways to protect yourself from radiation.

- Increase distance from the source of the radiation.
- Decrease time of exposure.
- Use shielding.

20. Cobalt -60 has a half life of 11 minutes. At 11:00 am the doctor has 20 mg, how much is left if you arrive at 11:22? **5 mg.**

**At 11:11, the doctor has 10 mg. At 11:22 the doctor has 5 mg.**

21. Which type of radiation has the least penetrating power? **Alpha particles**
22. Which type of radiation has the most penetrating power? **Gamma Rays**
23. Which of the following measures not only amount of radiation absorbed but also the biological effect of the radiation. (A) Curie. (B) RAD. (C) REM.

**The REM.**