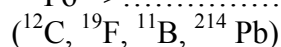


Atomic physics problems 2.

1. During the decay of ^{226}Ra isotope an α -particle of 5.5 MeV energy is produced. How large is the velocity of this particle? ($1.62 \cdot 10^7$ m/s)

2. In the interaction of a positron and an electron (annihilation) two photons are produced, each with 511 keV energy. How large mass belongs to this energy? ($9.1 \cdot 10^{-31}$ kg, that is the mass of the electron)

3. Complete the following decay schemes.



4. How many radioactive atoms are in the ^{137}Cs isotope of 60 MBq activity? How large is the mass of it? ($N = 8.2 \cdot 10^{16}$; 18.7 μg)

5. According to certain estimations the amount of ^{131}I , that got into the atmosphere during the nuclear accident in Chernobyl (1986. 04. 26.) is $1.7 \cdot 10^{18}$ Bq. How large is its activity now? (practically zero)

6. In the same time, according to the estimation 85 PBq ^{137}Cs also got into the atmosphere. How large is its activity now? (48.3 PBq)

7. How large is the activity of ^{131}I isotope of 1.2 pg mass? (5.5 kBq)

8. How long do we have to wait until the activity decreases from 0,8 GBq to 0.1 kBq in case of

a) $^{99\text{m}}\text{Tc}$ b) ^{137}Cs ?

(a: 138 hours; b: 690 years)