9 During the de-commissioning of a nuclear reactor, a mass of 2.5×10^6 kg of steel is found to be contaminated with radioactive nickel-63 ($^{63}_{28}$Ni).
The total activity of the steel due to the nickel-63 contamination is 1.7×10^{14} Bq.

(a) Calculate the activity per unit mass of the steel.

activity per unit mass = ... Bq kg^{-1} [1]

(b) Special storage precautions need to be taken when the activity per unit mass due to contamination exceeds $400\,\text{Bq kg}^{-1}$.
Nickel-63 is a β-emitter with a half-life of 92 years.
The maximum energy of an emitted β-particle is 0.067 MeV.

(i) Use your answer in **(a)** to calculate the energy, in J, released per second in a mass of 1.0 kg of steel due to the radioactive decay of the nickel.

energy = ... J [1]

(ii) Use your answer in **(i)** to suggest, with a reason, whether the steel will be at a high temperature.

.....

.....

..... [1]

(iii) Use your answer in **(a)** to determine the time interval before special storage precautions for the steel are not required.

time = ... years [3]