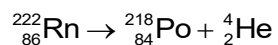


- 7 (a) State what is meant by the *activity* of a radioactive sample.

.....

..... [1]

- (b) Radon ($^{222}_{86}\text{Rn}$) can decay into polonium ($^{218}_{84}\text{Po}$) by emitting an alpha radiation as shown.



The half-life of radon is 3.8 days.

In a 1.0 g sample of radon, determine

- (i) the number of radioactive nuclei,

number of radioactive nuclei = [1]

(ii) its initial activity,

activity = decay s^{-1} [2]

(iii) the time taken for its activity to decline to 1.0% of its initial level, and

time = s [2]

(iv) the energy that will be released when all the radon has decayed.

Fig. 7.1 shows the masses of the particles.

particle	mass / u
helium	4.002602
polonium	218.008966
radon	222.017576

Fig. 7.1

energy = MeV [3]

- (c) A Geiger–Müller tube attached to a counter is placed near the sample at the start of the decay. The count rate measured is far lower than that calculated in (b)(ii).

Suggest a possible reason for this.

.....

.....

..... [1]

[Total: 10]