IB Chem/AP Chem: Ch. 21 worksheet

Name:

A. Complete the nuclear decay reaction by identifying the missing component ($^{Z}_{A}X$ or Z/A values alone).

1.	${}^{256}_{103} \operatorname{Lr} \rightarrow {}^{4}_{2} \alpha + {}^{A}_{Z} X$	 $6. {}^{247}_{Z} Am \rightarrow {}^{0}_{-1}\beta + {}^{A}_{Z} X$	
2.	$^{A}_{Z}X \rightarrow ^{211}_{87}Fr + ^{4}_{2}\alpha$	 7. ${}^{11}_{6}C \rightarrow {}^{0}_{1}\beta^{+} + {}^{A}_{Z}X$	
3.	$^{6}_{2}\text{He} \rightarrow ^{0}_{-1}\beta + ^{A}_{Z}X$	 8. $^{237}_{93}$ Np $\rightarrow ^{4}_{2}\alpha + ^{A}_{Z}X$	
4.	$^{211}_{79}\mathrm{Au} \rightarrow ^{0}_{-1}\beta + ^{A}_{Z}X$	 9. ${}^{40}_{19}K + {}^{0}_{-1}e^{-} \rightarrow {}^{A}_{Z}X$	
5.	$^{72}_{34}$ Se + $^{0}_{-1}$ e \rightarrow $^{A}_{Z}X$	 10. $^{121}_{Z}I \rightarrow ^{0}_{1}\beta^{+} + ^{A}_{Z}X$	

- B. Writing nuclear decay reactions:
 - 11. Decay of Po-218 by alpha emission:
 - 12. Decay of U-237 by beta emission:
 - 13. Positron emission of F-18:
 - 14. Formation of Cs-144 from alpha decay:
 - 15. Formation of C-13 from beta decay:
 - 16. Formation of Co-59 from electron capture:
- C. Half-life processes:
 - 17. Thallium-208 has a half-life of 3.053 min. How long will it take for 120.0 g to decay to 7.50 g?

18. Actinium-226 has a half-life of 29 hours. If 100 mg of actinium-226 disintegrates over a period of 58 hours, how many mg of actinium-226 will remain?

19. A space rock contains 3.20g of ${}^{147}{}_{62}$ Sm and 0.110g of ${}^{143}{}_{60}$ Nd. If ${}^{147}{}_{62}$ Sm decays through alpha emission to ${}^{143}{}_{60}$ Nd with a half-life of 1.06 x 10¹¹ yrs. What is the maximum age of the rock, assuming there was no ${}^{143}{}_{60}$ Nd present at the "birth" of the rock?

D. Series:

20. Write the reactions for the decay of Th-238. There are ten steps: (Alpha→Beta→Beta→Alpha→Alpha→Alpha→Alpha→Beta→Beta→Alpha).

What is the stable isotope formed from this series?