

Joseph Specht

NPRE 247

Homework 8

1) Yes, Jupyter

2) Activity:  $56.842 \times 10^{12}$  bq

Activity:  $1.536 \times 10^3$  Ci

3) Ratio after  $10^5$  years;  $5.943 \times 10^{-6}$

Ratio after  $10^7$  years;  $5.959 \times 10^{-4}$

Ratio after  $10^9$  years; 0.0795

4a)  ${}^6\text{Li}(n,t){}^4\text{He}$

${}^{16}\text{O}(t,n){}^{18}\text{F}$

b) Q  ${}^6\text{Li}(n,t){}^4\text{He}$ : 4.783 MeV

Q  ${}^{16}\text{O}(t,n){}^{18}\text{F}$ : 1.268 MeV

c) Both  $Q > 0$ , so there is no threshold.

d) Yes

5a) Scatters  ${}^{16}\text{O}$ ; 5.77879560768414

b) Scatters  ${}^{56}\text{Fe}$ ; 19.6398709003390

6) Hydroelectric is from currents, which is from the moon, which is made of material in stars, which is from fusion in stars.

Wind is from the weather, which is from the uneven exposure to solar radiation, which is from fusion in stars.

Coal is made of hydrocarbons, which are made of carbon and hydrogen, which is made from fusion in stars.

Nuclear materials are from supernovae, which is when a star explodes and dies, which happens when fusion makes the core iron.

7a) Linear Attenuation Coefficient:  $0.8224 \text{ cm}^{-1}$

b) Half Thickness: 0.843 cm

c) Mean Free Path: 1.216 cm

8a) 17.158 b

b) 4.226 b