

Wkst 21.1

- Determine the binding energy of
 - ${}^3\text{He}$
 - ${}^{11}\text{C}$
- Determine the energy released in the following nuclear reactions.
 - ${}^3\text{H} + {}^1\text{H} \rightarrow {}^4\text{He}$
 - ${}^{235}\text{U} \rightarrow {}^4\text{He} + {}^{231}\text{Th}$

Complete the following nuclear equations

- ${}^{23}\text{Na} + {}^4_2\text{He} \rightarrow {}^{26}\text{Mg} + ?$
- ${}^{106}\text{Ag} \rightarrow {}^{106}\text{Cd} + ?$
- ${}^{10}\text{B} + {}^4_2\text{He} \rightarrow {}^{13}\text{N} + ?$
- ${}^{213}\text{Bi} \rightarrow {}^4\text{He} + ?$
- ${}^{13}\text{N} + {}^4\text{He} \rightarrow {}^{16}\text{O} + ?$
- ${}^3\text{H} \rightarrow {}^3\text{He} + ?$

Wkst 21.3

- Determine the energy released in the following nuclear reactions.
 - ${}^2\text{H} + {}^2\text{H} \rightarrow {}^4\text{He}$
 - ${}^5\text{Li} + {}^2\text{H} \rightarrow {}^7\text{Be}$
 - ${}^{238}\text{U} + 1n \rightarrow {}^{95}\text{Kr} + 2^1_0n + {}^{142}\text{Ba}$
- Determine the decay constant, and the decay rate of the following.
 - 2.00 g of ${}^{60}\text{Co}$ which has a half life of 5.2 years.
 - 200 atoms of ${}^{99}\text{Tc}$ which has a half life of 6.0 hours.
 - 0.232 moles of ${}^3\text{H}$ which has a half life of 12.26 years.
 - 375 atoms of ${}^{131}\text{I}$ which has a half life of 8.00 days.
- ${}^{210}\text{Po}$ has a half life of 138 days. If one has 1000 atoms of ${}^{210}\text{Po}$, how much would be left after
 - 100 days
 - 250 days
 - 900 days
- How long would it take 3.00 grams of ${}^{14}\text{C}$ to decay to 1.00 grams if its half life is 5730 years.
- Write the nuclear reaction when
 - ${}^{14}\text{C}$ decays by beta decay.
 - ${}^{197}\text{Hg}$ decays by alpha decay.
 - ${}^{30}\text{S}$ decays by β^+ .
 - ${}^{25}\text{Al}$ decays by electron capture.

Wkst 21.4

- Determine the decay rate in decays per second of
 - 30.0 nanocuries of ${}^{238}\text{U}$.
 - 4.57 microcuries of ${}^{69}\text{Cu}$.
 - 1.50×10^5 atoms of ${}^{18}\text{F}$ whose half life is 109.8 minutes.
 - 1.50×10^5 atoms of ${}^{10}\text{C}$ whose half life is 19.4 seconds.
- How many atoms are left after 60.0 days if one starts with
 - 1.50×10^5 atoms of an element whose half life is 13.0 days.
 - 1.50×10^5 atoms of an element whose half life is 37.0 days.
 - 1.50×10^5 atoms of an element whose half life is 13.0 hours.
 - 1.50×10^5 atoms of an element whose half life is 0.250 years.
- Write the nuclear reaction when
 - ${}^{10}\text{C}$ decays by emitting a positron.
 - ${}^{32}\text{S}$ absorbs an alpha particle and releases a proton.
 - ${}^{11}\text{B}$ absorbs a proton and emits an alpha particle
- Calculate the energy of the reaction when,
 - ${}^6\text{Li} + {}^2\text{H} \rightarrow {}^4\text{He} + {}^4\text{He}$
 - ${}^9\text{Be} + {}^1\text{H} \rightarrow {}^2\text{H} + {}^8\text{Be}$

Ws 21.5

- The fusion reactions taking place in the sun can be described as following.
 - ${}^1\text{H} + {}^1\text{H} \rightarrow {}^2\text{H}$
 - ${}^2\text{H} + {}^1\text{H} \rightarrow {}^3\text{He}$
 - ${}^3\text{He} + {}^3\text{He} \rightarrow {}^6\text{Be}$
 - ${}^6\text{Be} \rightarrow {}^4\text{He} + {}^1\text{H} + {}^1\text{H}$Determine the energy released in each reaction.
- Determine the decay rate of
 - 15 nanocuries
 - 0.025 g of ${}^{46}\text{Sc}$ whose half life is 83.79 days
 - 1.00 mole of ${}^{238}\text{U}$ whose half life is 4.47×10^9 years.
- ${}^{134}\text{Cs}$ has a half life of 2.065 years. If one has 8.50×10^{10} atoms of ${}^{134}\text{Cs}$, how much would be left after
 - 1.00 year
 - 5.00 years
 - 12 years
- ${}^{46}\text{Sc}$ has a half life of 83.8 days. If one has a sample of 0.00035 g of ${}^{46}\text{Sc}$, determine the decay rate in decays/sec. Determine the quantity left after 1.00 year.